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PhD Thesis

THE HETEROGENEITY OF DISRUPTIVE BEHAVIOR IN THE PRESCHOOL YEARS: LEVELS OF ORGANIZATION AND UNDERLYING MECHANISMS

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CONFLICT OF INTEREST

Beatriz Domínguez Álvarez declares no conflicts of interest.

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Pra miña abuela Camila,
Camila Rodríguez Montes,
muller moi dura e traballadora, sempre alegre e
infinitamente boa

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Rather than words comes the thought of high windows:
The sun-comprehending glass,
And beyond it, the deep blue air, that shows
Nothing, and is nowhere, and is endless.

High Windows- Philip Larkin

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Son unha persoa con sorte e por iso me inquieta, máis ca nada, esta páxina en branco.

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ABSTRACT

Disruptive behaviors (DB) are common in the preschool years. However, strong evidence suggests that, for some children, such behaviors might be signaling the onset of a potentially pervasive and harmful trajectory. In the study of these early difficulties, a major challenge is their heterogeneity in clinical presentation (i.e., behavioral phenotypes), origins (i.e., etiological mechanisms) and course (i.e., developmental trajectory). As a result, advances in preventive, and intervention science are frustrated. This dissertation aims to contribute to address some of these issues by further exploring the phenotypic and etiological heterogeneity of DB in the preschool years. Research questions were formulated based on guiding theory and prior evidence. On a conceptual level, we relied on bottom-up empirical approaches to psychopathology and temperament theory and research. On a methodological level, we used latent variable models (e.g., structural equation modelling [SEM]) to test our hypotheses.

The first study examines the phenotypic heterogeneity of DB. We sought to elucidate the number and nature of latent dimensions of disruptive behavior in early childhood using longitudinal data from a large community sample of Galician preschoolers (ELISA Project [initial sample, T1], N =2467, 48.1% girls, mean age= 4.25 years, SD=0.91). Our analyses showed that a hierarchical dimensional model in which both first and second order factors were specified, could adequately account for the phenotypic distinctiveness and affinities among oppositional defiant disorder (ODD), attention-deficit/hyperactivity disorder (ADHD), and callous-unemotional (CU) traits in the preschool years. Further analyses revealed that this structural configuration was replicable using different operationalizations of CU traits. Importantly, the prospective predictive utility of the overarching factor (i.e., the externalizing dimension), over and above specific externalizing problems, was also demonstrated. Together, these results suggested that both narrower and broader phenotypic characterizations may be useful to better understand the causes and correlates of DB.

The second study builds upon the results of the first work. We aimed to provide further evidence on the hierarchical phenotypic structure of DB identified in the first study by examining its temperamental correlates in an at-risk sub-sample of preschoolers of the study sample (ELISA Project [subsample, T1], N = 543, 55.6% girls, mean age = 4.26 years, SD = 0.92). Results indicated a partial correspondence between broader and narrower temperament traits and externalizing problems, at different levels of breadth. That is, we identified relevant broader temperament traits in which general-purpose models of temperament converge (i.e., approach-oriented behaviors), that appear to map onto the broader externalizing factor at the higher level of the phenotypic organization. At the same time, we showed how turning to more fine-grained temperament dimensions (i.e., Negative Emotionality, Prosociality and Daring) can provide a more nuanced dispositional characterization of DB at lower levels of the phenotypic organization. Finally, we established the incremental utility of the developmental propensity model (Lahey & Waldman, 2003), a specific-purpose temperament model, to account for the temperament antecedents of DB at different levels of specificity. Overall, these findings converge in supporting the hierarchical structure of both externalizing psychopathology and dispositional risk.

The third study is focused on the etiological heterogeneity of DB and, specifically, how to assess the multiple facets of impulsivity, a well-established risk factor for the development and maintenance of externalizing behavior problems, in the preschool years. We adapted the UPPS-P Impulsive Behavior Scale (Cyders, Smith, Spillane et al., 2007; Whiteside & Lynam, 2001) to obtain an abbreviated (i.e., 20 items) and parent reported version, in Spanish and Galician, which could be used with children aged 3 to 6. Next, we tested its psychometric properties in a large sample of preschoolers (ELISA Project [initial sample + new preschoolers incorporated later into the study sample, T3], N = 1688, 47.2% girls, mean age = 5.40 years, SD = 0.65). Our results expanded prior evidence on the first and second order factor structure of the scale and supported its invariance across genders. Furthermore, the convergent and discriminant validity of the UPPS-P first and second-order subscales was established.

The final study is based on the results of the third empirical work. We aimed to identify the precursors and externalizing outcomes of affect-driven impulsivity (i.e., Urgency) in a large sample of preschoolers (ELISA Project [initial sample, T2], N = 2006, 48% girls, mean age = 5.35 years, SD = .92). Our results indicated that both child and parental factors contribute to account for levels of impulsive behaviors triggered by negative and positive emotions. Child's temperamental reactivity, as well as parent's behaviors (e.g., harsh parenting) and personality traits (e.g., Neuroticism) predicted higher levels of child's Urgency. Finally, cross-sectional and longitudinal analyses provided evidence on the associations of affect-driven impulsivity and various forms of DB (e.g., ODD and CU traits). These results are compatible with conceptualizing emotion-based dispositions to rash action as a transdiagnostic factor for externalizing behavior in early childhood.

This thesis concludes by summarizing the main findings, addressing key limitations, and discussing avenues for future research. Taken together, the results of this research outline potential targets for research, assessment, and intervention.

Keywords

Externalizing problems, preschool years, heterogeneity, classification, temperament

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RESUMEN

Las conductas disruptivas son frecuentes durante la etapa preescolar. Sin embargo, para algunos niños/as, tales conductas pueden estar señalando el comienzo de una trayectoria potencialmente persistente y dañina. Un desafío importante en el estudio de estas dificultades tempranas es la heterogeneidad en su presentación (i.e., fenotipos conductuales), orígenes (i.e., mecanismos etiológicos) y curso evolutivo (i.e., trayectorias de desarrollo). Esta característica contribuye a frustrar, al menos parcialmente, los avances en la prevención e intervención sobre estos problemas. En esta tesis, nos propusimos profundizar en el análisis de la *heterogeneidad fenotípica* y *etiológica* de las conductas disruptivas en los años preescolares. Las preguntas de investigación se formularon teniendo en cuenta los modelos teóricos disponibles y la evidencia empírica previa. A nivel conceptual, nos apoyamos en aproximaciones a la psicopatología de corte empírico, así como la teoría e investigación sobre temperamento. A nivel metodológico, utilizamos modelos de variables latentes (e.g., análisis con ecuaciones estructurales) para contrastar nuestras hipótesis.

En el primer estudio se examina la heterogeneidad fenotípica de las conductas disruptivas. Nuestro objetivo era elucidar el número y naturaleza de las dimensiones latentes que conforman la conducta externalizante en la infancia temprana, usando datos longitudinales de una amplia muestra comunitaria de preescolares (Proyecto ELISA [muestra inicial, T1], N= 2467, 48.1% niñas, media de edad=4.25 años, DT=.91). Los análisis con modelos factoriales mostraron que una solución dimensional jerárquica, en la que se especificaron tanto factores de primer y segundo orden, podría dar cuenta de las diferencias y afinidades fenotípicas entre conductas oposicionistas desafiantes, conductas hiperactivas- impulsivas y rasgos de dureza e insensibilidad en los años preescolares. Análisis posteriores revelaron la replicabilidad de esta configuración estructural, utilizando diferentes operativizaciones de los rasgos de dureza-insensibilidad. Asimismo, se demostró la utilidad del factor general (i.e., la dimensión externalizante), más allá de factores específicos, en predicciones longitudinales. Tomados en conjunto, estos resultados sugieren que tanto caracterizaciones fenotípicas más restringidas, como otras máis abarcadoras, podrían resultar útiles para una mejor comprensión de las causas y correlatos de las conductas disruptivas de inicio temprano.

El segundo estudio, se basa en los resultados del primer trabajo. Intentamos proporcionar más evidencia sobre la validez de la estructura fenotípica jerárquica identificada previamente, a través del análisis de sus correlatos temperamentales en una submuestra de preescolares seleccionados por su nivel de riesgo de presentar dificultades conductuales, emocionales y sociales (Proyecto ELISA [submuestra, T1], N= 543, 55.6% niñas, media de edad=4.26 años, DT=.92). Los resultados indicaron una correspondencia parcial entre rasgos temperamentales, generales y específicos, y problemas externalizantes, conceptualizados en diferentes niveles de especificidad. En concreto, identificamos rasgos disposicionales ampliamente representados en modelos generales de temperamento (i.e., tendencias de aproximación), que parecen corresponderse con el factor general externalizante en el nivel más alto de organización fenotípica. Al mismo tiempo, mostramos cómo una atención prioritaria a dimensiones temperamentales más específicas (i.e., Emocionalidad Negativa, Prosocialidad y Atrevimiento), permite una caracterización disposicional más refinada de las conductas

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disruptivas, en los niveles más bajos de organización fenotípica. Por último, demostramos la utilidad del modelo de Lahey y Waldman (2003; 2005) para dar mejor cuenta de los antecedentes de las conductas externalizantes en diferentes niveles de organización. En general, estos resultados apoyan la estructura jerárquica tanto de la psicopatología externalizante como el riesgo disposicional asociado.

El tercer estudio está centrado en la heterogeneidad etiológica de las conductas disruptivas y, en particular, cómo evaluar las múltiples facetas de la impulsividad, un factor de riesgo bien establecido para el desarrollo y mantenimiento de problemas de conducta externalizante, en la etapa preescolar. Realizamos una adaptación de la escala UPPS-P (Cyders, Smith, Spillane et al., 2007; Whiteside & Lynam, 2001), buscando obtener una forma abreviada (i.e., 20 items), para ser cubierta por madres/padres, en español y gallego, que pudiera ser usada con niños/as con edades comprendidas entre los 3 y los 6 años. A continuación, analizamos sus propiedades psicométricas en una amplia muestra de preescolares (Proyecto ELISA [muestra inicial, con preescolares incorporados a posteriori a la muestra del estudio], N= 1688, media de edad= 5.40 años, DT= .65). Nuestros resultados proporcionan evidencia sobre la estructura primaria y secundaria de la escala y apoyan su invarianza por géneros en la edad preescolar. Además, la validez convergente y discriminante de las escalas de primer y segundo orden también fue demostrada.

El último estudio, se basa en los resultados de tercer trabajo empírico. Nuestro objetivo fue identificar los precursores y consecuencias externalizantes de las conductas impulsivas desencadenadas por emociones (i.e., Urgencia) en una muestra de niños/as preescolares (Proyecto ELISA [muestra inicial, T2], N= 2006, 48%, media de edad= 5.35 años, DT=.92). Nuestros resultados indican que tanto factores individuales del niño/a como parentales contribuyen a explicar los niveles de impulsividad relacionados con estados emocionales negativos y positivos. La reactividad temperamental del niño/a, así como ciertas conductas y características de personalidad maternas/paternas (e.g., prácticas parentales punitivas y nivel de Neuroticismo), se asociaron a mayores niveles de Urgencia del niño/a. Finalmente, análisis transversales y longitudinales revelaron las relaciones entre conductas impulsivas asociadas a emociones y varias formas de conducta disruptiva infantil. Estos resultados nos permitirían especular sobre el estatus transdiagnóstico de este mecanismo disposicional en relación a la conducta externalizante en la infancia.

La tesis concluye con un resumen de los principales resultados, y una discusión sobre sus limitaciones básicas y vías para la investigación futura.

Palabras Clave:

Problemas externalizantes, años preescolares, heterogeneidad, clasificación, temperamento

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RESUMO

A condutas desobedientes, as perrenchas severas e recorrentes, ou as pelexas frecuentes cos iguais son só algúns exemplos de condutas perturbadoras infantís. Estes indicadores observábeis empréganse habitualmente na construción de definicións coas que describir, operativamente, certos patróns de conduta externalizante nos nenos/as. Tal estratexia é, dende un punto de vista conceptual e tamén máis pragmático, suficientemente válida de cara a desentrañar a complexa fenomenoloxía da conduta perturbadora infantil a nivel descritivo. A maiores, para completar ou apuntalar calquera proposta de definición, pode aludirse ao grado de deterioro funcional que poden ocasionar estes problemas (e.g., malestar e disfunción significativa), aos supostos mecanismos subxacentes (e.g., actividade neurocognitiva) ou aos rasgos de personalidade asociados (e.g., desinhibición e antagonismo). En xeral, a maioría das conceptualizacións contemporáneas tenden a converxer, polo menos en certo grado, arredor dalgúns destes elementos. Neste traballo de tese, o termo "conduta perturbadora infantil" emprégase para facer referencia a certos síndromes externalizantes, incluíndo o trastorno por déficit de atención e hiperactividade ou o trastorno oposicionista desafiante, así como outros construtos estreitamente relacionados (e.g., as condutas agresivas ou os rasgos de dureza-insensibilidade).

Malia que algunhas destas manifestacións condutuais son particularmente frecuentes durante os anos preescolares (e.g., as condutas agresivas ou as perrenchas) no caso dalgúns nenos/as, poden estar sinalando o comezo dunha traxectoria potencialmente persistente e nociva. Un desafío importante no estudo destas dificultades temperás é a heteroxeneidade na súa presentación (i.e., fenotipos condutuais), orixe (i.e., mecanismos etiolóxicos) e curso evolutivo (i.e., traxectorias de desenvolvemento). Esta heteroxeneidade parece non só unha das características máis salientes da conduta perturbadora infantil, senón tamén, e ubicua. Noutras palabras, semella que unha vasta miscelánea de problemas interrelacionados, apenas delimitados, con cursos de evolución potencialmente distintos pero moitas veces converxentes, poden ser o resultado dunha miscelánea incluso máis vasta de factores causais que interaccionan entre si mediante procesos tan complexos que resultan, por momentos, certamente difíciles de aprehender. Esta característica, pode estar contribuíndo a frustrar, polo menos parcialmente, os avances na prevención e intervención sobre estes problemas. Este escenario, xa que logo, podería considerarse, en si mesmo, a xustificación máis elemental para calquera tipo de interese nesta cuestión. Porén, de cara articular de forma máis contundente e sólida por que a heteroxeneidade da conduta perturbadora infantil importa, é necesario recordar, igualmente, o desafío que representa para outras tarefas críticas máis aló da prevención e a intervención, como son a clasificación mesma destes problemas e o estudo dos mecanismos de risco asociados.

Nesta tese, propuxémonos afondar na análise da *heteroxeneidade etiolóxica* e *fenotípica* dos problemas de conduta perturbadora de inicio temperán. As preguntas de investigación formuláronse tendo en conta os modelos teóricos dispoñibles e a evidencia empírica previa. A nivel conceptual, apoiámonos en aproximacións estruturais á psicopatoloxía de corte empírico, así como a teoría e investigación sobre temperamento. A nivel metodolóxico, utilizamos modelos de variables latentes (e.g., análises con ecuacións estruturais) para contrastar as nosas hipóteses. Os obxectivos xerais da nosa investigación foron os seguintes. Buscamos, en

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primeiro lugar, contribuír ao avance na clasificación empírica da conduta perturbadora infantil nos anos preescolares. Afondar, tamén, no estudo das relacións entre o temperamento e a psicopatoloxía externalizante na infancia temperá, considerando diferentes niveis de especificidade de problemas e rasgos. Explorar, por último, as asociacións entre as condutas impulsivas desencadeadas por estados emocionais intensos e/ou extremos e as condutas perturbadoras infantís, apenas estudadas nas etapas iniciais no desenvolvemento. Para isto, realizamos catro estudos empíricos, relacionados entre si, que conforman os capítulos centrais deste traballo. Os dous primeiros, ocúpanse da heteroxeneidade fenotípica da conduta perturbadora infantil. Nestas investigacións, intentamos probar un modelo estrutural da conduta externalizante na etapa preescolar, e proporcionar evidencia sobre a súa validez, tratando de esclarecer os seus correlatos temperamentais. Os dous últimos estudos, en cambio, céntranse na heteroxeneidade etiolóxica da conduta externalizante na etapa preescolar. Nestes traballos, exploramos o papel da impulsividade, multidimensionalmente conceptualizada, como un factor de risco da conduta externalizante temperá, centrándonos, de forma prioritaria, nas condutas impulsivas desencadeadas por estados emocionais intensos.

Empregando datos lonxitudinais dunha ampla mostra comunitaria de nenos/as galegos/as (Proxecto ELISA [mostra inicial, T1], N= 2467, 48.1% nenas, media de idade= 4.25 anos, DT=.91) comezamos por preguntarnos sobre o número e a natureza das dimensións latentes que conforman a conduta perturbaadora nos anos preescolares, para responder a certos interrogantes que permanecen sen resolver literatura. En primeiro lugar, tratamos de determinar se é posible modelar estatisticamente un compoñente supraordinado de conduta externalizante tamén na etapa preescolar, denotado, en función da investigación previa como "factor externalizante". Segundo, clarificar se os rasgos de dureza-insensibilidade poderían dar conta dunha porcentaxe significativa de varianza de tal factor. Terceiro, examinar a validez preditiva deste hipotético factor externalizante se a comparamos coa de conductas externalizantes específicas, para explicar niveis de dificultades prospectivamente reportados por múltiples informantes (i.e., nais/pais e mestras/es). Por último, determinar se un nivel de ánalise frente a outro (máis abarcador ou máis circunscrito), podería predicir mellor os niveis da mesma dificulte ou problema (e.g., trastorno oposicionista desafiante) ao longo do tempo. As análises con modelos factoriais, mostraron que unha solución dimensional xerárquica, na que se especifican tanto factores de primeira como segunda orde, podería dar boa conta das diferenzas e afinidades fenotípicas entre condutas oposicionistas desafiantes, condutas hiperativas-impulsivas e rasgos de dureza- insensibilidade. En concreto, os nosos resultados suxiren que, polo menos en termos estatísticos, unha estrutura xerárquica podería dar boa conta do patrón de correlacións entre estas condutas observado na nosa mostra de estudo, contribuíndo a explicar *como* e, potencialmente, *por que*, múltiples problemas do mesmo "tipo" ou "forma" tenden a darse conxuntamente. Dado que os rasgos de dureza-insensibilidade, non foron, ata o momento, adecuadamente representados nos modelos estruturais de psicopatoloxía contemporáneos (e.g., o HiTOP; Kotov et al., 2017), as implicacións deste resultado non son menores. É esta a primeira vez que se inclúen, explicitamente, como parte dunha configuración xerárquica, en concreto, un modelo factorial de segunda orde, que busca representar a estrutura latente das dificultades de conduta nos anos preescolares. Alén disto, puidemos demostrar, tamén, a utilidade do factor xeral (i.e., dimensión externalizante), por riba dos factores específicos na predición de resultados lonxitudinais relevantes. En concreto, encontráronse asociacións

prospectivas entre este factor e 1) problemas de conduta, operativizados nun e 2) dificultades máis específicas ao longo dun período de dous anos (i.e., T1-T3). Tomados en conxunto, estes resultados suxiren que tanto caracterizacións fenotípicas máis restrinxidas, como outras máis abarcadoras, poderían resultar útiles para unha mellor compresión das causas e correlatos dos problemas de conduta perturbadora de inicio temperán. Considerado xunto cos resultados de investigacións previas o noso traballo contribúe a proporcionar: 1) evidencia sobre a estrutura xerárquica da conduta perturbadora infantil na infancia temperá (validez estrutural); 2) evidencia sobre os compoñentes e a configuración de tal representación xerárquica (validez de contido) e 3) evidencia sobre a validez do factor externalizante, que podería representar unha vulnerabilidade xeral subxacente, cun papel importante na predición de resultados lonxitudinais (validez preditiva).

O segundo estudo basease nos resultados do primeiro traballo. O noso obxectivo foi intentar proporcionar evidencia máis robusta sobre a estrutura fenotípica xerárquica identificada previamente, a través dunha análise dos seus correlatos temperamentais nunha submostra de preescolares seleccionados polo seu risco de presentar dificultades condutuais, emocionais e sociais (Proxecto ELISA [submostra, T1], N= 543, 55.6% nenas, media de idade= 4.26 anos, DT=.92). Tradicionalmente, nas investigacións centradas en esclarecer a estrutura e as relacións entre múltiples condutas psicopatolóxicas, adoita prestarse unha atención predominante aos aspectos estruturais (e.g., os compoñentes), máis que aos correlatos da mesma (e.g., rasgos de personalidade). Na investigación con poboacións infanto-xuvenís, a validez destas conceptualizacións de tipo xerárquico podería analizarse examinando os seus correlatos temperamentais. Sen embargo, unha cuestión a ter en conta nesta tarefa é que, na actualidade, múltiples modelos de temperamento, entre os que podería existir un solapamento parcial, se encontran dispoñibles. Neste traballo, exemplificamos como pode realizarse investigación deste tipo con poboacións infantís, centrándonos, en concreto, na estrutura dos problemas externalizantes nos anos preescolares, e aproveitando, ao mesmo tempo, a diversidade de modelos e medidas temperamentais existentes. Propuxémonos, específicamente, examinar o posible solapamento conceptual e empírico entre múltiples modelos de temperamento (xerais e específicos); explorar as asociacións entre rasgos temperamentais xerais e específicos e operativizacións da conduta externalizante a distintos niveis de especificidade; estudar as posibles contribucións únicas de modelos de temperamento propostos, especificamente, para os problemas de conduta. Os resultados das análises realizadas indicaron unha correspondencia parcial entre rasgos temperamentais, xerais e específicos, e problemas externalizantes, a diferentes niveles de organización. En concreto, identificamos rasgos disposicionais amplamente representados en modelos xerais de temperamento (i.e., tendencias de aproximación), que parecen corresponderse co factor xeral externalizante no nivel máis alto de organización fenotípica. Ao mesmo tempo, mostramos como unha atención prioritaria a dimensións temperamentais máis específicas (i.e., Emocionalidade Negativa, Prosocialidade e Atrevemento), permite unha caracterización disposicional máis refinada das condutas perturbadoras, nos niveis máis baixos de organización fenotípica. Encontramos, así mesmo, influencias simultáneas de mecanismos de amplo espectro e outros máis específicos operando sobre estes niveis de organización fenotípica máis baixos. Os nosos resultados indican, polo tanto, na liña do que foi xa proposto por algúns autores, que ambos tipos de influencias etiolóxicas deben considerarse, ao mesmo tempo, se se desexa capturar adecuadamente a

heteroxeneidade etiolóxica e fenotípica dos problemas de conduta de inicio temperán (Lahey et al., 2017; Lahey & Waldman, 2012). Por último, demostramos neste traballo a utilidade do modelo de Lahey e Waldman (2003; 2005) para operativizar os antecedentes das condutas externalizantes en diferentes niveis de amplitude. Se o comparamos con outros modelos, este marco conceptual podería proporcionar unha contribución única de cara a comprensión e clasificación da fenomenoloxía externalizante en fases temperás do desenvolvemento. En xeral, os nosos resultados apoian a estructura xerárquica da psicopatoloxía externalizante e o risco disposicional asociado.

O terceiro estudo está centrado na heteroxeneidade etiolóxica dos problemas de conduta perturbadora e, en particular, en como avaliar as múltiples facetas da impulsividade, un factor de risco ben establecido no desenvolvemento e mantemento dos problemas de conduta externalizante. Dende un punto de vista teórico, o modelo UPPS/UPPS-P de condutas impulsivas é un marco conceptual sólido (Cyders & Smith, 2007; Whiteside & Lynam, 2001). Dende un punto de vista psicométrico, trátase dun modelo robusto, que ten sido extensamente validado durante as últimas décadas. Ao longo dos últimos anos, desenvolvéronse, precisamente, diversas adaptacións da escala UPPS-P para a avaliación de condutas impulsivas, incluíndo formas auto e heteroinformadas (e.g., para pais) dirixidas a poboacións infanto-xuvenís. Sen embargo, unha versión fiable e válida, abreviada en contido que puidera empregarse con nenos/as pequenos non se encontra actualmente dispoñible no contexto español. Tan só, moi recentemente, unha forma curta para nenos/as maiores de 10 anos foi proposta (Caneto et al.,2020). Neste estudo, propuxémonos, pois, abordar esta limitación na literatura existente, realizando unha adaptación da escala UPPS-P (Cyders, Smith, 2007; Whiteside & Lynam, 2001), que permitise obter unha forma abreviada en español e galego, para ser utilizada con nenos/as con idades comprendidas entre os 3 e os 6 anos, utilizando ás nais/pais como informantes. Dúas investigadoras participaron neste proceso. Como base para realizar a adaptación da escala traballouse con dúas versións da UPPS-P. Por unha parte, a forma curta existente para adultos en español (Candido et al., 2012), que se usou como referencia para establecer a estrutura xeral do cuestionario (i.e., número de ítems, a súa orde e o contido xeral). Por outra parte, a forma estándar en inglés validada para o seu uso con nenos/as (Zapolski et al., 2010), que se empregou como guía para axustar, cando resultou inevitable, o contido de certos ítems. Dado que non existía, no momento en que se levou a cabo a adaptación da escala (i.e., o ano 2019) unha forma dispoñible en español para nenos/as, a versión en inglés converteuse na nosa referencia. Unha vez realizada a adaptación, exploráronse as propiedades psicométricas da escala nunha ampla mostra de preescolares (Proxecto ELISA, [mostra inicial + preescolares incorporados a posteriori á mostra do estudo], N= 1688, media de idade= 5.40 anos, DT= .65). Máis especificamente, buscamos: 1) analizar a estrutura factorial da escala e a súa invarianza por xénero, 2) examinar a validez converxente e discriminante das subescalas de primeiro e segundo orde da UPPS-P. Os nosos resultados proporcionan evidencia sobre a estrutura primaria e secundaria do cuestionario e apoian a súa invarianza por xénero na idade preescolar. Ademais, a validez converxente e discriminante das subescalas de primeira e segunda orde tamén foi demostrada.

O último estudo, basease nos resultados do terceiro traballo empírico. O noso obxectivo foi identificar os precursores e as consecuencias externalizantes das condutas impulsivas desencadeadas por emocións (i.e., Urgency, en inglés) nunha mostra de nenos/as preescolares

(Proxecto ELISA [mostra inicial, T2], N= 2006, 48%, media de idade= 5.35 anos, DT=.92). Unha evidencia cada vez maior apunta á relevancia clínica e evolutiva das formas emocionais de impulsividade, posiblemente involucradas, como suxire a literatura, en procesos que poden dar lugar a diversas formas de psicopatoloxía de tipo internalizante e externalizante. O seu estudo é, polo tanto, de máxima importancia. O presente traballo dirixiuse a examinar os antecedentes e as consecuencias das condutas impulsivas desencadeadas por estados emocionais extremos ou moi intensos, de valencia tanto negativa (e.g., ira) como positiva (e.g., alegría), tradicionalmente pouco estudados con poboacións infanto-xuvenís e, particularmente, con mostras preescolares. Así pois, pretendemos abordar, fundamentalmente, dous tipos de cuestións. Por unha parte, os determinantes e potenciais mecanismos subxacentes ás formas emocionais de impulsividade. Por outra parte, o papel deste tipo concreto de condutas impulsivas no desenvolvemento de múltiples condutas externalizantes durante os anos preescolares. Os obxectivos principais deste estudo foron: 1) Identificar as contribucións independentes e interactivas do temperamento do neno/a (e.g., aspectos reactivos e regulatorios), as prácticas parentais (e.g., estilos punitivos) e a personalidade materna/paterna (e.g., Neuroticismo) nos niveis informados por nais/pais de impulsividade emocional do neno/a, 2) Identificar as contribucións tanto independentes como interactivas das formas emocionais e non emocionais de impulsividade sobre os niveis concorrentes e prospectivos de problemas de conduta dos nenos/as, informados tamén por nais e pais. Os nosos resultados indican que tanto factores individuais, do neno/a, como parentais, contribúen a explicar a tendencia a actuar impulsivamente relacionada coa experimentación de estados emocionais negativos e positivos intensos. A maiores, converxen con múltiples estudos previos en suxerir que unha aproximación multifactorial e transaccional resulta necesaria para examinar estes procesos. Isto é, múltiples factores (i.e., características do neno/a, risco contextual), así como as asociacións destes factores a través de procesos de moderación deben considerarse para analizar tales relacións. En canto aos determinantes das formas emocionais de impulsividade resulta destacable a aparente preponderancia dos aspectos tamperamentais máis reactivos (i.e., Afecto Negativo e Surxencia/Extraversión) frente aos regulatorios (i.e., Effortful Control), definidos dacordo co modelo psicobiolóxico de Rothbart (Rothbart, 1989). Igualmente, os efectos significativos dun estilo parental punitivo, operativizado como o uso frecuente de castigo físico e verbal e os niveis altos no rasgo de Neuroticismo das nais/pais, cuxos efectos non teñen sido estudados en investigacións previas. Finalmente, análises transversais e lonxitudinais revelaron as relacións entre condutas impulsivas asociadas a emocións e varias formas de conduta perturbadora infantil. En particular, maiores niveis concorrentes de condutas oposicionistas-desafiantes, impulsivas-hiperactivas e de dureza-insensibilidade e niveis máis altos de condutas oposicionistas-desafiantes de dureza-insensibilidade, lonxitudinalmente segundo os datos aportados por nais e pais. Estes resultados permitiríannos especular sobre o estatus transdiagnóstico deste mecanismo disposicional en relación aos problemas de conduta perturbadora na infancia. A maiores, poden ter implicacións para a comprensión da fenomenoloxía das formas emocionais de impulsividade nas fases temperás do desenvolvemento, resaltando a importancia deste rasgo de cara a futuros estudos en investigación en psicopatoloxía do desenvolvemento.

As ideas e resultados presentados como resultado do traballo de tese, pretendían avanzar no estudo da clasificación e a etioloxía de certas formas temperás de conduta perturbadora. O noso

punto de partida foi que tales condutas son heteroxéneas en relación á súa presentación, orixes e consecuencias no tempo, e que os marcos teóricos e métodos tradicionais teñen xeral fracasado á hora de capturar e abordar apropiadamente esta complexidade. As hipóteses para este traballo articuláronse, por estes motivos, sobre modelos organizativos alternativos que actualmente son referencia na investigación estrutural e etiolóxica contemporánea. En esencia, os nosos resultados apuntan a unha estrutura xerárquica das formas máis temperás de conduta perturbadora infantil e o risco disposicional asociado, así como certos mecanismos transdiagnósticos asociados, de tipo disposicional, que poderían subxacer a esta suposta vulnerabilidade externalizante inespecífica. Sen embargo, máis investigación que probe a replicabilidade destes resultados e conclusión está completamente xustificada. Estudos lonxitudinais a gran escala, como o Proxecto ELISA, poderían ser particularmente prometedores para esta tarefa, porque permitirían probar:

1) De que forma evolucionan os fenotipos externalizantes ao longo do tempo e cal é a robustez de certas configuracións psicopatolóxicas.
2) Ata que punto as asociacións entre certos rasgos temperamentais e certos fenotipos externalizantes permanecen ou non invariantes ao longo do desenvolvemento e que mediadores e/ou moderadores (están potencialmente involucrados nestas variacións (e.g., factores contextuais).
3) Os efectos a longo prazo da impulsividade desencadeada por estados emocionais intensos.

As implicacións conceptuais e prácticas dos resultados de tese presentados son múltiples. Dende o punto de vista do seu valor aplicado albergan potencial para proporcionar certa guía ou orientación das decisións clínicas relacionadas coa conduta perturbadora infantil temperá en, polo menos, tres sentidos. Primeiro, utilizando unha aproximación dimensional, os resultados do primeiro e segundo estudo contribúen a proporcionar máis luz sobre a fenomenoloxía e variabilidade das condutas externalizantes nos anos preescolares. Semellan corroborar, en concreto, que non só as condutas desobedientes e desafiantes forman parte do espectro externalizante nos anos preescolares, senón tamén as impulsivas, inatentas e hiperactivas, xunto cos rasgos de dureza-insensibilidade. A maiores, os resultados do segundo estudo, poden contribuír a fortalecer os argumentos a favor dunha análise simultánea de factores de risco disposicional tanto xerais como específicos á hora de articular plans de avaliación e tratamento adaptados para as dificultades externalizantes de inicio temperán. Por último, o terceiro e cuarto estudo, contribúen a conferir certo grado de visibilidade ás formas emocionais de impulsividade, un rasgo disposicional escasamente estudado en poboacións preescolares. De particular importancia é que, con esta tese, se proporciona una medida fiable e válida reportada por nais/pais basada do modelo UPPS-P de impulsividade para avaliar este tipo de condutas.

Palabras Clave:

Problemas externalizantes, anos preescolares, heteroxeneidade, clasificación, temperamento

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1 CHAPTER ONE
INTRODUCTION

1.1. Disruptive Behavior: Epidemiology, Relevance, and the Preschool Years

1.1.1. A Definition

Disobeying often, exhibiting frequent and severe temper tantrums, or starting fights with peers regularly, are all examples of disruptive behaviors (DB). Such observable indicators are commonly used to construct operational definitions describing certain patterns of externalizing conduct in children (Achenbach, 1966). This is, from a conceptual and practical standpoint, a convenient and valid strategy towards disentangling the complex phenomenology of DB at a descriptive level (Zachar, 2020). In addition, one can also invoke significant functional impairment (e.g., distress and dysfunction, APA, 2013), alleged underlying mechanisms (e.g., neurocognitive activity; Blair et al., 2014) or related traits (e.g., disinhibition and antagonism; Krueger et al., 2021) to broaden the definition. Overall, contemporary conceptualizations tend to agree, at least to some extent, in some of these key elements. Throughout this manuscript, the term "disruptive behavior(s)" will be used to refer to externalizing syndromes, including attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), as well as related constructs such as aggression and Callous Unemotional (CU) traits. At times, "disruptive behavior(s)", "externalizing psychopathology/ problems/ behaviors" and "behavioral problems/ difficulties" will be used interchangeably.

1.1.2. The Singularity and Relevance of the Preschool Years

Disruptive behaviors are normative in the preschool years. For example, children aged 3 to 6 often display acts of physical aggression or temper tantrums which are particularly idiosyncratic expressions of this period (Tremblay, 2010). Although both tend to decrease with age, physical aggression, reaches its peak at 2-4 years (Cote et al., 2006) and brief, mild temper tantrums are common in early childhood (Wakschlag et al., 2012a). This is not incompatible with saying, at the same time, that psychopathology, including externalizing problems, can be present very early in life (Lorber et al., 2015; Scheper et al., 2017; Sterba et al., 2007). Indeed, epidemiological and clinical evidence strongly support this conclusion (see Tables 1 and 2).

Although DB can be reliably assessed and diagnosed, identifying clinically significant and impairing dysfunction during the early phases of the development, is far from a simple task (Keenan & Wakschlag, 2000, 2002; Wakschlag et al., 2005; Wakschlag et al., 2012a). Manifestations of DB are highly heterotypic during this period. Thus, despite a degree of stability (e.g., overall optimal regulation of physical aggression), discontinuities in the

expression of behavior (e.g., isolated aggressive acts) are also observed due to varying developmental capacities (e.g., more physical strength) and demands overtime (e.g., new interacting contexts with peers). Furthermore, the preschool years are a period of major, rapid changes for children and, as a consequence, significant variation in behavior is expected to occur (Wakschlag et al., 2010).

Together, these observations raise an important question. How can meaningful DB be identified during this developmental period? Or, put differently, how can it be reliably concluded that observed deviations in child behavior are or not normative, and a child may need, therefore, professional help? According to the principles of developmental psychopathology, which presupposes the bidirectional relations between psychopathology and development, childhood behavioral and emotional problems "need to be understood in relation to developmental sequences, developmental norms and developmental processes" (Achenbach & Rescorla, 2016, p. 48). Knowledge of development is thus essential in assessing and diagnosing psychopathology in young children. Relatedly, as Achenbach has proposed in his seminal works "…we must view problem behavior in children in a relativistic fashion" (Achenbach, 1984, p. 229). That is, it should be assumed that, except from childhood behaviors that are either inherently pathognomonic (e.g., lack of eye contact at 5 years of age) or dangerous, child problematic behavior is not, per se, pathological (Achenbach, 1984).

During the preschool years, important developmental processes unfold. The internalization of rules, the development of adaptive problem-solving skills, emotion regulation skills and empathy and conscience are some examples (Wakschlag et al., 2012b). Enough evidence implicates that preventive and intervention efforts are particularly effective during this period (Baker-Henningham et al., 2012; Comer et al., 2013; Rapee, 2013). Thus, elucidating how to identify disruptions or failures in these core developmental processes, earlier, more reliably, and more efficiently, is essential (Wakschlag et al., 2012a; Wakschlag et al., 2019). By so doing, preventing, or interrupting the progression of certain difficulties seems possible, given that such early deviations might contribute to an earlier onset of psychological difficulties potentially resulting in long-term impairment and chronicity.

If psychopathology can be present in the first years of life, and the preschool years appear to offer an optimal window for prevention and intervention (Keenan, & Wakschlag, 2000, 2002; McLuckie et al., 2019), pursuing a more thorough understanding of the expressions and correlates of early DB seems warranted.

1.2. A Salient Feature of Disruptive Behavior: Phenotypic, Etiological, and Developmental Heterogeneity

The starting point for this dissertation is that, beginning in early childhood, DB is highly heterogeneous regarding its presentation (i.e., behavioral phenotypes), origins (i.e., mechanisms) and outcomes (i.e., developmental course). By heterogeneous we mean "*mixed* or consisting of *dissimilar* or *diverse constituents*" (Merriam-Webster's Dictionary). In this section, we summarize the main findings from research into DB heterogeneity (**Figure 1.1**), by looking at interrelated levels of analysis (i.e., phenotypic, etiological, developmental), presented separately for two reasons. Firstly, we seek to provide a detailed account of DB heterogeneity, which is currently lacking in the literature. In fact, examples abound of

inconsistent and confusing uses of the term, applied similarly in both broader and more specific contexts, with wider and more circumscribed meanings (e.g., Fanti, 2018; Klahr & Burt, 2014). Secondly, such a strategy is intended to serve the more practical purpose of facilitating the reading and achieving a better clarity in exposition.

1.2.1. Phenotypic Heterogeneity

Operationalizations of DB have varied overtime. That is, the criteria to define specific disorders and, in some cases the core elements recognized as part of the externalizing phenotype have changed over the years (i.e., historical heterogeneity; Lynam, 1996). Accordingly, different conceptual heuristics have been proposed to meaningfully organize these multiple phenotypic elements and various approaches for characterizing the heterogeneity in the presentation of DB have emerged, building on consistent and replicated findings from developmental, clinical, and forensic research. Despite not having been directly or explicitly integrated into the major clinical nosologies (e.g., the DSM; APA, 2013), these organizing principles have provided a solid theoretical basis for formulating and testing a variety of crucial research questions, with some becoming commonly used subdivisions to classify distinct forms of externalizing behaviors in childhood and early childhood.

For instance, Dodge & Coie (1987) advanced in their seminal works what became a long-standing distinction among *aggressive behaviors* based on their form and purposes. The authors proposed that reactive aggression is exhibited in response to real or perceived threat or provocation, serving a defensive/retaliatory function. Proactive aggression, on the contrary, is non-provoked and aimed at influencing others, thus serving an instrumental function (e.g., achieving social dominance). The factor-analytic literature has consistently indicated the robustness of the two-factor model, while reporting, not surprisingly, moderate to high correlations between the two dimensions (Poulin & Boivin, 2000). Although reactive and proactive aggression show unique associations with different predictors and outcomes (Hubbard et al., 2010), and seem to follow different developmental trajectories, there is a group of children with chronic aggression problems starting as early as 6 years, in which both subtypes of aggression have been found to be similarly used (Girard et al., 2019).

Besides *overt* acts of physical aggression (e.g., hitting, pushing, biting, or kicking), behaviors such as cheating, lying, or repeatedly breaking rules, are also *covert* expressions of DB. Although the literature supports the feasibility of this differentiation in childhood (Olson et al., 2013), young children lack the capacity to display covert complex forms of DB. Rule breaking, for example, is quite unusual during childhood (Tremblay, 2010). For this reason, the utility of distinguishing between *overt* and *covert expressions* of DB may be limited in the preschool years.

More recently, emerging evidence has begun to differentiate between *"cold"* and *"hot"* pathways to early externalizing problems. Uncaring and remorseless behaviors underpinned by reduced sensitivity towards the emotions and needs of others (i.e., CU traits), would exemplify the cold pathway. Conversely, the hot pathway would be represented by oppositional-defiant and hyperactive-impulsive behaviors (Waller et al., 2015). This theoretical division has been supported by findings in a number of studies, in which the unique associations of each pathway with different correlates were established. Low dispositional fear and concern about other's

feelings are strongly associated with CU traits, whereas emotional and behavioral dysregulation are more characteristic of the hot-pathway phenotypes (Frick, 2012; Frick & Morris; 2004; Pardini & Frick, 2013). In addition to distinctive etiological origins, different developmental trajectories are linked to each path, with CU traits predicting more persistent and severe forms of externalizing and antisocial behavior in the long run (Frick et al., 2014).

These approaches have received widespread attention. Within this tradition, externalizing behaviors are examined on the assumption that a distinction between problems is feasible, but no further exploration is typically made regarding certain phenotypic affinities among disorders. In another incipient body of work, however, a promising differentiation is currently being made between "pure" and "combined" symptom/disorder presentations of externalizing problems (Aitken et al., 2018; Andrade et al., 2015; Andrade & Wade, 2016). Within this complementary perspective, heterogeneity seems to be interpreted not only as a fundamental feature of the DB phenotype, but also as arising from the systematic and non-random co-occurrence of certain behavioral problems with other externalizing and internalizing psychopathology (e.g., Burns et al., 2014; Willner et al., 2016). If children who show a behavioral difficulty tend to show also other difficulties of a similar and/or different kind, combined presentations of psychopathology must be also identified to better account for the miscellaneous expressions of DB. Whether research should focus on exploring the structural relations underlying this systematic covariation (e.g., Martel et al., 2010) or identifying possible symptom or disorder combinations which classify children with similar problems into homogeneous groups (e.g., Van Lier et al., 2003) warrants its own discussion. That is, a reflection on the applicability and utility of variable-centered and person-centered approaches to structural research on psychopathology. Nevertheless, a consistent replicated finding is that combined presentations predict more severe and persistent antisocial behavior (Beauchaine et al., 2010; Kuja-Halkola et al., 2015; Wertz et al., 2018).

In the present work, the distinction between the *hot* and *cold pathway* to DB will be adopted, in a general sense, as the principal conceptual reference. We might note, however, that none of these approaches on their own is likely to provide the best or definitive account of the heterogeneity of externalizing problems at a phenotypic level. Each one explains different aspects of early DB, and their utility may depend on the type of research question examined. Moreover, despite certain correspondences (e.g., the hot vs. cold pathway and reactive vs. proactive aggressive behaviors), these dimensions do not seem redundant. This implies that committing to a given theoretical subdivision inevitably involves the loss of relevant information captured elsewhere. As such, the utility of these heuristic models may be somewhat limited.

1.2.2. Etiological Heterogeneity

The mechanisms leading to externalizing behaviors are highly heterogeneous. Firstly, DB is multidetermined. At very general level, genetic and environment determinants act as causal risk factors for psychopathology (Rutter, 2009). These factors operate through multiple individual and contextual mechanisms working separately and interactively through dynamic and complex processes (Kiff et al., 2011). In addition, there is considerable individual variability in the propensity to develop DB. That is, not all children are at the same risk of developing an externalizing problem, with some exhibiting levels of certain dispositional traits

(e.g., high disinhibition) that place them at a particular risk for developing clinically significant levels of DB (Tackett, 2006). The nature of this effects is, however, probabilistic, not deterministic (Rutter, 2009). Finally, just as multiple causal mechanisms can lead to the same common outcome (i.e., *equifinality*), a single starting mechanism can lead to a diverse range of disparate outcomes (i.e., *multifinality*; Hinshaw, & Beauchaine, 2016).

This indicates that is perhaps at the etiological level where the heterogeneity of externalizing behaviors is most unequivocally obvious. However, addressing this entire amalgam of risk factors and mechanistic processes, in any study, would be exceedingly unrealistic. In this dissertation, we will focus primarily on one of the mechanisms potentially giving raise to DB: child's temperament.

Although temperament traits are normal and non-pathological variations in early child behavior (Carey, 2017), their associations with psychopathology across development are well-documented (Lahey, 2004; Nigg, 2006; Rettew & McKee, 2005). Specifically, a large body of work has shown that DB occurs in the context of individual differences in constitutionally based traits (Gartstein et al., 2012; Martel et al., 2012; Scheper et al., 2017). Thus, determining *which* may constitute the core of an *"early externalizing dispositional vulnerability"*, that in interaction with the child's environment could become the early basis for the emergence of behavioral problems, seems imperative. In trying to provide a satisfactory answer to this question, however, several problematic conceptual and methodological issues arise. Firstly, in temperament research, the lack of a common language between theoretical models and measures often hinders the interpretation of study findings addressing converging or similar research questions (Lawson & Robinson, 2021). Secondly, at a conceptual level, it has been proposed that the organization of temperament traits, as with the case of personality traits, is hierarchical. Thus, distinguishable levels of analysis that vary in breadth can be embraced (i.e., broader and narrower traits; Caspi et al., 2005). Finally, the very definition of the units of analysis in temperament research continues to be currently a subject of debate (Cloninger & Zwir, 2018). Questions remain, therefore, as to whether individual traits or multidimensional temperament profiles are roughly equivalent or, on the contrary, the added value of traits constellations is empirically demonstrable.

Despite such idiosyncrasies in temperament research, a great deal of effort has been devoted to uncovering the associations between dispositional traits and externalizing behaviors. Both individual traits and temperament profiles have been associated to increased risk for childhood conduct problems and later antisocial behavior (Caspi, 2000; Pardini et al., 2018). In the trait literature, impulsivity and DB have consistently been associated, with higher levels of this trait increasing the risk for an array of externalizing problems (Beauchaine et al., 2017; Halperin et al., 1995; James & Taylor, 2007; Martel et al., 2017; Rodenacker et al., 2018). Beyond impulsivity, negative affect and emotion dysregulation are also viewed as playing a central role in the origins of externalizing spectrum disorders (Beauchaine & Zisner, 2017; Beauchaine & Tackett, 2020; Singh & Waldman, 2010; Zastrow et al., 2018). Additional evidence from typological research provides further support for the relevance of a particular trait constellation encompassing, precisely, these reactive and regulatory aspects of temperament (Aksan et al., 1999; Asendorpf et al., 1999; Asendorpf et al., 2001). Children who tend to be restless, inattentive, impulsive, and emotionally reactive (representing the

undercontrolled type) are at risk for exhibiting higher levels of externalizing behaviors in the short-term (Stifter et al., 2008; van den Akker et al., 2010) and antisocial outcomes in the long run (Caspi, 2000). At another level of analysis, more fine-grained, close attention has been paid to specific temperament traits (e.g., fearlessness and low affiliation) which have been shown to be developmental precursors of specific forms of DB (e.g., CU traits; Waller & Wagner, 2019).

Findings from this literature unveil an interesting and intricate picture, illustrating the somewhat antagonistic positions in the dialogue on the nature of etiological factors underlying psychopathology (Eaton, 2017; Krueger & Eaton, 2015; Lahey et al., 2017). That is, a discussion on the extent to which the effects of causal risk factors are unique and more dimension-specific or, conversely, they operate increasing the risk for multiple dimensions of psychopathology (see Tuvlad et al., 2009 or Wood et al., 2009 for examples of the later). Despite the centrality of this issue, empirical evidence is, contrary to theoretical elaborations, rather fragmented. On the one hand, transdiagnostic etiological models have achieved great visibility and recognition in recent years (Dadds & Frick, 2019; Dalgleish et al., 2020). On the other hand, as we have just mentioned, fine-grained etiological characterizations have been also shown to be quite useful in operationalizing DB in very precise ways (Waller & Wagner, 2019). Thus, they tacitly question the utility of those models with wider explicative purposes. Furthermore, since most research to date has covered either one or other kind of influences, with no studies considering both, a thorough understanding of how shared and non-shared etiological effects lead separately or in combination to DB is lacking (Lahey et al., 2017).

With the present dissertation, we sought to contribute to this ongoing debate with relevant implications for clinical processes such as assessment and intervention. We will argue that both transdiagnostic and specific mechanisms accounting for commonalities and differences among externalizing problems need to be simultaneously considered.

1.2.3. Developmental Heterogeneity

The evolution of early DB differs overtime. These variations in course can be observed not only for each individual child, but also among children following similar or very dissimilar paths. Developmental trajectories are statistical tools which graphically depict these meaningful differences between distinguishable courses of development (Tremblay, 2010).

In her pioneering work, Moffitt (1993) distinguished between youth engaging in antisocial behavior from early in the development (i.e., life-course persistent trajectory), and those exhibiting such behaviors only during adolescence (i.e., adolescence-limited trajectory). Thereafter, developmental and epidemiological research has extensively validated this developmental taxonomy of antisocial behaviors (Fairchild et al., 2013; Bevilacqua et al., 2018; Wertz et al., 2018). Beyond the stability of the trajectory (i.e., persistent vs. non-persistent), the change occurred overtime in the levels of a behavior of interest (i.e., increasing or decreasing courses) has been also investigated (Bongers et al., 2004; Olson et al., 2013; Shaw et al., 2003). Finally, combined profiles of various problems have been identified (e.g., concurrent externalizing and internalizing) and their developmental course and correlates longitudinally monitored (e.g., Basten et al., 2016).

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One conclusion from the available data is that *heterogeneity is not only one of the most salient features of DB* but also, *ubiquitous*. A vast miscellanea of diffusely limited and interrelated problems, with potentially differing courses, seems to be the result of an even vaster and more difficult to apprehend miscellanea of interacting causal factors. Such a scenario is per se the most basic justification for any interest in this issue. However, to better articulate why DB heterogeneity matters, we discuss, in the next section, how it represents a critical challenge for key clinical tasks.

1.3. Implications of Disruptive Behavior Heterogeneity [1]

1.3.1. A Challenge for Classification Endeavors

Classification, assessment, and diagnosis are interrelated processes (Achenbach & Rescorla, 2016). At present, nosological and non-nosological systems, oriented or not to diagnosis decisions, are both available as means to organize the heterogenous behavioral phenotypes within the externalizing spectrum (e.g., DSM5, APA, 2013; the HiTOP, Kotov et al., 2017). Critical scientific and clinical tasks (e.g., hypothesis testing and theory development, or assessment and intervention) depend on probing the validity of these classification systems (Beauchaine & Klein, 2017; Beauchaine & McNulty, 2013; Rutter, 2015). Thus, delving into how psychopathology *could* and *should* be systematically organized to facilitate these processes is imperative.

In recent years, there has been an upsurge of interest on this issue. As Eaton (2017) has stated, "*an explosion* in classification research" (p.1) has occurred. Likewise, a growing enthusiasm towards alternative approaches to categorical nosological systems has emerged (Clark et al., 2017). Yet, this changing landscape was, to some extent, long anticipated. Uher & Rutter (2012) had already argued that "the *false assumption that current classification is valid must be discarded*. Instead of diagnosis-specific investigations, studies of unselected groups assessed with *bottom-up approaches* are needed" (p. 601). Later, Rutter (2015) warned that "due to the extensive overlap among diagnostic categories, *the present classification systems* constitute *a degree of threat to the validity of child psychiatry and psychology*"(p. 3).

Therefore, the current state of affairs is not surprising. It appears that we are, indeed, amid a transitional moment (Lahey et al., 2017; Latzman et al., 2021). Only a few decades ago, research on psychopathology was handcuffed by the conceptual and practical constraints of the prevailing categorial approaches (Helzer et al., 2006; Hyman, 2010; Widiger & Samuel, 2005). In the last years, however, this scenario has been substantially transformed and their hegemony seems now at risk. This, of course, has important implications for our purpose of better understanding the heterogeneity of DB, since the assumptions and foundations of traditional and modern frameworks/systems are not equivalent.

Such frameworks/systems can be ascribed to three categories based on the method by which they were developed: an *authoritative*, *empirically based*, or *experimental* approach. The authoritative approach is exemplified by the Diagnostic and Statistical Manual of Mental Disorders and the International Classification of Disease in their latest editions (DSM5 and

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[1] In this section, no explicit distinction between phenotypic, etiological, and developmental heterogeneity will be made as we briefly introduce each challenge. Unless stated otherwise, "heterogeneity" will be used in a broader rather than particular sense.

ICD11; APA, 2013; WHO, 2019). The empirically based approach is represented by the Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017). The experimental approach, a radical departure from the previous two and not intended to serve a classification purpose in the short run is represented by the Research Domain Criteria initiative (RDoC; Insel et al., 2010). While some were deliberately conceived to serve critical clinical and administrative purposes (e.g., DSM), others are primarily focused on how to coherently organize, integrate, and group different psychopathological constructs on an empirical basis (e.g., HiTOP) or uncover the individual differences in underlying neurobiological mechanisms of psychopathology (e.g., RDoC). It could plausibly be said that each of them aims to capture a specific aspect of the phenomenology of psychopathology, including externalizing behaviors. That is, its clinical (DSM), etiological (RDoC) and empirical reality (HiTOP). Each has merits and shortcomings, and more important, similarities and marked differences (**Table 3**).

Research on psychopathology has largely benefited from the emergence of these frameworks. Yet, this is particularly obvious for two problematic issues linked to DB heterogeneity. At one level, the systematic co-occurrence of different forms of psychopathology (i.e., comorbidity), poses a considerable challenge for classification and diagnostic endeavors (Kuja-Halkola et al., 2015; Lilienfiled, 2003; Nikolas, 2016). The HiTOP system is, perhaps apart from RDoC, the best positioned paradigm to account for the often combined and heterogeneous clinical presentations of DB on conceptual terms. With the introduction of different levels of analysis (e.g., superspectra, spectra and subfactors), comorbidity appears more easily accommodated. Importantly, this feature entails another major advantage. By functioning similarly to a microscope with lens of different resolution, the HiTOP system allows for the adoption of different levels of analysis, on the assumption that that not a single one, individually, best depicts psychopathology. Instead, researchers and clinicians are allowed to choose the level in which they prefer to focus, without the obligation to concentrate exclusively in one of them (Conway et al., 2021; Kotov et al., 2021). Such degree of flexibility and versatility of *non-categorical hierarchical approaches* is inconceivable within a *categorical hierarchical approach* like the DSM (Clark et al., 2017). At another level, it has been generally assumed that classification and diagnosis should be, ideally, etiology based (Beauchaine & McNulty, 2013; Uher & Rutter, 2012). This would imply, in the particular case of DB, that the mechanisms underlying externalizing psychopathology are both *identifiable* and *identified*. RDoC is, arguably, the research framework best positioned to accomplish this hypothetically feasible task. This research program frees investigators from having to use the diagnostic categories of the DSM and its nomenclature. Instead, basic mechanisms relevant for etiology (e.g., reward responsiveness) are of interest (Cuhbert & Kozak, 2013).

The applicability of the HiTOP and the RDoC frameworks in clinical contexts has been strongly questioned (Haeffel et al., 2022; Lilienfeld, 2014). Furthermore, both share the limitation of being, at least to this point, largely adevelopmental. Thus, non-different, in this regard, from traditional classification systems. Besides these, each has gardened its own criticisms. The HiTOP system has been described as purely descriptive, atheoretical, non-falsifiable, unlikely to solve the comorbidity problem and not useful to capture cultural nuances (DeYoung et al., 2022). The RDoC initiative has been defined as a reductionistic and abstract approach, with little interest on contextual aspects but only biological factors, and more focused on cognitive neuroscience rather than clinical psychopathology (Clark et al., 2017; Lilienfeld,

2014). Despite these criticisms, it is perhaps unquestionably the case that these frameworks have permitted the reformulation of long-standing research questions, while extending the language and conceptual space for the formulation of new ones.

As noted, the heterogeneity of DB entails a considerable challenge for classifying, assessing, and diagnosing externalizing problems, but traditional nosologies have failed to properly address this issue. Because of this and also due to other limitations, categorical systems are on the spotlight. At this point in time, however, a rotund departure from classical approaches to modern views, more empirically based, seems highly improbable. These alternatives to classical categorical systems are still viewed with a certain suspicion. As a result, both modern and traditional approaches to conceptualize psychopathology currently coexist in apparent harmony.

In this thesis, we will argue that empirically based conceptualizations of psychopathology are better able to enhance our understanding on the origins, correlates, and outcomes of early DB. Such bottom-up approaches, in which empirical data rather than theoretical representations are prioritized to construct definitions of psychopathology, have a long-standing history in child and adolescent research (Achenbach, 2020). In fact, Achenbach's pioneering and influencing work has been crucial in delineating, statistically and conceptually, broader and narrower psychopathological constructs, including an externalizing factor and specific externalizing syndromes (Achenbach, 1966; Achenbach & Edelbrock, 1978). More recently, dimensional hierarchical models have emerged (i.e., the HiTOP; Kotov et al., 2018), bridging findings from various bottom-up research programs, including Achenbach's own large body of work (Achenbach, 2021; Caspi et al., 2014; Krueger et al., 2002; Wright et al., 2013).

1.3.2. A Challenge for the Study of Mechanisms of Risk

The main purpose of etiologic investigations in mental health research is to provide a valid identification of genetic and environmental causes of mental illness (Rutter, 2009). Delineating these causal pathways and associated mechanisms constitutes a challenge for psychopathology, in general, and for DB, in particular, for various reasons. First, as discussed above, multiple interacting *heterogeneous* etiologies underlie externalizing problems (Kiff et al., 2011; Rettew & McKee, 2005; Shaw & Shelleby, 2014). Even though in this work we are focusing primarily on child's temperament and not the wider scope of potentially driving mechanisms, we do not want to convey the erroneous impression that there is such a thing as "*the* cause" of DB. Rather, the causes are numerous, changing, and interrelated (Hinshaw & Beauchaine, 2016). Second, the processes of equifinality and multifinality, described above, add a further layer of *complexity and variability,* which could make prediction seem unattainable or indeed futile from a somewhat more pessimistic position. Third, clinical presentations of DB are highly heterogeneous. Children with the same diagnosis may exhibit markedly different symptom profiles. Thus, it is very unlikely that *etiologically delineated groups* with *distinct risk factor profiles* can be identified (Viding & McCrory, 2020). Fourth, traditional categorial nosologies are *free of etiological assumptions*. Thus, nosological systems such as the DSM (APA, 2013) fail to provide a guiding framework to organize and interpret etiological research. Epidemiology, genetic, and intervention research have proved to be more useful in this regard (Krueger et al., 2021; Rutter & Pickles, 2016; Uher & Rutter, 2012).

It thus seems that alternative organizing models for conducting etiological research are needed to better address the heterogeneity of DB. Fortunately, in the last decade, advances in this direction have been made. At least two novel approaches have suggested that changes are needed in the way research and clinical practice are conducted. First, Lahey et al. (2017) have recently proposed a causal taxonomy of psychopathology, after comprehensively reviewing the literature on behavior genetic studies. The aim of these researchers was to *provide an organizational framework* which could facilitate studies on the causes of psychopathology. By proposing *a hierarchy of causal influences*, this framework is clearly aligned with the premises of the HiTOP system (Kotov et al., 2021). Specifically, it is hypothesized that the hierarchical structure of psychopathology is translatable, in etiological terms, into a set of nonspecific and dimension-specific factors increasing risk for psychopathology operationalized at different levels of specificity. Second, the RDoC initiative can be viewed as a revolution in the field of etiologic research because it has *inverted the logic* in which traditional studies on the causal factors of psychopathology were conducted (Clark et al., 2017). Historically, it was generally accepted that a valid classification of psychopathology was the necessary preliminary condition to uncover its underlying mechanisms. The RDoC model, rather, proposes that it is by first identifying these mechanisms how we can better inform and advance classification (Blair et al., 2014). Such a strategy appears to be quite promising, since as we have mentioned, traditional diagnostic categories seem to be an unreliable basis to conduct etiologic investigations, due to the heterogeneity observed in clinical presentations.

Both the HiTOP model and the RDoC initiative seem to reflect attempts to achieve an elusive goal: a valid comprehensive classification system. Both represent, in different degrees, a departure from non-etiologically informative traditional nosological systems. Both can be, until proven otherwise, transformative, either alone or in tandem (Michelini et al., 2021).

Here, we will argue that Lahey's et al. (2017) timely proposal may constitute a sound and valuable framework to advance and expand our current understanding of DB etiological heterogeneity. We assume that such an organizing framework might contribute to reducing "the great chasm between description an explanation" which has been misleadingly attributed to descriptive psychopathology (Zachar, 2020, p. 280), and, eventually, to reduce the gap between structure and processes in psychopathology research (Tyrer, 2018).

1.3.3. A Challenge for Prevention and Intervention Endeavors

The efficacy of psychological interventions for children and adolescents with externalizing problems is rather modest (Bakker et al., 2017). While some studies report stronger benefits for preschool children (Comer et al., 2013), at present, their mechanisms of action and potentially moderating factors remain poorly understood (e.g., Musci et al., 2013 or Tamm et al., 2019). The same can be said of preventive interventions (McLuckie et al., 2019). The heterogeneity of externalizing problems is probably one of the reasons contributing to these modest effects. In fact, it seems at the very core of two unresolved questions.

A first crucial issue is *when* to intervene. We know for the research literature on developmental trajectories, that the course of DB is not uniform overtime. In fact, different trajectories are possible; persistent and increasing ones, but also, and perhaps most importantly, non-persistent and decreasing courses (Bongers et al., 2004; Olson et al., 2013; Shaw et al.,

2003). This evidence seems to imply that we should not make any a priori assumptions as to the *imperative need* for intervention in the presence of emerging DB. In a similar vein, recent meta-analytic research has failed to find evidence of the greater efficacy of interventions through parenting programs, *earlier in childhood* (Gardner et al., 2019). Such findings call into question the generally accepted notion that earlier intervention is always superior. Taken together, these findings indicate that decisions regarding the need for and timing of psychological interventions for externalizing problems may not be that straight-forward.

Of equal importance is establishing *how* to intervene, specifically, how this heterogeneity should be incorporated into the assessment, and treatment of early DB? We know from developmental and clinical research that some transdiagnostic psychobiological processes underlie multiple forms of externalizing behaviors (Beauchaine et al., 2017). Relatedly, *cross-domain effects* of psychological and pharmacological treatments have been reported in the intervention literature for externalizing problems (Feil et al., 2016; Hukkelberg et al., 2019; Pringsheim et al., 2015). It has even been suggested that "*lack of specificity is the rule*" in psychological treatments (Uher & Rutter, 2012, p. 591). However, we know from intervention research targeting very specific forms externalizing problems particularly resistant to treatment (i.e., CU traits), that tailored treatments are also effective (Kimonis et al., 2019). A major issue, hence, is to clarify which strategy works better for whom. Recently, Forbes and colleagues (2019) have argued that a hierarchical model of psychopathology such as the HiTOP seems to provide a solid framework to articulate preventive strategies. These authors have proposed "a developmentally-informed and *transdiagnostic stepped care approach*" (p. 1), to prevent psychopathology beginning in early childhood. Such a strategy would start with universal interventions in the preschool years (i.e., 3-6 years), which would become progressively selective and tailored as children progress in development and as potential problems become increasingly specific.

1.4. CURRENTLY UNRESOLVED ISSUES

The core of this dissertation is organized around two fundamental issues discussed above. On the one hand, the question of how to better classify the *heterogeneous externalizing phenotypes* through empirically based structural models of psychopathology. On the other hand, the issue of how to better tackle the *heterogeneous determinants of externalizing problems,* by disentangling the unique and non-unique effects of underlying dispositional risk. These two topics are intrinsically linked, such that a better understanding of how trait-like mechanisms operate can inform classification of DB and vice-versa. Ultimately, both have relevant implications for the prevention and treatment of early DB.

Although plenty of research has addressed the multiple presentations and correlates of externalizing psychopathology, a number of critical questions remain unanswered in the literature. Two of these are of particular interest for the purposes of this dissertation. As regards the structure of externalizing behaviors in the preschool years, it remains unclear *which* and of *what* type and *nature* the essential components of DB during this period are. As regards their etiology, *a more sophisticated account* of underlying dispositional risk factors is required, considering both specific and unspecific influences as well as relevant traits, which remain largely unexamined in prior research with young children (e.g., emotional forms of impulsivity).

1.5. General Objectives of this Thesis

In the current work, our general research objectives were as follows:

1) To advance towards a more comprehensive and empirically based classification of DB in the preschool years.

2) To further examine the associations between temperament and externalizing psychopathology, in early childhood, at different levels of specificity.

3) To explore the associations between affect-driven impulsivity and DB early in development.

The remaining text of this manuscript is organized as follows. In the first part (**Chapters 2 and 3**), the results of two related studies on the phenotypic heterogeneity of DB are presented. In these works, we sought to test a structural model of preschool externalizing behavior, and to provide further evidence on its validity by trying to elucidate its temperamental correlates. In the following part (**Chapters 4 and 5**), we present the results of two related studies on the etiologic heterogeneity of DB. In these investigations we explored the role of impulsivity, multidimensionally conceptualized, as a risk factor for early externalizing behavior, focusing, specifically, on affect-driven impulsivity. At the end of each of these chapters, a series of brief summaries or "take-home messages" are provided with the main findings of each study. These are intended to facilitate the reading through succinctly conveying the essence of this work. In the final part of the manuscript (**Chapter 6**), the main findings are summarized and discussed, addressing key limitations of the work, and advancing avenues for future research.

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Table 1.1. A handful of brief epidemiological notes on preschool disruptive behavior

#1
The **prevalence estimates** of disruptive behaviors in the preschool years are, in general, not very dissimilar to those reported in the broader epidemiology literature for older children and adolescents through meta-analytic techniques (i.e., 5.7%, CI 95% 4.0-8.1%; Polanczyk, 2015). Nonetheless, there are also studies reporting considerably higher rates for this period (e.g., Markovic et al., 2015). In **Table 2**, available data on the prevalence of disruptive behaviors in the preschool years in different countries across the world is summarized.
#2
The **distribution of externalizing problems in the preschool period** is not uniform across different levels of certain sociodemographic characteristics (Egger & Angold, 2006). Unsurprisingly, these findings dovetail with the broader epidemiological literature on behavior problems in older children and adolescents (Cohen et al., 1993; Merikangas et al., 2009). Compared to girls of the same age, boys aged 2 to 5 are more likely to have a disruptive behavior problem (Lavigne et al., 1996). Further, preschoolers whose families report a lower SES are at increased risk for ODD, due to its indirect influences on family environment (e.g., stress, conflict or parental depression, hostility, and support, Lavigne et al., 2012). As would be expected, these mechanisms start to exert their influences from infancy (i.e., the fetal period; Rijlaarsdam et al., 2013).
#3
A vast body of research has shown that a **group of children displaying early disruptive behavior problems,** as early as two years of age, are at the highest risk for persistent, and more severe patterns of antisocial and maladaptive behavior later in development (Petitclerc & Tremblay, 2009; Reef et al., 2010). These early behaviors have been associated with deleterious outcomes in multiple domains (Bevilacqua et al., 2018). Longitudinal studies starting in early childhood show that early behavioral problems tend to co-occur with poor academic performance at school entry (Reinke et al., 2008). Children on this developmental trajectory are also at risk of peer victimization over the preschool, childhood, and adolescent years (Turner et al., 2010) and, overall, exhibit early impairments in social functioning (e.g., negative peer status, Brennan et al., 2015). As they grow into the teenage years, they are more likely to get involved in problematic substance use (e.g., cannabis; Heron et al., 2013). Above all, strong evidence from longitudinal research demonstrates that, in the long run, they manifest the highest risk for poor health (e.g., hospitalizations), mental health (e.g., young adult psychopathology), plus social (e.g., isolation) and criminal (e.g., convictions) outcomes (Gutman et al., 2019; Kassing et al., 2019; Wertz et al., 2018).
#4
Several risk factors are associated with preschool disruptive behaviors these including multiple individual, family, and social characteristics that predict an increased probability of early behavioral problems (Shaw et al., 1996; Shaw et al., 2000). At a trait level, children at greatest risk of early problem behavior have been found to score higher on Negative Affect and Extraversion, but lower on temperamental regulation (i.e., Effortful Control; Martel et al., 2012). At the family level, evidence corroborates the centrality of the caregiving environment during infancy in relation to the later development of externalizing disorders (i.e., 6 years of age; Shaw, et al., 2001). Consistent with this latter point, it has been shown that pervasive antisocial behaviors during adolescence, in contrast to situational antisocial behaviors, are predominantly explained by familial influences that originate in early childhood, rather than nonshared environmental and genetic influences (Wertz et al., 2016). Finally, socioeconomic disadvantage and exposure to poverty during early childhood are particularly detrimental to later outcomes and, notably, strong predictors of early DB (e.g., physical aggression of oppositional behavior; Shaw & Shelby, 2014). Perhaps most importantly, these risk factors are, at least to some degree, all malleable (McLuckie et al., 2019).
#5
Early starting behavioral disorders are **harmful, impairing, and costly for children, their families and society at large** (Rivenbark, et al., 2018). Treating them as a serious public health problem is, therefore, justified (Burt., 2018). Since accumulated evidence has shown that mental disorders are preventable and that population approaches appear to be more effective than high-risk approaches (Wahlbeck 2015), stronger efforts to achieve systematic strategies for improving preschoolers' mental health are needed (Wakschlag et al., 2019). Data on the cost-effectiveness of mental health services for the preschool period is still scarce overall, and almost non-existent in relation to DB (Beecham, 2014). Yet, it is likely that, as has been established for later developmental periods (Sandler, et al., 2014), the utility of preventive interventions, from this cost-benefits perspective, can be also empirically demonstrated.

Table 1.2. Epidemiological data based on studies of the prevalence of disruptive behaviors in the preschool years in different countries

Location	Study	N	Age/ Age Range (years)	Informant	Assessment, diagnostic criteria	Prevalence
United States America (USA)	Earls (1980)	100	3	Parents	Semi structured interview	ADHD (2%); ODD (4%)
	Stallard (1993)	1170	3	Parents	The Behavior Checklist	*Percentage for each individual item related to child behavioral problems, reported by parents as causing "a lot of concern":* - Overreactive (2.24%); Poor concentration (0.8%); Demands attention (1.65%); Difficult to control (5.40%); Tantrums (3.18%); Poor peer relationship(0.9%);
	Lavigne et al., (1996)	510	2-5	Parents	Clinical consensus	ADHD (2%); ODD (16.8%)
	Briggs-Gowan et al., (2001)	1280	1-2	Parents	-The CBCL/2–3 -The PSI Difficult Child (PSI/DC) scale (i a proxy for behavior problems)	*Percentage of children considering both clinical and subclinical range on the broad band Externalizing Scale* - 9.3% - -6.2 %
China (Hong Kong)	Luk et al. (1991)	851	3-4	Teachers	The Preschool Behavior Checklist	*Percentage for each individual item of the hyperactive/conduct problems factor of the checklist:* Overreactive (27%); Not liked by others (25%); Poor concentration (52 %); Difficult to manage (34%); Temper tantrums (62%); Fights (26%); Interferes in play (38%); Tease (21%); Destructive (26%); Habits (28%)
Germany	Koot & Verhulst (1991)	421	2-3	Parents	The CBCL/2–3	*Percentage of children estimated to have a behavioral problem* 7.8 %
	Fuchs et al., (2013)	1738	3-5	Parents	The SDQ	*Percentage of children with scores on the abnormal range* Hyperactivity/Inattention (10.8%); Conduct Problems (6.1%)
Finland	Sourander (2001)	374	3	Parents	The CBCL/2–3	*Percentages of children using the 90th percentile as cutoff for the broad band Externalizing Scale* - 5.3 % of girls - 5.8 % of boys
Denmark	Skovgaard et al., (2007)	211	1.5	Parents	-ICD-10 -DC 0–3	*Percentages of children using Axis I of the ICD-10* - ADHD (2.4 %); Disorder of Conduct and Emotion (4.3%) *Percentages of children using Axis II of the DC-0-3* - Aggressive/Hostile (0.5%)
Romania	Gleason et al., (2011)	1003	1.5- 5	Parents	CBCL 1½–5	ADHD (0.4%); ODD (0.9 %); CD (0.2 %); (%); any behavioral disorder (1.4 %)

Location	Study	N	Age/ Age Range (years)	Informant	Assessment, diagnostic criteria	Prevalence
Canada	Brault & Lacourse (2012)	5514	3-6	Parents	Diagnosis reported by parents	2% (males), 0.5 % (females) with a diagnosis of ADHD
Australia	Beyer et al., (2012)	500	infancy -5 years	Parents	CBCL 1½–5	7.3 % (males), 5.5 % (females), scores in the borderline/clinical symptom range for externalizing at 5 years of age
Norway	Wichstrøm et al., (2012)	1250	4	Parents	The Preschool Age Psychiatric Assessment (PAPA)	ADHD (1.9%); ODD (1.8 %); CD (0.7%)
Brazil	Petresco et al., (2014)	3585	6	Parents	The Development and Well-Being Assessment (DAWBA)	ADHD (2.6%); ODD (2.6%)
Serbia	Markovic et al., (2015)	512	4-6	Parents Teachers	CBCL 1½–5 C-TRF	*Percentages of children scoring above the clinical cut point for the CBCL/1/5–5 and C-TRF.* - Broad-band Externalizing (13.4%); aggressive behavior (3%); ADHD and ODD, DSM-oriented scales (7.7% and 3%, respectively) - Broad-band Externalizing (9.7% and 6.9% for boys and girls, respectively); aggressive behavior (3.1% and 1.5 %); ADHD (2.7% and 1.8%); ODD (2.7% and 3.3 %)
Spain	Ezpeleta et al., (2014)	622	3	Parents	Diagnostic semi-structured interview (DICA-PPC)	ADHD (3.2 %); ODD (6.9%); CD (1.4%)
Sweden	Gustafsson et al., (2017)	815	1-6	Parents	The SDQ	*Percentages of children establishing the cut-off in accordance with the 90th percentile* - Hyperactivity/Inattention (12% and 7.5% for boys and girls, respectively); Conduct Problems (10.2% and 6.2%)
Switzerland	Stülb et al., (2019)	555	2-6	Parents	The SDQ	Hyperactivity/Inattention (5.3%); Conduct Problems (7.6%)

Note. Only studies reporting the prevalence of disruptive behaviors in the preschool years that used community samples are summarized in this table. Investigations addressing 1) other developmental periods, 2) specific samples (e.g., low family SES) or 3) populations with specific mental or health problems (e.g., asthma), were deliberately excluded.
We used the publication date of the study and its location to organize and present the information in the table.

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Figure 1.1. Heterogeneity of DB at different levels of analysis

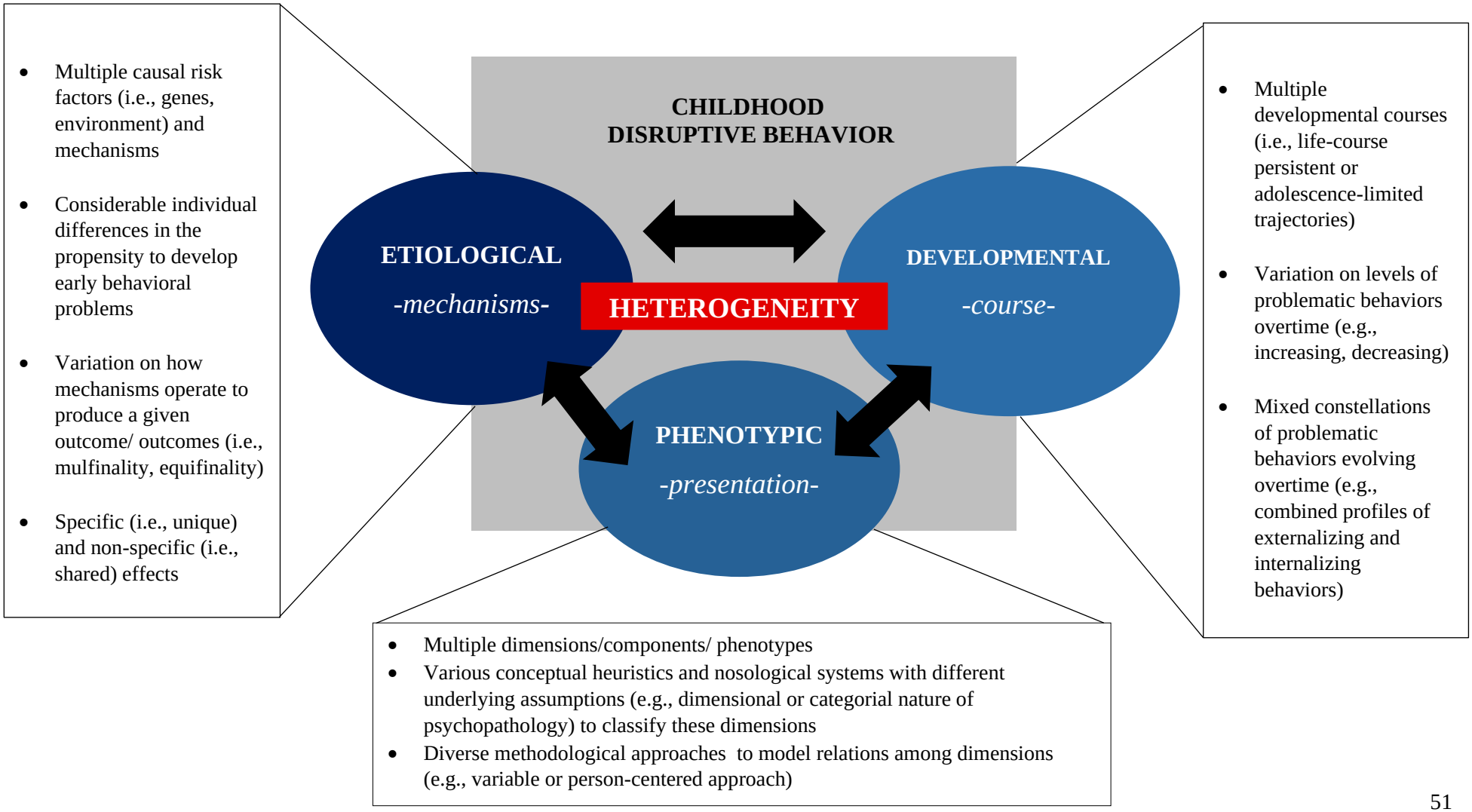


Table 1.3. Correspondences and divergences among different frameworks to conceptualize psychopathology

	***Traditional* Frameworks to Conceptualize Psychopathology**[2]		***Modern* Frameworks to Conceptualize Psychopathology**	
	DSM	**ICD**	**RDoC**	**HiTOP**
Background				
• **Developers**	American Psychiatric Association (USA)	World Health Organization (international)	National Institute of Mental Health (USA)	HiTOP Consortium (International group of experts)
• **Origins**	First edition: DSM-I (1952) Latest edition: DSM5 (2013)	First edition: ICD-6 (1949)[3] Latest edition: ICD-11 (2019)	2009 (Insel et al., 2010)	2017 (Kotov et al., 2017)
• **Development method**	Authoritative approach (clinical authority, committees of experts), largely atheoretical	Authoritative approach (clinical authority, committees of experts), largely atheoretical	Experimental approach	Quantitative approach, largely atheoretical
• **Actualization/Revision Process**	Periodic, intended to be research-based	Periodic, preference is given to clinical utility	Ongoing, research-based	Ongoing, research-based
Conceptual foundations	Nosologically based model (top-down/ deductive approach to psychopathology)	Nosologically based model (top-down/deductive approach to psychopathology)	Experimentally- based model	Empirically- based model (bottom-up/inductive approach to psychopathology)
Purposes	Descriptive, nosological	Descriptive, nosological	Explicative, non-nosological	Descriptive, nosological
Uses	Predominantly clinical (public-health, clinical applications) and administrative	Predominantly clinical (public-health, clinical applications)	Research	Intended to serve both, clinical and research applications
Main features				

[2] The terms “classification system”, “nosologic system” or “diagnostic system” are deliberately avoided, as some of the reviewed frameworks are not intended for that purpose (e.g., the RDoC). As we see it, this designation is potentially the less misleading and problematic.
[3] Mental disorders were first included in the sixth revision of the International Classification of Diseases (ICD-6)

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	Traditional Frameworks to Conceptualize Psychopathology[2]		*Modern* Frameworks to Conceptualize Psychopathology	
	DSM	**ICD**	**RDoC**	**HiTOP**
• **Units of analysis**	Diagnostic categories	Diagnostic categories	Neurobiological correlates of mental illness, particularly brain circuitry and brain/cognitive functions	Empirically derived phenotypes
• **Assumptions on the nature of psychopathology**	Categorical (*qualitatively* distinct from adaptative behavior)	Categorical (*qualitatively* distinct from adaptative behavior)	-[4]	Dimensional (*quantitatively* distinct from adaptative behavior)
• **Assumptions on the factors underlying psychopathology**	No	No	Yes	Not explicit
• **Unique contributions**	Polythetic conceptualization of diagnostic categories (e.g., inclusion and exclusion criteria) and the nomenclature to designate them	Narrative definitions for diagnostic categories	Neurobiological constructs (e.g., frustrative non reward)	Superspectra, Spectra constructs (e.g., antagonistic externalizing, disinhibited externalizing)
• **Idiosyncratic elements**	Diagnostic labels	Diagnostic code	RDoC Matrix	HiTOP diagram
• **Similarities with other systems**	Fundamentally the ICD	Fundamentally the DSM	-	Partially the DSM/ICD and the RDoC

4 The RDoC approach is explicitly dimensional, not as in regard to the nature of psychopathology, but in regard to the individual differences in the neurobiological constructs assumed to vary continuously in the population

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2 CHAPTER TWO

AN EXAMINATION OF THE PHENOTYPIC STRUCTURE OF EARLY CHILD DISRUPTIVE BEHAVIOR: FURTHER EVIDENCE FROM FACTOR ANALYTIC MODELS

2. 1. INTRODUCTION

Delineating the contours of child disruptive behavior remains, to these days, a difficult endeavor (Rutter & Pickles, 2016). In the last decades, considerable work has yielded notable insights into which meaningful phenotypic indicators should be considered (Frick et al., 2014), how and when to look at their clinical relevance (Wakschlag et al., 2019), and which may be the operating mechanisms impeding a normative development (Clark, 2005). However, despite several attempts to find the best phenotypic characterization of DB in young children, achieving a valid and clinically useful classification continues to be a challenge. At least, from the assumptions of traditional categorical approaches (Beauchaine & Klein, 2017).

At the same time, parallel contributions from alternative empirically approaches have rapidly evolved, fostering clinical practice, theory, and research (Brunner et al., 2012). Factor analytic models, for example, have been critically useful to identify the latent factors underlying the covariation among multiple problematic behaviors and to improve our understanding of homotypic and heterotypic comorbidity patterns across development (Achenbach, 1966; Krueger & Markon, 2006; Lilienfeld, 2003). Research from this analytic perspective has consistently demonstrated the structural complexity of externalizing psychopathology, yielding some crucial findings. First, significant evidence indicates that different levels of analysis can be adopted to describe the patterns of covariation among externalizing behaviors. That is, both narrower and more specific subfactors, as well as broader and more general constructs may serve to operationalize externalizing difficulties (Krueger et al., 2021). Second, adopting a broader rather than a domain-specific view seems to be not only a feasible, but also a valid strategy to investigate key issues. For instance, the associations of DB with other common forms of psychopathology in childhood (e.g., fear, distress syndromes; Doyle et al., 2016).

Despite these advances in structural research, our current knowledge on the structure of externalizing psychopathology may be limited because the literature on the nature and components of the so-called externalizing spectrum persists, at present, largely disaggregated (Nikolas, 2016). Some of the reasons hindering this much-needed integration, derive from the considerable variation in some key features across studies examining the structure of externalizing psychopathology. This variability is evident as regards the developmental period investigated, the indicators adopted to operationalize DB, the underlying assumptions on the

nature of DB components (e.g., continuous vs. categorical) or the statistical tools used to explore this research question (e.g., variable vs. person-centered approach). Thus, the overall scarcity of studies testing competing hypotheses on the type of best-fitting structural model, through comparable indicators and methods, uncovers a fruitful area for further inquiry.

2.1.1. Evidence for Diverse Structural Configurations of DB

The interest on structural models of DB is not new, but it seems to have flourished afresh in recent years (Achenbach, 2020; Achenbach, 2021; Lahey et al., 2021).

A recent conceptualization of DB posits the existence of three separated, but correlated forms of DB, that represent distinct aspects of the phenotypic variation along the externalizing spectrum. Namely, oppositional-defiant, hyperactive-impulsive, and callous-unemotional behaviors (Waller et al., 2015). Studies supporting this idea differ in two important ways: a) whether the examined dimensions are empirically derived or a priori hypothesized and b) the terminology to designate them (e.g., *"hurtful dimension", "callous/unemotional behaviors", "proactive/callous behavior";* Stringaris and Goodman, 2009b, Waller et al., 2015; Waschbusch et al., 2004). However, the underlying constructs they are referring to can be considered theoretically equivalent. Strong converging evidence supports this empirical differentiation, with similar findings obtained across samples, cultural contexts, age groups, and study designs (Stringaris & Goodman, 2009a; Stringaris & Goodman, 2009b; Willoughby et al., 2014; Waller et al., 2015, Waschbusch et al., 2004; Whelan et al., 2013). Evidence indicates that children displaying oppositional, hyperactive-impulsive and callous unemotional behaviors have unique and distinguishable combinations of temperamental traits and respond to treatment interventions differently (Kolko & Pardini, 2010; Waller et al., 2015), while all are at higher risk of poorer health, academic and social outcomes in the long run (Aebi et al., 2013). Despite these problematic domains are considered to be theoretically and empirically distinct, moderate to high correlations among them have been consistently reported in the literature (Waschbusch et al., 2004; Willoughby et al., 2011). Thus, it seems plausible that the relations among these early forms of externalizing psychopathology could be conceptualized hierarchically. The high co-occurrence among externalizing disorders in clinical and epidemiological samples further supports this hypothesis (Bendiksen, et al., 2017; Kuja-Halkola et al., 2015, Obsuth et al., 2019).

Prior research with child and youth populations consistently emphasized the hierarchical organization of the externalizing spectrum (Achenbach, 1966). Evidence from developmental, individual differences and genetically informed research strongly support this idea (Pillow et al., 1998; Waschbusch, 2002; Lahey et al., 2011). However, besides Achenbach's pioneering and influential contributions, most of evidence on the hierarchical structure of the externalizing spectrum does not come from child samples. Rather, most data is from adolescent and adult populations (Carragher et al., 2014; Farmer et al., 2009; Lahey, Rathouz et al., 2008; Verona et al., 2011). In adult research, for instance, a *multidimensional hierarchical model* of the externalizing spectrum has been defined and widely supported in the extensive work of Krueger and his collaborators (Bezdjian et al., 2011; Burt et al., 2001; Forbes at al., 2016; Krueger et al., 2002; Krueger et al., 2005; Krueger et al., 2007). However, a similar effort to uncover the hierarchical configuration of externalizing problems in childhood and, in particular, the preschool years, is pending.

2.1.2. Integrating Findings and Defining the Steps Ahead

As noted, various reasons preclude a more integrated and comprehensive view of the externalizing spectrum, including its earlier expressions. Here, some are emphasized.

1. There is considerable variation across studies on the indicators adopted to operationalize externalizing problems. This might be a direct consequence of the differences on the developmental period studied or, perhaps, a reflection of a more difficult to resolve issue. It is reasonable to expect that different manifestations are needed to characterize externalizing psychopathology in particular developmental phases. For instance, while activity level and distress to limitations have been adopted as DB indicators in infancy (i.e., < 24 months; Lorber et al., 2015), ODD and ADHD symptoms appear more suitable for the preschool period (i.e., 3-6 years; Witkiewitz et al., 2013; Waller et al., 2015) and middle childhood (i.e., 6-12 years; Waschbusch et al., 2004). However, beyond the expected variation *across* developmental periods, the observed variation among studies targeting *the same* developmental period, seems to be tacitly exposing the lack of consensus on what might be the meaningful indicators of the externalizing vulnerability in a given developmental gap. In fact, this is much likely to be the case for DB in the preschool years (Wakschlag et al., 2010).

2. Some relevant indicators, such as CU behaviors/traits, have been systematically excluded in most structural research. To date, most empirical works have been focused on more common forms of DB (e.g., ADHD, ODD), and, to a lesser extent, ADHD and conduct disorder (Beauchaine et al., 2010; Burns et al., 2014, Burns et al., 2020; Martel et al., 2010). This gap may help to explain why neither CU traits, nor psychopathic traits, have been explicitly represented, yet, in recent holistic hierarchical proposals to organize psychopathology (i.e., the HiTOP system; Kotov et al., 2017). As we see it, however, starting to investigate the feasibility of their inclusion into these multidimensional hierarchical models might be particularly critical for a number of reasons. Firstly, the utility of CU traits to better characterize more severe and stable forms of conduct problems across development is well-established (Longman et al., 2016). Secondly, CU traits can be reliably assessed, including early in the development (e.g., the preschool years; Waller & Hyde, 2017). Thirdly, because of their clinical relevance, CU traits have already been incorporated into categorical diagnostic systems (e.g., the DSM5; Salekin, 2016).

3. Studies across programs of research differ not only on the specific behavioral indicators of DB incorporated into the factor analytic models, but also on the *type* or *nature* of these indicators. For instance, in some studies with adolescent and adult samples, personality traits such as impulsivity, have been deliberatively modeled along with externalizing symptoms (Krueger et al., 2002; Krueger et al., 2007). Since the relation between personality and psychopathology appears to be dimensional in nature, looking at certain forms of psychopathology as manifestations of extreme levels of traits is warranted. Even so, the decision to explicitly include or not temperament/personality traits in structural models of externalizing psychopathology does not seem inconsequential.

2.1.3. A Methodological Consideration

Finally, a key methodological issue must be addressed. The externalizing factor construct, that is, the putative supraordinate factor underlying the covariation of a wide range of observable disruptive behaviors, can be modeled via two non-equivalent, non-interchangeable approaches. Specifically, the higher-order model or the bifactor model (Beaujean, 2015). Each relies on different psychometric traditions and premises, has different features and limitations and, thereby, allows distinct inferences and interpretations (Markon, 2019). On one hand, the supraordinate (i.e., general) factor, as specified in the higher-order model, would account for the tendency of the subordinate (i.e., specific) factors to be correlated, and, at a formal level, its relations with the specific behavioral indicators, at the lowest level of the hierarchical structure, would take place through these intermediate paths. On the other hand, the supraordinate factor, as specified in the bifactor model, would be directly related to each behavioral indicator, without a mediating path, and the unique variance not captured by such a factor would be accounted by the subordinate factors (Bornalova et al., 2020). Subordinate factors are predominantly salient in the former, and the supraordinate factor is, in the later. Both models have been thoroughly examined and compared in previous research (Forbes et al., 2021; Watts, Poore & Waldman, 2019). However, mostly through simulation studies and, rarely, in relation to the development of child externalizing psychopathology during the preschool years (e.g., Greene et al., 2019; Moore et al., 2020).

Hence, some of these questions seem to need further answers: What is the model that best represents the structure of externalizing psychopathology in early childhood and by which indicators should be defined? Is there a hierarchical component to this organization and which is the most appropriate way to model it? What is the conceptual and clinical meaning of this construct? Ultimately, how these multiple structural configurations dovetail with existing etiological models of DB?

2.1.4. This Study

In the present study, we address some of these issues by means of a longitudinal design, a multi-informant approach and capitalizing on a large sample size. For the first time, we are considering for comparison, in the same study, conceptually and statistically non-equivalent models, specified upon previous literature, to account for the structural relations among disorders in the level of the externalizing spectrum, using factor analytic techniques. We include problematic behaviors (i.e., CU traits) systematically precluded in previous research, operationalized, importantly, through different measures (**three methods** described in detail in the following sections). Our general objective is to study what is the best-fitting model to represent the factor structure of a set of externalizing behaviors (i.e., ODD, ADHD, CU traits) in our sample of preschoolers. More specifically, we aim:

1) To determine if it is possible to model and extract a supraordinate component of externalizing behavior denoted, according to previous literature and research, as the "externalizing factor".

2) To clarify if a significant amount of variance in such a factor could be accounted by individual differences in CU traits levels.

3) To examine the differential predictive validity of the externalizing factor on levels of behavioral difficulties prospectively informed by parents and teachers, over and above the effects of specific externalizing behaviors (i.e., conduct problems, hyperactivity-inattention, CU traits).

4) To determine whether one level of analysis compared with another (broader vs. narrower), better predicts parent and teacher reported levels of the same specific problem (e.g., ADHD) over time.

Based on the evidence reviewed, we hypothesized that a hierarchically organized structure for DB in the preschool years is plausible, with a general externalizing factor accounting for the shared variance among ADHD, ODD and CU traits, found to be highly correlated in previous empirical studies. Building upon this evidence, we also expected that CU traits, assessed via different measures, would explain a significant portion of variance in such externalizing factor. Finally, we hypothesized that the construct validity of this broader factor could be established by demonstrating its prospective associations with relevant indicators and correlates of DB, above and beyond the specific effects of particular problematic externalizing domains. Importantly, such associations were expected after controlling for other well-established correlates of DB, such as child's tendency to show distress and become easily aroused and his/her skills to regulate this activation (i.e., temperamental reactivity and regulation; Gartstein et al., 2012; Scheper et al., 2017; Zastrow et al., 2018). However, due to lack of consistent evidence, we deliberately avoided making any predictions regarding the superiority of one level of analysis over another to predict the same set of problematic behaviors over time.

2. 2. METHOD

2.2.1. Sample

Data for this study is from the ELISA Project (Estudio Longitudinal para una Infancia Saludable, Longitudinal Study for a Healthy Childhood, [ELISA]), an ongoing longitudinal project aiming to analyze early conduct, emotional and social development of a large sample of Galician children (see **Supplementary Material for Chapter Two** for more details about this longitudinal project and the ELISA sample). Specifically, we used only two data waves for this work: waves 1 and 3. Data was parent-reported at T1, and parent and teacher-reported at T3. The initial sample of the study was composed by 2467 preschoolers (48.1% girls; Mean age = 4.25 years, SD = 0.91). Wave 1 (T1) was collected in the Spring of 2017 (reports from both informants were obtained for n=2219, 89.9% of the original sample). Wave 3 (T3) was collected two years later, in the Spring of 2019 (reports from both informants were obtained for n=1555, 63% of the original sample). At T1, children's ages ranged from 3 to 6. At T3, ages ranged from 5 to 8 (M = 6.08 years, SD = 1.08). At both time points, 48.1% of the sample were girls. Most of the participating families were Spanish (93.9%) and came from rural, semi urban, urban areas of Galicia, a region in the NW of Spain. At T1, 77.2% of the mothers and 92.4% of fathers were employed. These percentages increased to 82.5% and 93.3%, respectively, in T3. Only 6.8% of the families reported difficulties making ends needs at T1.

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2.2.2. Measures

Measures of Child Disruptive Behaviors for Factor-Analytic Models *(T1, parent-reported)*

Oppositional-Defiant Disorder (ODD) and Attention-Deficit Hyperactivity Disorder (ADHD). We assessed child oppositional and hyperactive-inattentive behaviors via parent reports on the ASEBA Preschool Form (Achenbach & Rescorla, 2000). Twelve items from the DSM-5 oriented scales were used. Specifically, six for ADHD (e.g., *he/she cannot concentrate* or *cannot stand waiting)* and six for ODD (e.g., *he/she is defiant* or *has angry moods stubborn/sullen*). Parents rated each item on a 3-point Likert scale ranging from 0 (not true) to 2 (absolutely true). Internal consistency of the scales was acceptable for both subscales (α=.78, and α=.74, respectively)

Callous Unemotional (CU) traits. We used three different methods to operationalize CU traits in the factor-analytic models specified in this study. First, following the strategy of other researchers in previous works, we used five items of the ASEBA Preschool Form thought to represent the CU traits factor (e.g., *he/he does not seem to feel guilty after misbehaving* or *seems unresponsive to affection*; Willoughby et al., 2011; Willoughby et al., 2014; Waller et al., 2015). A 3-point Likert scale ranging from 0 (not true) to 2 (absolutely true) was used by parents to rate each item. Second, CU traits were also operationalized using parent reports on the 10-item CU traits scale of The Child Problematic Traits Inventory (CPTI; Colins et al., 2014), applying a 4-point scale, ranging from 1 (does not apply at all) to 4 (applies very well) to items such as *"he/she seldom expresses sympathy for others"* or *"sometimes seems to completely lack the capability to feel guilt and remorse"*. Finally, the specifier "with Limited Prosocial Emotions" established in the DSM5 for Conduct Disorder (APA, 2013) was also used to measure callous-unemotional behaviors (e.g., *"lack of remorse or guilt"* or*"shallow or deficient affect"*) on a 4-point scale ranging from 0 (totally disagree) to 3 (totally agree). From hereinafter, these three operationalizations would be referred to as **methods 1, 2** and **3**, respectively. The internal consistency of the five items from the CBCL was poor in our sample (α=.46). Conversely, the internal consistency of the CPTI CU traits subscale and the DSM5 LPE Specifier was acceptable (α=.85 and α=73, respectively).

Measures of Longitudinal Externalizing Outcomes for Regression Models *(T3, parent and teacher-reported)*

Conduct Problems (CP). Child conduct problems were measured via parent and teacher reports on the SOFIA Conduct Problems Scale (Colins et al., 2014). This 10-item scale is based on DSM-IV-TR criteria for ODD and conduct disorder and was developed to be used across early childhood, childhood, and adolescence (Colins et al., 2021). It assesses behaviors such as *"he/she has beaten, torn, shoved, kicked, or thrown something on others without a reason"*, "*threatens others*" or "*does not follow important rules*". Parents rated each item on a 5 -point scale ranging from 1 (never) to 5 (almost always). A composite scale score was generated by computing the mean of the 10 items. The internal consistency of the scale was acceptable for both parent and teacher forms (α=.88; α=.93, respectively).

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Oppositional Defiant Disorder (ODD). We assessed child oppositional defiant behaviors via parent and teacher report on the ASEBA School-Age Form (Achenbach & Rescorla, 2001). The 5-item scale assesses behaviors such as *"he/she is disobedient at school"*, *"disobedient at home"* or *"argues a lot"* on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). The internal consistency of the scale was acceptable for both parent and teacher forms (α=.76; α=.85, respectively).

Attention-Deficit Hyperactivity Disorder (ADHD). Child inattention, hyperactivity and impulsivity were assessed via parent and teacher reports on the ASEBA School-Age Form (Achenbach & Rescorla, 2001). The 7-item scale assesses behaviors such as *"he/she is impulsive, acts without thinking"*, *"is inattentive and gets easily distracted*" or "*does not finish what she/he starts"* on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). The internal consistency of the scale was acceptable for both parent and teacher forms (α=.80; α=.93, respectively).

CU traits. CU traits were assessed using parent and teacher reports on the 10-item CU traits scale of The Child Problematic Traits Inventory (CPTI) which was designed for use with children aged 3-12 years old (Colins et al., 2014). Parents and teachers rated items (e.g., *he/she dos not become upset when others are being hurt*) on a 4-point scale, ranging from 1 (does not apply at all) to 4 (applies very well). The internal consistency of the scale was acceptable for both parent and teacher forms (α=.89; α=.94, respectively).

Measures of Covariates for Regression Models *(T1, parent-reported)*

Prior Levels of Child Disruptive Behaviors

Conduct Problems. To control for prior levels child's behavioral difficulties in regression models testing the prospective predictive utility of the externalizing factor extracted through factor analysis**,** we used data from the 5-item Conduct Problems subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001). Each item (e.g., *"he/she often has temper tantrums"* or *"often fights with other children or bullies them"*) was scored on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). The internal consistency of the scale was α=.59.

Hyperactivity-Inattention. The 5-item Hyperactivity-Inattention subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) was used with the same purpose. Items such as *"he/she is restless, cannot stay still for long"* or *"easily distracted, difficulties concentrating"*, were rated on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). The internal consistency of the scale was α=.77.

CU traits. The Spanish translation of the Proposed Specifiers for Conduct Disorder (PSCD) was used to assess CU traits (López-Romero et al., 2019). The PSCD was developed to assess the interpersonal, affective, and lifestyle components of psychopathic personality in youth, besides conduct disorder. The 5-item CU traits scale (e.g., *"he/she rarely feels guilty or rem*orseful" or *"can turn and walk away from someone who is hurt"*) was rated by parents on a 3-point scale of 0 (not true), 1 (somewhat true) and 2 (true). The internal consistency of the scale was α=.60.

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Child Temperament

Reactivity. To assess the tendency of the child to show distress and become easily aroused we used the 5-item *Emotionality* subscale of the Emotionality Activity Sociability (EAS) Temperament Survey for Children (EAS-TS-FC; Buss & Plomin, 1984), which is recommended to be used with children aged 1 to 9 years. Each item (e.g., *"he/she cries easily"* or *"reacts intensely when upset"*) was scored on a 5-point scale ranging from 1 (not characteristic or typical of my child) to 5 (very characteristic of my child). The internal consistency of the scale was acceptable (α=.71).

Regulation. To assess child's self-control (e.g., *"he/she can calm down when excited", "can handle rejection"* or *"thinks before acting"*) we used the 6-item Emotion Regulation Skills subscale of The Fast-Track Social Competence Scale (Conduct Problems Prevention Research Group, 1995). Responses were coded on a 5-point scale ranging from zero (not at all) to 4 (very well). The internal consistency of the scale was acceptable α=.76.

Sociodemographic characteristics. We included an assessment of family socioeconomic status (SES), which was derived from questions about parent education, family income, and family financial solvency to face daily overheads. Education level was computed as the mean of mother and father ratings on a six-point scale ranging from 1 (without basic studies) to 6 (postgraduate). Family income was based on parents' reports of family income rated on a four-point scale from 1 (serious problems making ends meet) to 4 (well off). Finally, family financial solvency to face daily overheads was assessed via a five-point scale ranging from 1 (never worried) to 5 (worried every day). A mean of each of the z-transformed variables was computed to represent an SES composite. A similar strategy was also followed in other large-scale community-based studies (e.g. Colins et al., 2014) and prior works with ELISA Project data (López-Romero et al., 2019). Finally, we included child gender (1=male, 0=female) and age in years as covariates.

2.2.3. Analytic Strategy

We explored the applicability of the model revised above to account for the structure of the disruptive behaviors in our sample, by running different structural models within a SEM framework and examining the predictive validity of the latent externalizing factor. This analytic strategy is aligned with recent recommendations emphasizing the need to examine the predictive validity of the latent factors from factor-analytic techniques, beyond relying exclusively on the comparison of model fit to reach a decision on what is the best representation for the data (Forbes et al., 2021). Statistical analyses were all conducted in Mplus v. 8.0 (Muthén & Muthén, 2019). Some graphical data analyses were conducted in RStudio (RStudio Team, 2019). In the first part of our analyses, we constructed different measurement models in which we tried to establish how many, and which type of latent factors -broader, narrower- might underlie the set of externalizing behaviors examined in our study. In the second part of our analyses, we studied whether dimensions at different levels of breadth (i.e., the extracted externalizing factor vs. particular externalizing problems) related differently to particular outcomes over a three-year period.

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We run replication analyses for both measurement and regression models. On the one hand, we tested the replicability of the factor analytic models with different parent-reported measures of CU traits. Specifically, as mentioned earlier, we used the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001, **method 1**), the Child Problematic Traits Inventory (CPTI; Colins et al., 2014, **method 2**), and the DSM-5 Limited Prosocial Emotions Specifier for Conduct Disorder (LPE; APA, 2013, **method 3**). By using alternative measures with optimal internal consistency, we aimed to test if our results were sufficiently robust to support the inclusion of CU traits as a specific factor in the models. On the other hand, we run the regression analyses with different operationalizations of the externalizing factor to examine whether its associations were equivalent across methods as well as informants.

Structural Analyses. We started by estimating a first order Confirmatory Factor Analysis (CFA) with correlated factors. Next, we estimated a second order CFA, by fixing the correlations among first-order factors to zero and specifying a second-order factor. Then, we estimated a bifactor model by specifying all its factors to be orthogonal. Due to the ordinal nature of the data, WLSM (Weighted Least Square Mean), was the model estimation method. To facilitate the interpretation of the factor loadings of the second order CFA, we also applied the Schmid-Liedman Transformation (SLT) to the initial factor loadings (Schmid, & Leiman, 1957). The structural validity of the models was compared examining model fit and the configuration of factor loadings for each factor. Formal tests of improvement of fit were not conducted because it was not possible to compare the differences on fit indices for some of the estimated models (e.g., in first and second-order CFAs the same number of parameters are usually estimated, thus, the same fit statistics are expected). To conclude this phase of the analyses, factor scores of all specified dimensions across models were extracted via the Maximum A Posteriori Method (MAP, Grice, 2001).

Longitudinal Predictive Analyses. To examine the predictive validity of the latent externalizing factor we used externalizing factor score, extracted in prior analyses, in further regression models. We adopted a two-step approach. In predicting prospective parent and teacher-reported levels of conduct problems we entered, at step 1, the latent externalizing factor, along with other relevant covariates, (i.e., child's sociodemographic characteristics and temperamental reactivity and regulation). At step 2, we added along these variables, a set of specifics externalizing behaviors to test if the effects of the latent externalizing factor remained significant. Importantly, contrary to the externalizing factor, these independent variables were not factor scores extracted from the second-order CFA, but alternative measures of the ODD, ADHD and CU traits latent constructs. Even so, to test for multicollinearity between the latent externalizing factor and these alternative measures, we examined the Variance Inflation Factor (VIF) for each independent variable in each model. These analyses were run in SPSS Statistics version 26 (IBM, 2019). Following the established conventions, it was assumed that a VIF value >10 is a clear indicator of multicollinearity (Hair et al., 1998).

The same two-step analytic approach was also adopted to test whether the latent externalizing factor (step1), compared with individual specific behavioral problems (step 2), better predicted parent and teacher reported levels of the same specific problem over time. In this regression analyses, changes in R^2 (i.e., differences between the R^2 in the most complex model, step 2, and the R^2 in the simplest one, step 1) were interpreted.

2.3. RESULTS

2.3.1. Structural Phenotypic Configuration of Disruptive Behavior

We conducted a series of factor analyses to test different theoretical models on the structure of DB in our sample. Mirroring the approach described by Willoughby et al., (2011), Willoughby et al., (2014), and Waller et al., (2015), we started by specifying the models with CU traits operationalized via items selected from the CBCL (Achenbach & Rescorla, 2001, **method 1**). These results are presented and discussed here, in detail. We also conducted replication analyses with CU traits operationalized via other measures (**methods 2** and **3**). These results are also discussed in this section of the chapter but are readily available for consultation in the **Supplementary Material for Chapter Two.**

2.3.1.1. CU traits Assessed via the CBCL (*Method 1*)

The correlations between items used as indicators of DB (**Table 2.1**), are shown in **Figure 2.1**. All were positive and most of them significant, varying considerably in magnitude (r=0.05-0.59). Non-significant correlations were found for two pairs of items: *shows little affection /too little fear to get hurt* (CU21-22, r= 0.03, p<.195), and *unresponsive to affect/ too little fear to get hurt* (CU20-22, r= 0.03, p<.104).

The three competing models examined in this study and their different levels of structural organization are represented in **Figure 2.2**. Fit indices for each of them are summarized in **Table 2.2**.

The correlated-factor model is depicted in **Figure 2.2A**. The overall model fit of the initial estimated solution was acceptable ($\chi 2$ (116) = 1514.86, p < .000, CFI = .92, RMSEA = .073 (90% confidence interval [90% CI]: .070 - .077). However, after respecifying this initial model by introducing four pairs of residual correlations, the model fit improved (**Table 2.2**). We decided to consider these changes after reviewing the suggestions of the modification indices and the work of Willoughby et al. (2014) in which the exact same residual correlations were specified, obtaining as a result, similar fit indices to ours. Importantly, items within each pair were conceptually related (ADHD1-2; ADHD3-6; ODD5-7; CU20-21). The range of factor loadings was β=0.53-0.81; β =0.49-0.82 and β =0.31-0.72 (all significant, p<.000) for ADHD, ODD and CU traits factors, respectively (**Table 2.3**). Thus, indicating, that the specific factors were reasonably well-defined, particularly, ADHD and ODD. The correlations among these first-order factors were significant, positive and strong (r=0.77-0.89), suggesting that the three dimensions, could share a considerable amount of variance.

The higher-order model is depicted in **Figure 2.2B**. Again, the overall model fit of the initial estimated solution was adequate, but it improved, after respecifying this initial model with a set of residual correlations (**Table 2.2**). In this case, after reviewing the suggestions of the modification indices a more parsimonious solution was achieved. Residual correlations were specified for three of the four previous pairs of items only (ADHD1-2; ADHD3-6; CU20-21). The ranges of factor loadings for the first-order factors were similar to those yielded by the correlated-factor model. Thus, indicating that the specific factors, in this model too, were reasonably well-defined. Similarly, the second-order factor (i.e., general externalizing factor),

as indicated by the significant first-factor loadings, particularly high for the ODD and CU traits factors (β=0.94 and 0.93, respectively, **Table 2.3**).

The bifactor model is depicted in **Figure 2.2C.** The overall model fit was adequate (**Table 2.2**). Item factor loadings for the general externalizing factor ranged from β= 0.28 to 0.74. The range of factor loadings was β=0.10-0.64; β=-0.09-0.61 and β=-0.14-0.90 (not all significant) for the ADHD, ODD and CU traits factor, respectively (**Table 2.3**). Thus, indicating that the specific factors in this model, contrary to those obtained in prior factor solutions, were considerably worse defined. Also, some atypical loading patterns emerged, involving these specific factors. First, low item loadings below .30, in the ADHD and CU traits factors (β=0.10**,** p<.001, ADHD12; β=0.13**,** p<.002, CU18). Second, a non-significant loading in a central item of the ODD factor (i.e., "*disobedient*", β=0.02**,** p<.563, ODD7). Third, significant negative item loadings in the ODD and CU traits factors (β=-0.09**,** p<.019, ODD26; β=-0.14**,** p<.001, CU22).

We applied the Schmid-Liedman Transformation (SLT) to item loadings of the higher-order model, to improve factor interpretation and analyze, specifically, the relations between the general externalizing factor and its indicators (See **Table 2.4S** in the **Supplementary Material for Chapter Two**). Results revealed that five items from each of the three specific factors, had the highest factor loadings on this externalizing factor: *stubborn* (β=0.77**,** p<.000, ODD23), *defiant* (β=0.73**,** p<.000, ODD5), *disobedient* (β=0.73**,** p<.000, ODD7), *punish doesn't change* (β=0.18**,** p<.000, CU18) and *can't stand wait* (β=0.66**,** p<.000, ADHD3).

Next, we computed factor scores for each estimated model. Correlations among factor scores extracted from the three competing models are shown in **Figure 2.3**. Overall, correlations of factor scores from the correlated-factor and higher-order models were significant and strong, but this pattern was less clear and interpretable for factor scores of the bifactor model. Critically, correlations among factor scores representing specific dimensions (i.e., ODD, ADHD, CU traits) in the bifactor model were negative. Thus, suggesting a poor definition and dubious meaning of the specific factors as specified in this factor model.

Taken together, the results presented above suggest that the specific factors from the correlated-factor and higher-order model were reliable. In subsequent analyses, only the latent externalizing factor score from the latter was considered to test further predictive associations.

2.3.1.2. Replication Analyses with CU traits Assessed via Alternative Measures (*Methods 2 and 3*)

In **Table 2.4,** we present the different indicators by which CU traits were operationalized in our study. Item-level correlations are shown in **Figures 2.1S, 2.2S, 2.3S** in the **Supplementary Material for Chapter Two.**

Standardized item and factor loadings for the re-estimated models, operationalizing CU traits through **methods 2** and **3** are depicted in **Figures 2.4S** and **2.5S** (see **Supplementary Material for Chapter Two**). Fit indices for these models are compiled in **Table 2.5**.

Fit indices for models estimated with items from CU traits subscale of the CPTI (**method 2**) were acceptable. The analyses with items from the LPE Specifier of the DSM5 (**method 3**), yielded similar results, except for the bifactor model. Apart from this exception, the bifactor

model continued to exhibit, in line with our previous findings, the best fit to the data according to the traditional fit indices. However, anomalous (e.g., negative) and atypical (e.g., lower than expected) loading patterns were also found for individual specific factors across methods (**Figures 2.4S and 2.5S**). Thus, suggesting, again, that latent specific factors as specified in the bifactor model might be unreliable. By contrast, the correlated-factor and higher-order models yielded more consistent results, in terms of both fit indices and factor loading configurations across methods. Thus, suggesting their potential superiority to account for the structure of the data in our sample. In **Table 2.6,** factor loadings of the higher and lower order factors of the second order model across operationalizations are shown. Overall, specific factors remained well-defined. As for the externalizing factor, there was a considerable reduction in the magnitude of the CU traits factor loading, assessed through the CPTI (**method 2**, β=.54, p<.000) and the LPE (**method 3**, β=.58, p<.000), compared to items from the CBCL (**method 1**, β=.93, p<.000). However, the contribution of the subfactor to the total amount of variance of the externalizing factor remained significant.

In sum, our initial results suggesting that individual differences in CU traits levels might account for the variation along a general externalizing vulnerability in early childhood, were replicated trough different assessment methods.

2.3.2. Longitudinal Predictive Validity of the Supraordinate Factor of DB

The results of the analyses exploring the predictive validity of the externalizing factor are shown in **Tables 2.7-2.9**. Results of the complementary analyses, considering different operationalizations of CU traits, can be found in **Tables 2.6S to 2.11S** of the **Supplementary Material for Chapter Two**. In what follows, they will be jointly summarized.

2.3.2.1. Outcome: Conduct Problems

We first examined the effects of the externalizing factor in isolation (step 1), by performing a series of multiple regressions of prospective parent and teacher-reported levels of conduct problems on the second order factor. Overall, results were consistent across methods as well aswithin and across informants. That is, the effects of the broader externalizing factor remained statistically significant despite variations on the strategy to assess CU traits and the informant reporting the outcome of interest. **Table 2.7**, in the main text of the chapter, and **Tables 2.6S and 2.8S**, in the **Supplementary Material for Chapter Two**, show that the range of variation of these associations across methods was similarly narrow in parent and teacher models (β range= 38-.40 and 29-.30, respectively). For both informants, the largest associations were found with the externalizing factor assessed with the CU items from the CPTI (**method 2**, β=.40 and β=.30 in parent and teacher models). By contrast, the most modest effects were found with **method 1** (i.e., the CBCL, β=.38) for parent-reported data and **method 3** (i.e., the LPE, β=.29) for teacher-reported data. The percentage of explained variance ranged from 22-23% in parent models, and was of 15% for teacher models.

Next, we performed a set of multiple regression models in which specific externalizing behaviors (i.e., conduct problems, hyperactivity/impulsivity, CU traits) intended to represent the constructs at the lower level of the hierarchical model, were included along with the externalizing latent factor (step 2). We run tests to probe if the data met the assumption of

collinearity, which indicated that multicollinearity was not a concern (Tolerance and VIF values are reported in each of the tables which summarize the results from regression models). In these analyses, effects continued to be pretty consistent across methods and within informants, but slightly mixed across informants. While in parent models, the effects of the externalizing factor remained significant over and above those of specific externalizing behaviors, for **methods 1, 2** and **3**, in teacher models, the effects of the externalizing factor remained significant only for **methods 1** and **2,** with a considerable overall reduction, in addition, on effects sizes (**Table 2.7, 2.6S, 2.8S**). Importantly, in parent models, a slight decrease of the effects sizes of the externalizing factor after introducing the covariates was found. However, despite this attenuation, that is suggesting some kind of redundancy between broader and narrower dimensions, the slight reduction on R^2 in some of these models, as a result of introducing the specific facets as covariates, may be indicating, at the same time, a predictive preponderance of this broader factor (e.g., **Tables 2.6S** and **2.8S**). Critically, the fact that neither with parent nor teacher-reported data, the effect sizes of the externalizing factor were amplified after including the covariates in the second step, impedes to conclude that this broader factor might be explaining an additional amount of variance which is not captured by narrower operationalizations of behavioral problems.

In sum, associations between specific externalizing behaviors at T1 (i.e., conduct problems, hyperactivity/impulsivity, CU traits) and higher levels of parent and teacher-reported conduct problems at T3 were found. Furthermore, the predictive validity of the externalizing factor, both in isolation and over and above these specific domains was also demonstrated.

2.3.2.2. Outcome: Same Specific Dimensions over Time

We applied, again, a two-step approach in the regression analyses. First, we regressed, in separated models, each specific externalizing behavior, reported prospectively by parents and teachers, on the externalizing factor alone. These analyses revealed significant effects of moderate magnitude across methods that, importantly, were replicated, within and, albeit differences in magnitude, across informants (**Tables 2.9, 2.10S, 2.11S**). Specifically, in parent models, the effects of the externalizing latent factor were particularly strong in predicting levels of ODD (β range across methods= .57-.58) and ADHD (β range across methods= 51-.54) over a three-year period. Similar results were found with teacher-reported outcomes. Second, we re-estimated each model by including, along with the externalizing factor, parent-reported previous levels of the same specific problematic behavior which we aimed to predict. Again, results were consistent across methods, within and, albeit differences in the magnitude of effects, across informants. In both parent and teacher models, the effects of the externalizing factor remained significant and in the expected direction (i.e., positive) over and above those of each specific problem. In fact, higher levels on the latent broader vulnerability previously reported by parents, were prospectively and strongly associated with higher levels of ODD, above those of the very same specific dimension (**Tables 2.9A, 2.10AS, 2.11AS**). However, these findings were not replicated with teacher-reported data.

In sum, higher levels of conduct problems, hyperactivity-inattention and CU traits previously reported by parents were prospectively associated to higher levels of these same difficulties reported, also by teachers, over a three-year period. However, for certain disruptive

behaviors (i.e., ODD), the externalizing factor at T1 outperformed specific problems in predictive analyses.

Taken together, the results presented above (subsections **3.2.1** and **3.2.2**), suggest that the externalizing factor might be useful to longitudinally predict not only general (e.g., conduct problems), but also, specific forms of externalizing psychopathology. Therefore, indicating that its predictive utility might be extendable to operationalizations of DB varying in scope.

2.4. DISCUSSION

The general objective of the present work was to examine what is the best-fitting model to represent the factor structure of a set of externalizing behaviors in a sample of preschoolers. We compared conceptually and statistically non-equivalent factor analytic models, specified upon previous literature, to account for the structural relations among ODD, ADHD, CU traits. Although results presented above must be interpreted with caution because of the limitations of this study, they provide preliminary support for our hypotheses.

2.4.1. A Multidimensional Hierarchical Model of DB in the Preschool Years

Correlations of moderate magnitude among diverse forms of externalizing problems are well-documented in both child and adult literatures, but the debate on nature of these associations is unconcluded (Achenbach, 2021; Krueger et al., 2021, Nikolas, 2016). Our findings suggest that, at least statistically, a hierarchical structure could adequately account for the pattern of correlations among the disruptive behaviors examined in this large sample of preschoolers. On a practical level, such structure might serve to contextualize the systematic co-occurrence of apparently distinct externalizing phenomena, observed in both clinical and non-clinical samples (Bendiksen et al, 2017; Carbonneau et al., 2015; Kim & Eaton, 2015; Kuja-Halkola et al., 2015). That is, to better understand *how* and potentially, *why* multiple problems of the same "type" or "form" (e.g., disobedience, hyperactive behaviors, aggressive behaviors, callousness) tend to occur together.

These findings are interpretable along with existing evidence on the hierarchical structure of the externalizing spectrum in developmental periods such as childhood, adolescence or early adulthood (Achenbach, 1996; Farmer et al., 2009; Krueger et al., 2007). However, they add to the previous literature in some important ways. First, our results suggest that a hierarchical organization can be also applied to a variety of common disruptive behaviors observed in early childhood (i.e., the preschool years). As noted, research on the components and hierarchical structure of the externalizing spectrum has been predominantly focused on certain phases of development in detriment of others. To date, infancy or early childhood have been rarely examined (see Lorber et al., 2015 or Witkiewitz et al., 2013 for exceptions). Second, further support for the existence of overarching spectra constructs (i.e., the externalizing factor) in early developmental periods is provided (Krueger et al., 2021). Finally, to our knowledge, this is the first time that CU traits, poorly represented in contemporary structural models of psychopathology (e.g., the HiTOP; Kotov et al., 2017), are explicitly included as a part of a hierarchical configuration (i.e., second-order factor model) of externalizing psychopathology.

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2.4.2. The Externalizing Factor in the Preschool Years: Components, Meaning and Methodological Considerations

Research on the structure of psychopathology in childhood has yielded diverse conceptualizations of the externalizing factor, with some of them being sustained on particularly strong evidence (Achenbach, 1966; Achenbach, 2020; Achenbach & Edelbrock, 1978). However, further investigation into its content and components is still needed, particularly in youth (and specially child) populations (Krueger et al., 2021). The results of our analyses indicate that the specific problematic behaviors examined in this study (i.e., ODD, ADHD, CU traits) may share common variance that could be captured in a general "externalizing factor", a broader underlying dimension of liability, prospectively associated with later difficulties, reported by multiple informants.

These findings are interesting for various reasons. First and foremost, they seem to reveal something about the nature of the externalizing factor. It appears that, at least in part, CU traits potentially contribute to account for the phenotypic variation of such an overarching factor. This idea, however, needs to be further discussed. If support for these hypotheses could be established, it would imply that the tendency of CU traits to occur with other forms of DB (e.g., CP or ADHD; Brammer, & Lee, 2012; Haas & Waschbusch, 2012), could be partially explained by means of a broader underlying vulnerability and, also, a set of empirically and conceptually distinctive behaviors may be sharing, at least to a degree, certain etiological influences. This later inference, however, is problematic and extra caution must be taken to avoid falling into flawed reasonings. Latent factors do not necessarily imply the existence of common causes (Watts, Lane, et al., 2020) and it is becoming increasingly clear that the psychobiological precursors of CU traits are very much domain specific (Waller & Wagner, 2019). A similar reasoning could be also applied to ADHD. In fact, the relocation of ADHD into another section in the latest version of the DSM5 (i.e., neurodevelopmental disorders instead of disruptive disorders; APA, 2013) is based on evidence pointing to domain-specific neurodevelopmental vulnerabilities (Nigg, 2016). We, like others, believe, however, that this relocation complicates the study and understanding of the substantive relations between diverse forms of DB (Drabick et al., 2016).

Leaving aside these controversial issues, our study is contributing to address some critical gaps in previous research. First, beyond explicitly exploring, for the first time, whether CU traits could be a meaningful component of a broader externalizing vulnerability in the preschool years within a structural approach to psychopathology, we tried to assure that the strategy adopted to test this hypothesis was as stringent and exhaustive as possible. In the present study, CU traits, and by extension, the externalizing factor, were operationalized via different measures. As such, the possibility that the association between ODD, ADHD and CU under the overarching second order factor, was spurious and simply a mere artifact of the larger statistical power of our sample was somehow ameliorated. In fact, the similar results obtained across methods in these replication analyses suggest precisely otherwise. Second, the replicated observation that CU traits are part of an early broader vulnerability is central to the idea that beyond specific-domain etiological determinants, general-spectrum vulnerabilities should be also considered to examine the heterogeneous combinations that give rise to different forms of DB (Lahey et al., 2017). Third, we are contributing, with this study, to shed light into the debate

on what might be the most appropriate analytic strategy to model general factors thought to underlie multiple psychopathological dimensions. Our insights might be valuable, despite being circumscribed to a particular set of behaviors within the externalizing domain and not the wider range of psychopathology. As our analyses showed, if the higher-order and the bifactor were juxtaposed, the former would overperform the later, not in terms of model fit, but as for the reliability of its factorial components. In most of bifactor models specified in the present work, lower-order facets were not psychometrically coherent and difficult to interpret (e.g., anomalous, or unexpected loading patters were found). This might be uncovering their poor reliability. Overall, these results are aligned with increasing evidence exposing the limitations of such methodological applications (Eid et al, 2017; Sellbom & Tellegen, 2019; Watts, Poore & Waldman, 2019). At the same time, they are difficult to interpret along with the previous literature, due to the absence of prior empirical works comparing structural models of DB which used our very same indicators (see Strickland et al., 2011 for an example).

2.4.3. Validity of the Externalizing Factor in the Preschool Years: Longitudinal Outcomes

There is currently a scarcity of research testing whether adopting a certain level of analysis, (i.e., broader) compared to another (i.e., narrower) is better to predict relevant outcomes (Conway et al., 2021). At the same time, emerging literature suggests that a comprehensive analytic approach in which both structural and validity analyses are complementarily integrated, might constitute the best alternative to compare competing models on the structure of psychopathology (Forbes et al., 2021; Watts, Lane et al., 2020). To address this gap, and following these recommendations, we provided preliminary evidence on the prospective predictive validity of the externalizing factor. We demonstrated that a broader externalizing vulnerability, encompassing oppositional-defiant, hyperactive-impulsive and callous unemotional behaviors, might account for significant additional variance over specific externalizing problems when longitudinally predicting not only more general (e.g., conduct problems), but also, more specific forms of DB overtime. This last finding tentatively supports the idea that the manifestations of a broad early vulnerability could become increasingly specific as the individual progresses in development (i.e., p-differentiation processes; McElroy et al., 2018). At least for ODD, this could be the case. The latent externalizing factor showed, for this specific dimension, increased predictive utility over previous parent-reported levels of the same problematic behaviors assessed via alternative measures. Nonetheless, despite these interesting effects, the broader factor still failed to account, prospectively, for a considerable amount of variance of specific psychopathological domains. Over a three-year period, within and across informants, specific problematic domains strongly predicted specific problematic domains. In other words, despite its explanatory capacity and apparent heuristic value, the general externalizing factor is far from serving as a one-size fits all solution subsuming all the important phenotypic elements relevant to understand the onset of clinically significant externalizing problems.

2.4.4. Strengths and Limitations

The present work has some major strengths. First, we examined the structure of externalizing psychopathology in the preschool years. This is crucial, as more reliable and valid phenotypes are needed to identify, earlier, the antecedents of potentially more serious forms of

emerging psychopathology (Wakschlag et al., 2019). Second, we proposed a model that is based on previous research showing that CU traits, opposition-defiant and hyperactive behaviors are moderately correlated in the preschool years. Thus, the selection of DB indicators included in our hierarchical model was not arbitrary, but evidence based (Waller et al., 2015; Willoughby et al., 2011; Willoughby et al., 2014). Third, we used dimensional measures of the DB indicators instead of categorical diagnoses derived from traditional categorical classification systems of frequent use (e.g., the DSM; APA, 2013). By so doing, we are building upon mounting evidence supporting the dimensional nature of psychopathological problems and, most importantly, we are using "friendly-measures" (e.g., the CBCL; Achenbach & Rescorla, 2000) well-aligned with such approaches (Conway et al., 2021). Fourth, we tried to establish the external validity of the model. We considered, in this task, validators of varying scope: more general (e.g., conduct problems) and more specific (e.g., the same dimensions over time), that were, importantly, reported prospectively by multiple informants (i.e., parents and teachers). Increasing evidence suggest that fit indices alone are not, per se, sufficiently reliable indicators of model validity (Greene et al., 2019; Watts, Poore & Waldman, 2019).

At the same time, several limitations must be noted. First, our evidence on model validity is limited. No longitudinal measurement invariance tests were conducted because of limitations in our data. Although measures of CU traits operationalized via the CPTI and the LPE items were also available at T2 and T3, we lacked data for CU traits measured by the CBCL beyond T1. Hence, the developmental course of the broader and narrower factors could not be established through all the three methods considered in this study. Second, our characterization of the externalizing spectrum during this particular developmental period is likely to be incomplete. That is, some relevant elements within the universe of normative externalizing behaviors in the preschool years might have been poorly represented (e.g., aggressive behaviors). Additionally, dispositional accounts of behaviors consistently associated to the externalizing spectrum (e.g., impulsivity) were not included. Therefore, despite based in previous evidence, future investigations must consider improving this operationalization, as an adequate model of the externalizing spectrum would be expected to cover the full range of disruptive behaviors, including normative forms and associated traits (Waldman et al., 2006). Third, only parent-reported data was used to specify the factor-analytic models accounting for the structure of externalizing psychopathology. Thus, at least to some extent, common method variance might be contributing to inflate the correlations among both DB symptoms and first order dimensions that yielded the externalizing factor. Fourth, the size of the effects found was overall small. In fact, there is the possibility that these associations might be the result of the sufficient statistical power from the large sample size. That is, sample dependent. Fifth, we used data from a community sample. This approach is somehow justified given the increasing evidence on the dimensional nature of psychopathology, distributed within individuals along a severity continuum (Helzer et al., 2006). Nonetheless, further tests of these hypotheses in other samples (e.g., clinical) are needed to better understand the nature and correlates of the broader externalizing factor in different populations. Sixth and finally, in this study, the externalizing factor was not derived from observation in natural or clinical settings. One major concern may arise, thus, from the fact that the externalizing factor may be just reflecting a statistical product resulting from the application of factor analytic methods. The ecological validity and clinical relevance of this latent construct is, therefore, unclear.

2.4.5. Future Research

Future works can build upon these limitations. We found a well-fitting model and further evidence on the validity of key psychopathological constructs (e.g., the externalizing factor) operationalized through indicators traditionally understudied (i.e., CU traits). However, this is simply insufficient to conclude that we have found the true, or definite account of the underlying structure of DB in the preschool years. Further investigation into the replicability and validity of this model is needed. To support the hypotheses formulated in this study, additional tests using different samples (e.g., older age-groups), methods (e.g., clinical observation), and diverse and more comprehensive operationalizations of DB (e.g., item-level, disorder level data) are necessary. The idea that CU traits are a fundamental component of the externalizing factor must be further investigated. Also, determining the applicability and incremental utility of such empirically derived model over prevailing views in clinical and research contexts (e.g., categorical nosological systems) is also needed. Relatedly, progress towards how to best assess this broad vulnerability, reliably and validly, in early childhood, should be pursued (Simms et al., 2021).

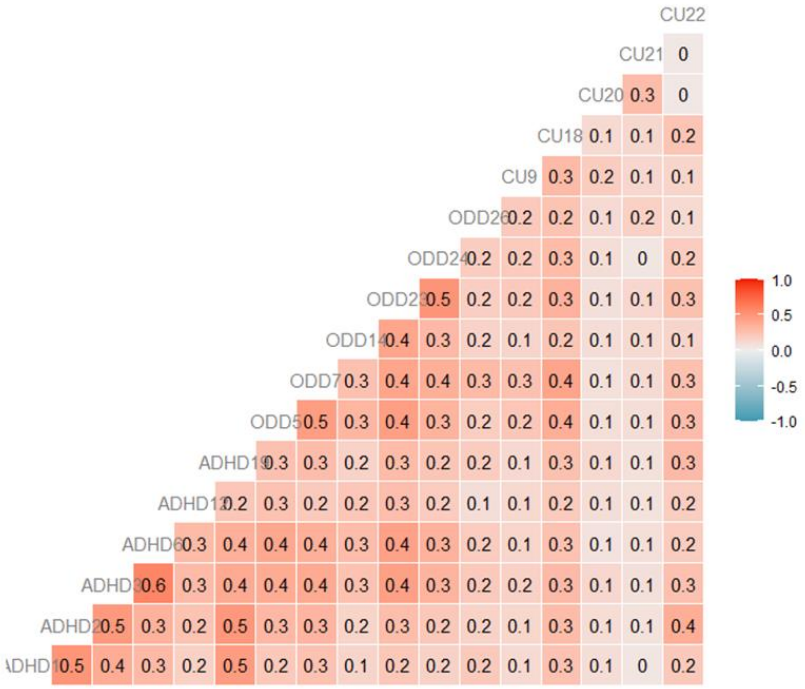
The implications of such efforts are critical. Essential clinical processes can be improved, by better elucidating which are the most optimal assessment and intervention targets (Forbes et al., 2019; Rosellini & Brown, 2021). Ultimately, current, and future research programs can be adapted and redirected, and, thus, substantial changes on how investigations are conducted and interpreted may occur (Waszczuk et al., 2020).

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Table 2.1. Descriptive statistics for each of the CBCL items used as indicators of child disruptive behavior *(method 1)*

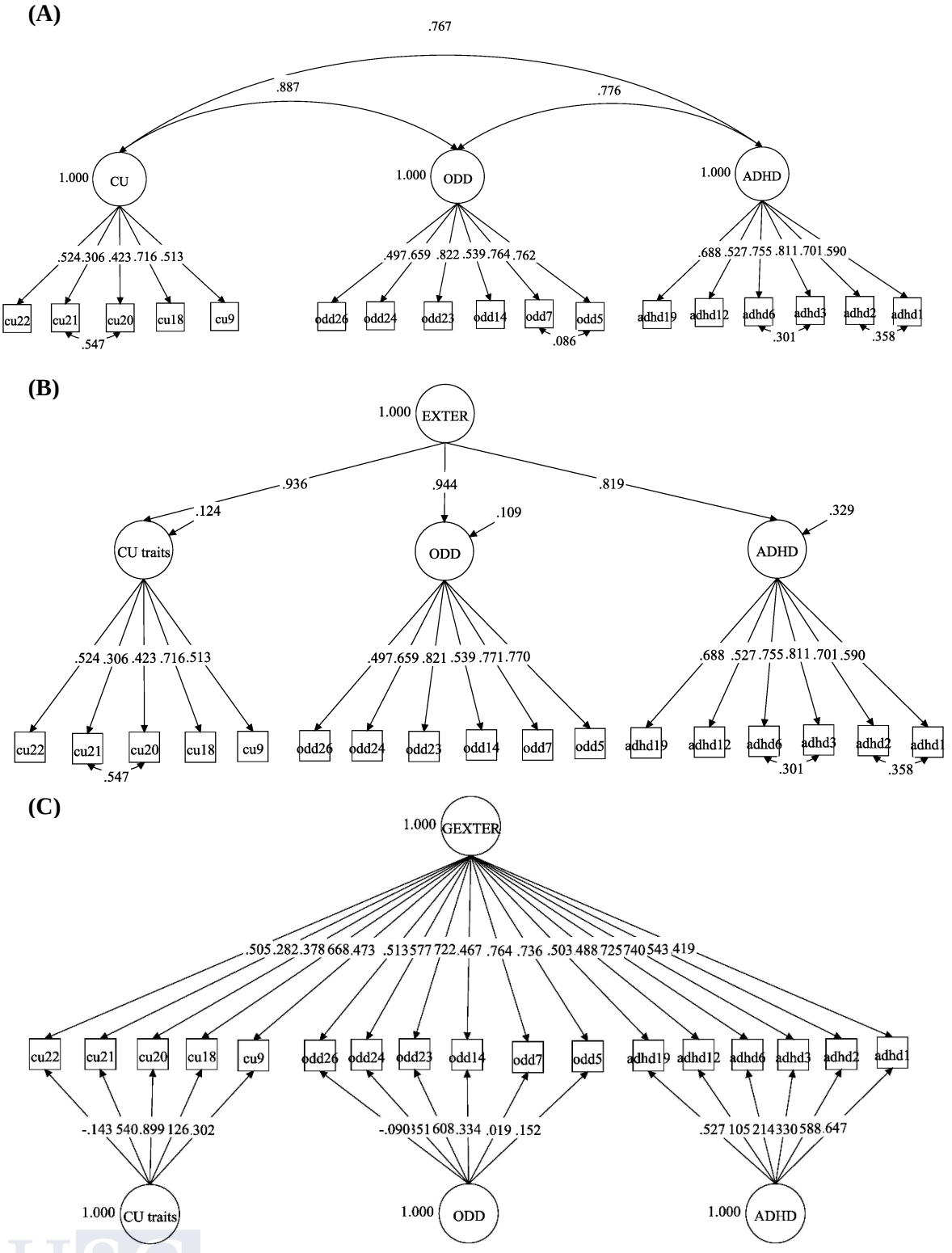
CBCL items (DSM5-oriented scales)		***N***	***% Missing***	***Mean***	***SD***	***Min***	***Max***	***Skew***	***Kurtosis***
ADHD1	*Can't concentrate*	2232	0.18	0.65	0.65	0	2	0.52	-0.70
ADHD2	*Can't sit still*	2233	0.13	0.74	0.73	0	2	0.45	-1.04
ADHD3	*Can't stand wait*	2232	0.18	0.82	0.65	0	2	0.21	-0.74
ADHD6	*Demands met*	2228	0.35	1.00	0.63	0	2	0.00	-0.48
ADHD12	*Into everything*	2218	0.80	0.38	0.56	0	2	1.14	0.30
ADHD19	*Quickly shifts*	2219	0.76	0.78	0.71	0	2	0.34	-0.98
ODD5	*Defiant*	2231	0.22	0.42	0.60	0	2	1.12	0.23
ODD7	*Disobedient*	2231	0.22	0.53	0.58	0	2	0.55	-0.65
ODD14	*Angry moods*	2219	0.76	0.69	0.63	0	2	0.36	-0.69
ODD23	*Stubborn*	2221	0.67	0.90	0.61	0	2	0.05	-0.36
ODD24	*Temper tantrum*	2221	0.67	0.83	0.64	0	2	0.19	-0.71
ODD26	*Uncooperative*	2221	0.67	0.23	0.46	0	2	1.81	2.36
CU9	*No guilt after misbeh.*	2227	0.40	0.26	0.51	0	2	1.84	2.54
CU18	*Punish doesn't change*	2210	1.16	0.42	0.61	0	2	1.17	0.31
CU20	*Unresponsive affection*	2217	0.84	0.05	0.25	0	2	5.46	31.82
CU21	*Shows little affection*	2215	0.94	0.13	0.37	0	2	2.97	8.60
CU22	*Too little fear get hurt*	2215	0.94	0.67	0.71	0	2	0.58	-0.87

Figure 2.1. Correlations between items of the CBCL assessing DB *(method 1)*



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Figure 2.2. Correlated-factor, higher-order and bifactor model of DB *(method1)*



Depicted here are: **(A) the correlated-factor model,** in which the correlated ADHD, ODD and CU latent factors account for the pattern of covariances among behavioral indicators at the lowest level of the hierarchy; **(B) the higher-order model**, in which a single supraordinate factor (i.e."EXTER") accounts for the shared variance among the subordinate factors (i.e., ADHD, ODD and CU traits) which, in turn, account for the pattern of item loadings at the lowest level of the hierarchy; **(C) the bifactor mode**l, in which all indicators load into a supraordinate factor (i.e."GEXTER"), and also, distinctively, into specific latent factors accounting for residual, unique variance (i.e.,ADHD, ODD and CU), being all these factors orthogonal.

Table 2.2. Fit indices for the competing models examined in this study *(method 1)*

Model (method 1)	***χ2* (df)**	**CFI**	**TLI**	**RMSEA (90% CI)**	**Corr. latent factors**
a. Correlated-factor model	1159.10 (112), *p* <.000	0.94	0.93	0.065 (0.061-0.068)	ADHD-ODD, *r*= .78 ODD-CU, *r*= .89 ADHD-CU, *r* = .77
b. Higher-order model	1161.66 (113), *p* <.000	0.94	0.93	0.064 (0.061-0.068)	-
c. Bifactor model	852.97 (102), *p* < .000	0.96	0.94	0.057 (0.054-0.061)	-

Note: CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval.

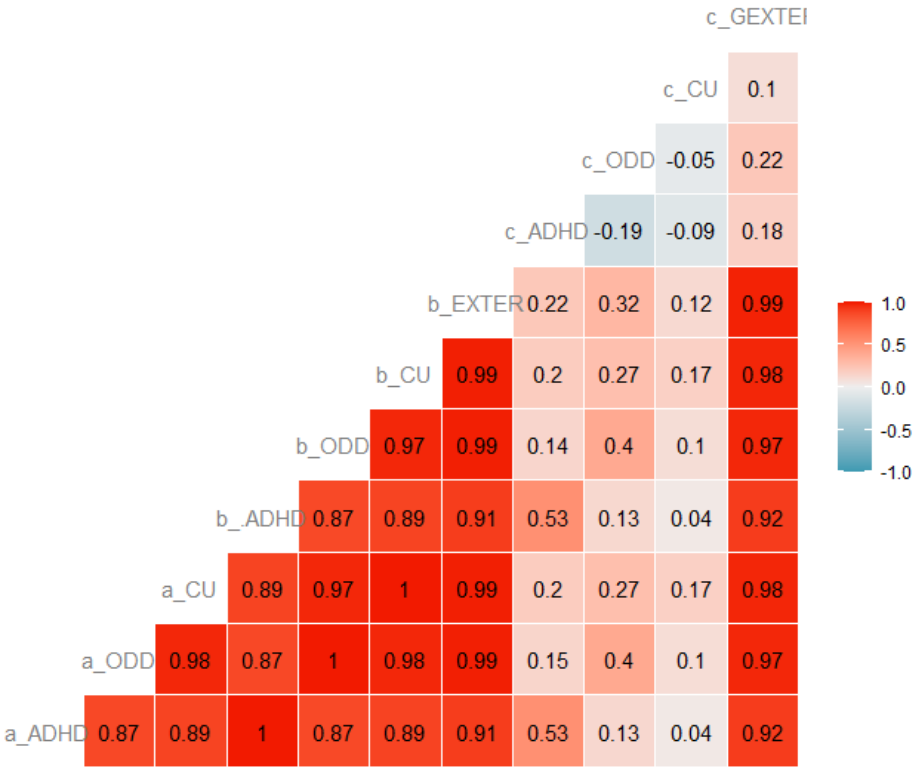
Table 2.3. Standardized item and factor loadings across the competing models *(method 1)*

	Correlated-factor model			***Higher-order model***				***Bifactor model***			
	ADHD	**ODD**	**CU**	**ADHD**	**ODD**	**CU**	**EXTER**	**GEXTER**	**ADHD**	**ODD**	**CU**
Indicator (*)	***β***	***β***	***β***	***β***	***β***	***β***	***β***	***β***	***β***	***β***	***β***
ADHD1	.59***			.53***				.42***	.64***		
ADHD2	.70***			.70***				.54***	.59***		
ADHD3	.81***			.82***				.74***	.33***		
ADHD6	.75***			.76***				.74***	.21***		
ADHD12	.53***			.53***				.72***	.10**		
ADHD19	.69***			.64***				.76***	.52***		
ODD5		.76* **			.77***			.47***		.15***	
ODD7		.76***			.78***			.49***		.02	
ODD14		.54***			.54***			.47***		.33***	
ODD23		.82***			.82***			.67***		.61***	
ODD24		.66***			.65***			.50***		.35***	
ODD26		.49***			.50***			.38***		-.09*	
CU9			.51***			.51***		.28***			.30***
CU18			.72***			.73***		.50***			.13***
CU20			.42***			.42***		.72***			.90***
CU21			.31***			.31***		.58***			.54***
CU22			.54***			.52***		.51***			-.14**
Subordinate factors											
ADHD							.82***				
ODD							.94***				
CU traits							.93***				

Note. *p<.05, **p<.01, ***p<.001; (*)= method 1

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Figure 2.3. Correlations between the factor scores extracted from the competing models examined in this study *(method 1)*



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Table 2.4. Items of the different measures used to operationalize CU traits in this study

Method 1: **Items selected from the CBCL**
1. Doesn't seem to feel guilty after misbehaving
2. Punishment doesn't change behavior
3. Seems unresponsive to affection
4. Shows little affection toward people
5. Shows too little fear of getting hurt
Method 2: **CU traits subscale of the CPTI**
1. Seldom expresses sympathy for others
2. Usually does not seem to share others' joy and sorrow
3. Never seems to have bad conscience for things that he/she has done
4. Often seems to be completely indifferent when other children are upset
5. Does not become upset when others are being hurt
6. Seldom remorseful when he/she has done something not allowed
7. Often does not seem to care about what other people feel and think
8. Sometimes seems to completely lack the capability to feel guilt and remorse
9. Never expresses feelings of guilt when he/she has done something not allowed
10. Does not express guilt and remorse to the same extent as other children of the same age
Method 3: **CD Limited Prosocial Emotions Specifier of the DSM5**
1. Does not feel bad or guilty when he/she does something wrong
2. Disregards and is unconcerned about the feelings of others
3. Does not show concern about poor/problematic performance at school, work, or in other important activities
4. Does not express feelings or show emotions to others, except in ways that seem shallow or superficial

Note. CBCL: The Child Behavior Checklist (Achenbach & Rescorla, 2001); CPTI: The Child Problematic Traits Inventory (Colins et al., 2014); DSM5: The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (APA, 2013)

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Table 2.5. Fit indices for the competing models examined in this study, with the externalizing factor operationalized through different measures of CU traits

	χ2 (df)	CFI	TLI	RMSEA (90% CI)	Correlations among latent factors
Models (T1)					
Method 1 (CU via the CBCL)					
a. Correlated-factor	1159.10 (112), p <.000	0.94	0.93	0.065 (0.061-0.068)	ADHD-ODD, *r* =.78; ODD- CU, *r* = .89; ADHD-CU, *r* =.77
b. Higher-order	1161.66 (113), p <.000	0.94	0.93	0.064 (0.061-0.068)	-
c. Bifactor	852.97 (102), p < .000	0.96	0.94	0.057 (0.054-0.061)	-
Method 2 (CU via the CPTI)					
a. Correlated-factor	1552.24 (206), *p* <.000	0.96	0.95	0.057 (0.055-0.060)	ADHD-ODD, *r* =.79; ODD- CU, *r* = .57; ADHD-CU, *r* =.44
b. Higher-order	1620.60 (206), *p* <.000	0.95	0.94	0.055 (0.053-0.058)	-
c. Bifactor	1132.99 (187), *p* <.000	0.96	0.96	0.047 (0.045-0.050)	-
Method 3 (CU via the DSM5)					
a. Correlated-factor	1414.64 (101), *p* <.000	0.93	0.92	0.076 (0.073-0.080)	ADHD-ODD, *r* =.75; ODD- CU, *r* = .54; ADHD-CU, *r* =.46
b. Higher-order	1414.64 (101), *p* <.000	0.93	0.92	0.076 (0.073-0.080)	-
c. Bifactor	786.89 (88), *p* <.000	0.96	0.95	0.060 (0.056-0.063)	-

Note: CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; CI = confidence interval. Method 1: CU traits assessed by items selected from the CBCL (Achenbach & Rescorla, 2001) ; Method 2: CU traits assessed by the CU traits subscale of the CPTI (Colins et al., 2014); Method 3: CU traits assessed by the Limited Prosocial Emotions Specifier of the DSM5 (APA, 2013).

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Table 2.6. Standardized item and factor loadings for the second-order Confirmatory Factor Analysis (CFA) specified with different measures of CU traits at T1

	Higher-order model											
	Method 1: CU via the CBCL (T1)				***Method 2: CU via the CPTI (T1)***				***Method 3: CU via the DSM5 (T1)***			
Indicators	**ADHD**	**ODD**	**CU**	**EXTER**	***Indicators***	**ADHD**	**ODD**	**CU**	**EXTER**	***Indicators***	**ADHD**	**ODD**	**CU**	**EXTER**
CBCL	**β**	**β**	**β**	**β**	***CBCL+ CPTI***	**β**	**β**	**B**	**β**	***CBCL+ LPE***	**β**	**β**	**β**	**β**
ADHD1	.53***				**ADHD1**	0.65***				**ADHD1**	0.66***			
ADHD2	.70***				**ADHD2**	0.72***				**ADHD2**	0.72***			
ADHD3	.82***				**ADHD3**	0.85***				**ADHD3**	0.85***			
ADHD6	.76***				**ADHD6**	0.80***				**ADHD6**	0.80***			
ADHD12	.53***				**ADHD12**	0.52***				**ADHD12**	0.51***			
ADHD19	.64***				**ADHD19**	0.68***				**ADHD19**	0.67***			
ODD5		.77***			**ODD5**		0.77***			**ODD5**		0.77***		
ODD7		.78***			**ODD7**		0.77***			**ODD7**		0.77***		
ODD14		.54***			**ODD14**		0.53***			**ODD14**		0.54***		
ODD23		.82***			**ODD23**		0.81***			**ODD23**		0.82***		
ODD24		.65***			**ODD24**		0.65***			**ODD24**		0.65***		
ODD26		.50***			**ODD26**		0.55***			**ODD26**		0.52***		
CU9			.51***		**CPTI1**			0.64***		**LPE1**			0.83***	
CU18			.73***		**CPTI2**			0.69***		**LPE2**			0.86***	
CU20			.42***		**CPTI3**			0.58***		**LPE3**			0.73***	
CU21			.31***		**CPTI4**			0.76***		**LPE4**			0.65***	
CU22			.52***		**CPTI5**			0.75***						
					CPTI6			0.75***						
					CPTI7			0.77***						
					CPTI8			0.82***						
First order factors					**CPTI9**			0.75***						
					CPTI10			0.74***						
ADHD				0.82***					0.77***					0.80***
ODD				0.94***					0.96***					0.93***
CU traits				0.93***					0.54***					0.58***

Note. *p<.05, **p<.01, ***p<.001; CBCL: The Child Behavior Checklist (Achenbach & Rescorla, 2001); CPTI: The Child Problematic Traits Inventory (Colins et al., 2014); DSM5: The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (APA, 2013)

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Table 2.7. Results of regression analyses with the externalizing factor score from the second order CFA predicting levels of conduct problems informed by parents and teachers over a two-year period (*method 1* was used for extracting the externalizing factor)

	Dependent variable: Conduct Problems (T3)							
	Parent-reported				**Teacher-reported**			
	(a)		**(b)**		**(a)**		**(b)**	
Predictors (T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.15 (.02)	-.16***	-.14 (.02)	-.15***	-.26 (.03)	-.22***	-.24 (.02)	-.20***
Age	-.01 (.01)	-.01	-.01 (.01)	-.02	.00 (.01)	.01	.00 (.01)	.00
SES	.01 (.01)	.01	.01 (.01)	.01	-.04 (.02)	-.05*	-.03 (.02)	-.04
Temperament								
Reactivity	.05 (.02)	.10**	.04 (.01)	.08**	-.01 (.02)	-.01	-.02 (.02)	-.03
Regulation	-.13 (.02)	-.17***	-.08 (.02)	-.11***	-.01 (.03)	-.01	.04 (.03)	.04
DB (broad factor)								
EXTER	.20 (.02)	.38***	.11 (.02)	.21***	.21 (.02)	.30***	.07 (.03)	.10*
DB (specific behaviors)								
CP *(SDQ)*	-	-	.38 (.05)	.26***	-	-	.45 (.08)	.23***
HYP-INA *(SDQ)*	-	-	. 02 (.03)	.02	-	-	.15 (.04)	.12***
CU traits *(PSCD)*	-	-	38 (.06)	.18***	-	-	.17 (.08)	.06*
R^2		.22***		.22***		.15***		.15***

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported

(a) = models in which the effects of the externalizing factor are considered alone or (b)= along with those of specific externalizing behaviors assessed at T1 via alternative measures of the specific domains; CP= Conduct Problems subscale of the SDQ (Goodman, 2001); HYP-INA= Hyperactivity-Inattention subscale of the SDQ; CU traits= CU traits subscale of the PSCD (López-Romero et al., 2019)

Table 2.8. Results of multi-collinearity tests for the most complex regression models

	Parents		**Teachers**	
	Tolerance	**VIF**	**Tolerance**	**VIF**
Externalizing factor	.31	3.22	.31	3.33
Conduct Problems	.47	2.14	.45	2.21
Hyperactivity-Inattention	.57	1.77	.55	1.81
CU traits	.87	1.15	.86	1.16

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Table 2.9 (A, B, C). Results of regression analyses comparing the utility of the externalizing factor to predict specific externalizing problems, informed by parents and teachers, over and above the same specific problems previously reported by parents

(A)

	Dependent variable: Oppositional Defiant Disorder (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.06 (.02)	-.07***	-.06 (.01)	-.07***	-.09 (.01)	-.12***	-.09 (.01)	-.13***
Age	.01 (.01)	.02	.01 (.01)	.02	.02 (.01)	.06**	.02 (.01)	.06**
SES	-.02 (.01)	-.03	-.02 (.01)	-.04	-.02 (.01)	-.03	-.02 (.01)	-.03
DB (broader)								
EXTER	.26 (.01)	.57***	.19 (.01)	.44***	.12 (.01)	.29***	.07 (.01)	.17***
DB (narrower)								
CP (*SDQ*)	-	-	.31 (.04)	.25***	-	-	.21 (.04)	.19***
R^2		.35***		.29***		.11***		.09*

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; CP= Conduct Problems subscale of the SDQ (Goodman, 2001).
Multicollinearity tests. Parent model : EXTER, VIF=1.99 ; CP, VIF=1.95 , Teacher model: EXTER, VIF=2.04 ; CP, VIF=1.99

(B)

	Dependent variable: ADHD (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.10 (.02)	-.12***	-.07 (.01)	-.08***	-.18 (.02)	-.22***	-.16 (.02)	-.20***
Age	.01 (.01)	.02	.01 (.01)	.03	.03 (.01)	.06**	.03 (.01)	.06**
SES	-.07 (.01)	-.12***	-.04 (.01)	-.08***	-.04 (.01)	-.06**	-.02 (.01)	-.04
DB (broader)								
EXTER	.26 (.01)	.54***	.13 (.01)	.29***	.15 (.01)	.31***	.07 (.01)	.16***
DB (narrower)								
HYP-INA (*SDQ*)	-	-	.38 (.02)	.47***	-	-	.21 (.02)	.25***
R^2		.35***		.37***		.17***		.17***

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; HYP-INA= Hyperactivity-Inattention subscale of the SDQ
Multicollinearity tests. Parent model: EXTER, VIF=1.71 ; CP, VIF=1.75 , Teacher model: EXTER, VIF=1.75 ; CP, VIF=1.78

(C)

	Dependent variable: CU traits (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.08 (.02)	-.09***	-.05 (.02)	-.06**	-.14 (.02)	-.13***	-.13 (.02)	-.12***
Age	.01 (.01)	.02	.01 (.01)	.02	. 04 (.01)	.08***	.04 (.01)	.07***
SES	-.03 (.01)	-.05*	-.02 (.01)	-.04	-.02 (.02)	-.02	-.01 (.02)	-.02
DB (broader)								
EXTER	.17 (.01)	.35***	.12 (.01)	.26***	.14 (.02)	.23***	.12 (.02)	.20***
DB (narrower)								
CU traits (*PSCD*)	-	-	.70 (.06)	.36***	-	-	.24 (.08)	.09**
R^2		.14***		.22***		.09***		.08***

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; CU traits subscale of the PSCD (López-Romero et al., 2019)
Multicollinearity tests. Parent model: EXTER, VIF=1.14 ; CP, VIF=1.11 , Teacher model: EXTER, VIF=1.15 ; CP, VIF=1.12

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Summary of this Study (Chapter Two)

- Psychopathology research is currently at a crossroads. More reliable and valid phenotypes are needed to better understand the causes and correlates of mental health dysfunction. As a result, assessment and intervention processes might be substantially improved.

- In this study, we aimed to explore the empirical structure of a set of disruptive behaviors in the preschool years. Namely, oppositional defiant, hyperactive impulsive and callous-unemotional behaviors.

- Considered along previous studies, our work contributes to provide:

  1. Further evidence on the hierarchical structure of disruptive behavior in early childhood (structural validity)

  2. Further evidence on the components and configuration of such a hierarchical representation (content validity)

  3. Further evidence on the validity of a broader underlying liability (i.e., the externalizing factor) accounting for important longitudinal outcomes (predictive validity)

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3 CHAPTER THREE

TESTING THE HIERARCHICAL ORGANIZATION OF DISRUPTIVE BEHAVIOR: PRELIMINARY FINDINGS FROM THE STUDY OF ITS TEMPERAMENT CORRELATES

3.1. INTRODUCTION

Temperament traits are constitutionally based differences in behavioral styles, that appear early in life, are relatively enduring, heritable and constitute the basis for later personality and adjustment (Zentner & Shiner, 2012). Despite representing normal variations on non-pathological dispositional tendencies, their role in the emergence of common early behavioral and emotional problems is well-established (Rettew & McKee, 2005). Associations between temperament traits and psychopathology, including disruptive behaviors, are well-documented from early in the development (Gartstein et al., 2012; Martel et al., 2012; Scheper et al., 2017). Thus, a better understanding of these relationships is essential to better elucidate the connections between certain trait-based mechanisms and negative developmental outcomes (Bijttebier & Roeyers, 2009).

With this work, we aim to contribute to this line of inquiry. To put our specific objectives in context, we began by briefly reviewing recent advances in psychopathology research as well as the conceptual framework upon to which investigation in temperament can be articulated. In these sections, we focus on the evidence supporting the hierarchical nature of externalizing psychopathology and describe the variety and scope of different general and specific-purpose models of temperament. We then present our overall approach, goals, and hypotheses. Specifically, we aim to test whether mapping general and specific temperament dimensions, onto different hierarchical levels of phenotypic organization (broader vs. narrower) can aid in understanding the processes involved in the phenotypic heterogeneity of early externalizing behavior. Such a mapping, conceptually based on prior research, is expected to help to clarify how several different underlying - broad and specific - dispositions might contribute to the complex heterogeneous forms of DB. However, one key issue is that, in performing this task, several and partially overlapping frameworks of temperament are at hand.

3.1.1. Psychopathology Research: The Case of Hierarchical Models of DB

There is no consensus on how to best conceptualize and organize psychopathological constructs. However, the current empirical and theorical discussion advances a vibrant and stimulating future (Gordon & Redish, 2016; Michelini et al., 2021; Rutter & Pine, 2015).

In the last decades, new organizing frameworks have gained considerable notoriety because the limitations of traditional nosologies are now extensively recognized (Clark et al., 2017). With the emergence of these approaches a visible shift has occurred. The focus of psychopathology research has migrated from mere symptom descriptions to more empirically based and testable explicative hypotheses on the nature of disorders (Cuthbert & Kozak, 2013; Kozak & Cuthbert, 2016; Krueger et al., 2018). These alternative conceptualizations, allow us to empirically test *how* symptoms cluster together and help us to hypothesize *why* (Eaton, 2017; Latzman, DeYoung, & HiTOP Neurobiological Foundations Workgroup, 2020). Importantly, such models appear to fit particularly well with the well-known interdependences between temperament and developmental psychopathology research and, more fundamentally, the well-documented relation between personality and psychopathology (Frick, 2004; Krueger et al., 2020; Mezquita et al., 2015; Watts, Poore, Lilienfied & Waldman, 2019; Wright & Hopwood, 2021).

One of these alternative views emphasizes the hierarchical nature of psychopathology, postulating that mental health problems can be understood at various levels of breadth. A synthesis of these ideas can be found in the current working model of the hierarchical taxonomy of psychopathology (HiTOP; Kotov et al., 2021). As regard the particular domain of externalizing psychopathology, findings from clinical, developmental and behavior genetic research have strongly supported this hypothesis (Krueger et al., 2021; Martel et al., 2010; Shevlin et al., 2017; Waldman et al., 2016). However, core gaps are pending to be addressed in structural research. For instance, investigations examining the dispositional correlates of externalizing behaviors have predominantly focused on the relations of particular temperament traits (e.g., Negative Affect or Extraversion) with particular forms of DB (e.g., ADHD or ODD; Martel et al., 2012; Scheper et al., 2017). Research on the external validity of the externalizing construct, that is, the higher-order factor accounting for the shared variance among a variety of DBs, is, however, much scarcer. In particular, with preschool populations (see Olino et al., 2014 for an exception). As such, the temperament correlates of this alleged hierarchical organization in early childhood remain largely unknown.

3.1.2. Temperament Research: General vs. Specific Models or Broader vs. Narrower traits

The conceptual framework on temperament is vast and rich in equal measure. Currently, multiple theoretical models coexist (Shiner et al., 2012). That includes general, classical models of temperament (see Zentner, 2008), and some others advancing specific hypotheses on the complex traits-psychopathology associations (e.g., the developmental propensity model for CP; Lahey & Waldman, 2003; 2005). This scenario, rather than problematic, is to be celebrated. However, some important questions remain unanswered. First, the partial overlap of existing models/concepts of temperament has been, despite some exceptions, rarely examined (Mervielde & De Pauw, 2012). Second, since only general-purpose but not specific-purpose models/measures have been included in such studies, their differential utility has not been systematically contrasted, and can only be theoretically hypothesized. Thus, it is unclear whether one type of model (e.g., specific-purpose) could be more appropriate, over the other (e.g., general-purpose), to assess temperament in children with or at risk for externalizing

psychopathology. As a result, researchers and clinicians might find themselves, at times, at a crossroads.

On the one hand, here is abundant evidence on *general broad-band* dimensions of temperament in relation to DB. For instance, trait impulsivity and negative affect/emotionality have been nonspecifically related to overall risk for externalizing behaviors and its associated impairment (Beauchaine & Zisner, 2017; Beauchaine & Tackett, 2020). These dimensions are relatively well-represented in general models such as Rothbart's psychobiological model (Rothbart, 2007), Buss and Plomin criterial approach (Buss & Plomin, 1984), and Gray's neuropsychological theory of temperament (Gray, 1991). However, the extent to which these -or other- general dimensions of individual differences are useful to classify and understand the phenotypic heterogeneity of the externalizing spectrum, is, despite some preliminary hypotheses and findings, still unclear (Dadds & Frick, 2019; Zastrow et al., 2018).

On the other hand, there are also some examples of temperament models comprising *more specific* dimensions proposed as developmental antecedents of DB. For instance, the developmental propensity model of antisocial behavior hypothesizes that three independent socioemotional dispositions, interacting with the environment, contribute to confer risk for conduct disorder, explaining its phenotypic heterogeneity, and concurrent and prospective patterns of comorbidity (Lahey et al., 2018; Taylor et al., 2013; Trentacosta et al., 2009). Frequent and intense negative emotional responses to threat, frustration, and loss (i.e., high Negative Emotionality), low dispositional concern for others (i.e., low Prosociality) and positive response to novelty and risk (i.e., high Daring) are the components of this genetically based, environmentally mediated antisocial propensity (Lahey & Waldman, 2003; 2005). The Child and Adolescent Disposition Scale (CADS; Lahey, Appelgate et al., 2008) was purposely developed to assess these dispositions and its adequate psychometric properties have been confirmed in research studies with various samples (Brammer & Lee, 2013; Lahey et al., 2020; Tackett et al., 2013). Despite some evident commonalities with other models, such as regards the affective component (e.g., Negative Emotionality), other dimensions (e.g., Prosociality), denote clearly unique etiological contributions. Evidence suggests, precisely, that it is this low dispositional concern for others' distress observed as early as 24 months of age, the most robust predictor of later conduct problems in childhood and adolescence (Rhee et al., 2016). Findings also indicate that these early socioemotional dispositions may be implicated in the covariation among behavioral problems (Class et al., 2019; Taylor et al., 2013).

The findings just reviewed appear to support two relevant ideas. First, as has been consistently demonstrated, different levels of trait-organization exist (Caspi et al., 2005; Castellanos-Ryan et al., 2016). Thus, individual differences associated to DB can be represented, in a broader sense, in terms of higher-order, or general personality/temperament traits. Second, the degree to which the "empirical utilities" (Paunonen, 1998, p. 538) of broader and narrower traits associated to DB are equivalent needs to be further examined.

In trying to address this issue we must not ignore, however, that Negative Emotionality, Daring and Prosociality were never ascribed to a particular level of trait-organization in Lahey's and Waldman's model (2003; 2005). Interpreted in the context of the developmental propensity model, the term *"specific"* refers only to the fact that the three socioemotional dispositions are thought to *specifically predict* the development of conduct disorder, rather than other childhood

or youth psychopathology. In this study, however, we further hypothesize that these traits can be mapped to the lower levels of an externalizing hierarchy, by leveraging on their specificity and granularity (e.g., Prosociality, Daring).

3.1.3. Temperament and Externalizing Psychopathology: Convergences within a Hierarchical Approach

The existence of multiple levels of phenotypic organization strongly suggests the existence of multiple causal levels of influence (Lahey et al., 2017). If some psychobiological mechanisms underlie multiple dimensions of DB, one would anticipate broader temperament dimensions to map directly into the broader externalizing factor. Research suggests that impulsivity may operate at this level, as nonspecifically increases risk for diverse forms of externalizing psychopathology (Beauchaine et al., 2017; Martel et al., 2017; Rodenacker et al., 2018). In contrast, if some psychobiological mechanisms underlie specific DB dimensions, one would anticipate specific temperament dimensions to map directly, and distinctively, into specific expressions of DB. These more domain specific etiological influences (e.g., low Prosociality) would increase risk only for certain problems (e.g., conduct disorder) but not others (Rhee et al., 2016). However, because of the hierarchical structure, both broad and dimension-specific mechanisms must be considered *at the same time* to better account for the heterogeneity of DB (Lahey & Waldman, 2012). That is, shared and unique mechanisms could be *simultaneously* involved in the origins of specific expressions of DB (Beauchaine & McNulty, 2013). However, the effects of both types of etiological influences are largely unaddressed in prior research (Lahey et al., 2017), and, to our knowledge, these hypotheses have not been tested with young children. As a result, little is known about how temperament correlates map onto externalizing psychopathology at various levels of breadth in early childhood.

Therefore, some of these issues need to be further addressed: Are broader traits consistently associated to DB (e.g., impulsivity/disinhibition), invariably and meaningfully present across general-purpose models/scales of temperament? How broad/specific temperament traits map onto different levels of DB assuming a hierarchical phenotypic organization? Are broader and narrower temperament dimensions simultaneously involved on the variation of DB in the lower levels of the phenotypic hierarchy? Do specific-purpose models of temperament posit a unique and incremental utility to understand DB, comparatively to general models?

3.1.4. This Study

In this work, we delve into some of these questions. To date, only a handful of studies with adult populations have examined the alignment of personality traits and psychopathology conceptualized at different levels of breadth, building upon the premises of the most recent hierarchical models of psychopathology (Conway & Simms, 2020). Here, we were particularly interested on how diverse operationalizations of dispositional and phenotypic constructs in terms of their scope (i.e., broader vs. narrower traits and broader and narrower problematic domains) could dovetail with one another and, ultimately, inform contemporary mechanistic and psychopathology research (Conway et al., 2021).

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Our hypotheses are based on, and consistent with, previous literature. However, they add to the prior research, in at least three significant ways. First, we formulate specific predictions regarding the level of phenotypic variation (i.e., higher, and lower order factors) at which each mechanism (i.e., specific and general trait) is expected to operate. Second, we used a sample of preschoolers at risk for psychopathology. Since research on the associations between temperament and psychopathology is overall scarce in clinical or at-risk youth populations, this is particularly important to better understand the nature of the relations between dispositional traits and maladaptive behaviors from early in the development. Third, as a result of adopting such a design, we can also directly compare the incremental utility of one type of model (e.g., specific-purpose) over the other (e.g., general purpose), to account for the temperament correlates of externalizing psychopathology. Our general objective is to contribute to the understanding of components and processes in the origins of externalizing psychopathology. Specifically, we aim:

1) To examine the conceptual and empirical overlap across general and specific-purpose models of temperament.

2) To test the associations of broader and narrower temperament dimensions across different levels of specificity within a hierarchical operationalization of externalizing behavior in the preschool years.

3) To study the unique contributions of specific-purpose models of temperament.

In **Figure 3.1,** we present our hypotheses. First, we expected that broad temperament traits, conceptually and empirically linked to DB, are, in fact, represented in well-known general-purpose models of temperament. That is, some degree of overlap across commonly used measures is assumed *(Hypothesis 1)*. Second, we anticipate a differential utility of broader and narrower temperament dimensions across different levels of the phenotypic hierarchy. Based on the literature reviewed, we made specific predictions on the level of analysis at which each one is expected to operate. Specifically, broader temperament dimensions are expected to map onto the broader externalizing factor *(Hypothesis 2*) and narrower dimensions, are expected to map into lower levels of the phenotypic hierarchy *(Hypothesis 3)*. Third, we speculate that additive significant effects of both, general and specific influences, might account for the phenotypic heterogeneity at the lowest level of phenotypic organization *(Hypothesis 4)*. We make no predictions, however, as for the specific forms of DB for which these simultaneous effects will be observed. Finally, we expect to demonstrate the unique contributions of the specific-purpose models. That is, despite anticipating a partial redundancy with general-purpose measures, we hypothesize an incremental validity to account for the temperament correlates of DB in a sample of children potentially at risk for psychopathology *(Hypothesis 5)*.

3.2. METHOD

3.2.1. Sample

Participants for this study are part of the ELISA Project. A total of 543 preschoolers (55.6% girls; Mean age = 4.26; SD = .92) at risk for psychopathology were selected from the initial sample (N = 2467, 48.1% girls, Mean age = 4.25 years, SD = 0.91). To be a part of the convenience sample, children's scores on the "Total Difficulties" scale of the Strengths and

Difficulties Questionnaire (SDQ, Goodman, 2001) had to be on the borderline or clinical range in the first data collection (T1). The "Total Difficulties score", is a composite of the following SDQ subscales: Emotional Symptoms, Conduct Problems, Hyperactivity-Inattention, and Peer Problems, and its scores can range from 0 to 40. We used existent normative cutoffs for Spanish youth (5- to 17-year-olds) with parent-reported data to conduct the selection, accounting for children's gender and age (Español-Martín et al., 2021). Descriptive statistics of the target and original samples on relevant problem indicators and sociodemographic characteristics are shown in the **Supplementary Material for Chapter Three** (**Table 3.1S**). Only 6.97% of girls (n=172) and 6.16% of boys (n=152) of the initial sample (N=2467), scored above the borderline threshold (i.e., 12 and 10, for girls and boys, respectively). Only 5,27% of girls (n=130) and 3,61% of boys (n=89) of the original sample, scored above the clinical threshold (13 and 16, for boys and girls, respectively). Parents at the convenience sample reported significant lower levels of socioeconomic status (F [*1*, 2250]=70.27, p=.000) and greater overall concerns about economic issues (F [*1*, 2240]=20.83, p=.000). No significant differences were found between families selected to be part this subsample and the rest of ELISA families on difficulties for social integration (F [*1*, 2414]=0.26, p=.607). However, teachers reported significantly lower levels of parental interest in school activities (F [*1*, 2418]= 27.99, p=.000) and poorer integration (F [*1*, 2418]=54.28, p=.000) and academic achievement in school (F[*1*, 2417]=40.94, p=.000) for this group of children.

3.2.2. Measures

Temperament

General Models of Temperament (general-purpose scales)

The EAS Model *(T1, parent-reported)*. We used an adapted version of the Emotionality Activity Sociability (EAS) Temperament Survey for Children (EAS-TS-FC; Buss & Plomin, 1984). This measure was designed to be used with children aged 1 to 9 and taps into four temperamental dimensions: *Emotionality* (i.e., the tendency to show distress and become easily aroused; 5 items; e.g., *he/she cries easily, reacts intensely when upset*); *Activity* (i.e., the expenditure of physical energy; 3 items; e.g., *he/she is always on the go, is very energetic*); *Shyness* (i.e., the tendency to be inhibited with unfamiliar people; 4 items; e.g., *he/she tends to be shy, takes a long time to warm up to strangers*) and *Sociability* (i.e., the tendency to prefer the company of others; 3 items; e.g., *he/she likes to be with people, prefers playing with others to playing alone*). Each item was scored on a 5-point scale ranging from 1 (not characteristic or typical of my child) to 5 (very characteristic). Composite scale scores were generated by reverse-scoring the corresponding items and computing the mean for each of the scales. The internal consistency of the scales in the current sample was .69 for *Emotionality*, .84 for *Activity*, .55 for *Sociability* and .75 for *Shyness*.

Rothbart's Psychobiological Model *(T2, parent-reported)*. We used The Child Behavior Questionnaire Very-Short Form (CBQ-VS-F; Putnam, & Rothbart, 2006). This 36-item temperament questionnaire is for children aged 3 to 7. It was designed to tap into three temperamental dimensions: *Surgency/Extraversion* (i.e., activity, positive emotionality and extraversion, e.g., *he/she often rushes into new situations, likes to go high and fast when pushed on a swing*); *Negative Affect* (i.e., the tendency to experience fear, sadness and frustration

frequently and intensely, e.g., *he/she is very difficult to soothe when upset, gets angry when can't find something to play with*); *Effortful Control* (i.e., the ability to choose a course of action under conditions of conflict, to plan for the future, and to detect errors, e.g., *approaches places s/he has been told are dangerous slowly and cautiously, is good at following instructions*). Each item was scored on a 7-point scale ranging from 1 (extremely untrue of my child) to 7 (extremely true of my child). The internal consistency of the scales was .72 for *Surgency/Extraversion*, .71 for *Negative Affect*, and .70 for *Effortful Control.*

Gray's Temperament Model *(T3, parent-reported)*. We used an adapted version of the Muris BIS/BAS Scales (Muris et al., 2005), an age-downward version of the Carver and White BIS/BAS Scales (Carver & White, 1994) which was developed for children aged 8 to 12 years. The BIS/BAS Scales assess approach and withdrawal behaviors in response to environmental stimuli. Signals of punishment and non-reward as well as novel stimuli are the eliciting stimuli for the behavioral inhibition system (BIS), which regulates inhibited and avoidant behavior. Signals of reward and non-punishment are the eliciting stimuli for the behavioral activation system (BAS), which regulates approach behavior. For this work, 10 items with the higher factor loadings on Muris's adaptation were selected and re-formulated into a parent-report form (i.e., *"My child…"*). Following this procedure, four out of seven items of the BIS subscale were included (e.g., *he/she usually gets very tense when thinking something unpleasant is going to happen* or *worriers about making mistakes*) and six out of thirteen of the BAS subscale (e.g., *he/she feels excited and full of energy when gets something she/he wants* or *when she/he wants something* or *usually goes all the way to get it*). Each item was scored on a 4-point scale ranging from 0 (not true) to 3 (very true). The internal consistency was .67 and .77, for the BIS and BAS subscale, respectively.

Specific Models of Temperament (specific-purpose scales)

The Developmental Propensity Model of CP *(T3, parent-reported)*. We used The Child and Adolescent Disposition Scale (CADS; Lahey, Appelgate et al., 2008). This questionnaire for children and adolescents, aged 4 to 17. It was designed to tap into three socioemotional dimensions: *Negative Emotionality* (i.e., negative emotional response to threat, frustration and loss, e.g., *is he/she easily upset? unpredictable moods?*), *Prosociality* (i.e., low dispositional concern for others, e.g., *feels bad when children get hurt? cares about others' feelings?*), and *Daring* (i.e., positive response to novelty and risk, e.g., *daring/ adventurous? enjoys risky activities?*). Instead of the original 50 items of the CADS, we used an adapted version, following Mathesius et al. (2017) and their work on the scale factor structure in preschoolers. Specifically, four items per dimension were used. Thus, a final reduced version composed by 12 items was applied. Each item assessed the frequency of certain behaviors during the las 12 months, on a 4-point scale ranging from of 1 (not at all) to 4 (very much). The internal consistency of the scales was .78, .77 and .88 for *Negative Emotionality*, *Prosociality*, and *Daring*, respectively.

Externalizing Behavior *(T3 parent-reported)*

Oppositional-Defiant Disorder. To assess child oppositional and defiant behaviors such as *"he/she is disobedient at school"*, *"disobedient at home"* or *"argues a lot"* we used parent reports on the ASEBA School-Age forms (Achenbach & Rescorla, 2001). Parents rated each

item on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). The internal consistency of the scale was .77.

Attention-Deficit Hyperactivity Disorder. To assess child inattention, hyperactivity and impulsivity we used parent reports on the ASEBA School-Age (Achenbach & Rescorla, 2001). The scale assesses behaviors such as *"he/she is impulsive, acts without thinking"*, *"is inattentive and gets easily distracted"* or *"does not finish what she/he starts"* on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). The internal consistency of the scale was .78.

CU traits. To assess CU traits we used parent reports on the 10-item CU traits scale of The Child Problematic Traits Inventory (CPTI; Colins et al., 2014), designed for use with children aged 3-12 years old. Parents rated items such as *"he/she usually does not seem to share others' joy and sorrow"*, *"seldom remorseful when has done something not allowed"* or *"does not become upset when others are being hurt"* on a 4-point scale, ranging from 1 (does not apply at all) to 4 (applies very well). The internal consistency of the scale was .87.

Covariates *(T1, parent-reported)*

Parenting Practices. We measured parenting practices introduced as covariates in some of our analyses via The Preschool Revision of the Alabama Parenting Questionnaire-Preschool Revision (APQ-Pr) adapted by de la Osa et al. (2014). The APQ-Pr consists of 42 adapted items from the original APQ, rated on a 5-point Likert-type scale ranging from 1 (never) to 5 (always). The questionnaire addresses three types of parenting practices: *Positive* (e.g., *l hug/kiss my child when she/he has done something well, praise him/her if he/she behaves well*); *Inconsistent* (e.g., *I threaten to punish him/her and then do not punish, I let him/her out of a punishment early*) and *Punitive* (e.g., *I slap him/her when he/she has done something wrong, I yell/scream at him/her when he/she has done something wrong*). The internal consistency of the scales was .80, .68 and .56 for *Positive, Inconsistent, and Punitive* parenting practices, respectively.

Sociodemographic Variables *(T1, parent-reported).* We included family SES, child age (in years) and child gender as demographic covariates in the regression analyses. The same strategy described in the first study (see **Chapter Two**) was adopted to operationalize these covariates.

3.2.3. Analytic Strategy

The first part of the analyses consisted of creating latent dimensions from a set of observed externalizing symptoms. Based on our previous findings (**Study 1, Chapter Two**) we hypothesized that, also with data from this particular subsample, a hierarchical representation of the relations among ODD, ADHD and CU traits was structurally feasible and psychometrically acceptable. Thus, we conducted a second order confirmatory factor analysis (CFA) in Mplus v. 8.0 (Muthén and Muthén, 2019), specifying a higher-order factor model. These results are summarized in the **Supplementary Material for Chapter Three**. Weighted Least Square Mean (WLSM) was used as the estimation method. Conventional cutoff criteria for fit indices were applied to examine model fit (Hu, & Bentler, 1999). Factor scores, later used as outcome variables in further predictive analyses, were extracted via the Maximum A Posteriori Method (MAP; Grice, 2001).

Next, we examined in an exploratory fashion, the commonalities among temperament models by applying Principal Component Analysis (PCA) with Varimax rotation to the subscales of the temperament inventories considered for this study. These analyses were conducted in SPSS Statistics version 26 (IBM, 2019) in two phases. PCA was first applied to subscales of general-purpose temperament measures. Then, subscales of both general and specific purpose models were considered together, in the same step. All subscales were mean centered before running the PCA. Only Principal Components with an Eigenvalue > 1 were retained for further analyses. Results of the first PCA were used to explore the overlap among general-purpose models of temperament and obtain the component scores for further analyses. Results of the second PCA, on the contrary, were used only to interpret the overlap between general and specific-purpose models. Because our analytic approach was exploratory rather than confirmatory, we used PCA despite concerns on its reliability to represent the latent structure of the data (Widaman, 2018). Specifically, this statistical procedure fitted with our purposes in three essential ways. First, we aimed to reduce our data (i.e., the correlations between components of temperament models) into a set of smaller number of uncorrelated temperament elements (i.e., principal components; Abdi, & Williams, 2010). Second, we aimed to assure that, after this reduction, the solution yielded the maximal amount of total explained variance (Widaman, 2018). Third, we aimed to use these varimax-rotated component scores, capturing the shared variance among related temperament dimensions, as predictors in later regression models.

Finally, in the last part of the analyses, we compared the predictive utility of broader and narrower temperament dimensions across different levels of the phenotypic hierarchy and their potential additive effects. We started by testing these associations separately. That is, either broad-band component scores obtained in the PCA, or specific-purpose dimensions from the CADS, were included, in separate regression models, to predict latent outcome variables (i.e., factor scores previously extracted from the CFA of externalizing symptoms). Then, to examine the simultaneous effects of these types of predictors (e.g., specific and general) both were introduced concurrently in the same models. Other relevant covariates such as sociodemographic variables and parent-reported parenting practices were also controlled in these predictive analyses.

3.3. RESULTS

3.3.1. Similarities and Differences Across Temperament Models

To examine whether the components of general and specific-purpose models of temperament may overlap partially or extensively, we first examined their correlations (**Table 3.1*).*** Then, we applied Principal Component Analysis (PCA) to re-express these relations in terms of a set of new orthogonal variables (**Tables 3.2A** & **3.2B**). We speculated that broad band-temperament traits involved in the origins of DB (e.g., impulsivity/disinhibition) may be present across general-purpose models/measures of temperament *(Hypothesis 1)*. Thus, we expected to extract interpretable principal components (PCs) capturing these commonalities between measures.

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The range of correlations between components of temperament inventories varied considerably (*r*=.13–.65**, Table 3.1**). As for the dimensions of Buss and Plomin's model, Emotionality was moderately and similarly correlated to both CBQ-VS-F Negative Affect and CADS Negative Emotionality. Similarly, Activity was strongly correlated with CBQ-VS-F Surgency/Extraversion as well as CADS Daring, and to a lesser extent the BAS component of the BIS/BAS scales. EAS-TS-FC Shyness, and CBQ-VS-F Surgency/Extraversion were inversely and moderately correlated, whereas EAS-TS-FC Sociability manifested moderate positive associations with CBQ-VS-F Surgency/Extraversion and the BAS component of the BIS/BAS scales. As for Rothbart's model, CBQ-VS- F Surgency/Extraversion manifested strong and moderate associations, respectively, with CADS Daring and the BAS subscale. CBQ-VS-F Negative Affect and CADS Negative Emotionality were, as expected, moderately correlated. CBQ-VS-F Effortful Control was modestly, and uniquely related to CADS Prosociality and the BIS component of the BIS/BAS scales. Finally, as for the BIS/BAS scales, significant and moderate correlations were found between the BIS component and CADS Prosociality and the BAS subscale and CADS Daring.

Results of PCA applied to EAS-TS-FC, the CBQ-VS-F, and the BIS/BAS subscales, revealed that a simplified structure of temperament dimensions present across these general-purpose models can be obtained, consisting of three principal components (PCs) with eigen values higher than 1. These orthogonal PCs, that explained 59.11% of the total variance, are shown in **Table 3.2A**. Primary loadings for each of them are indicated in bold print. The first principal component (PC1), that explained 28.93% of the total variance, showed the highest correlations with EAS-TS-FC Activity and Shyness (negative sign), as well as CBQ-VS-F Surgency/Extraversion and the BAS subscale. From a conceptual standpoint, these traits are linked, to some degree, to approach or appetitive dispositional tendencies and child exuberant behavior (e.g., highly energetic, impulsive, with a preference for intense, complex, and novel stimuli). The second principal component (PC2), that explained 18.88% of the total variance, showed the highest correlations with EAS-TS-FC Emotionality and Sociability as well as CBQ-VS-F Negative Affect. Together, these traits seem to represent the affective, emotive component of temperament, including EAS-TS-FC Sociability, more related in temperament and personality research to positive (e.g., extraversion) rather than negative affect. Overall, this second principal component accounts mostly for the tendency to experience intense, and frequent negative affect and distress as well as the associated autonomic arousal. Finally, the highest loadings for the third principal component (PC3), that explained 11.30% of the total variance, were for CBQ- Effortful Control and the BIS subscale. Conceptually, both are related to regulatory aspects of temperament. Specifically, either effortful or effortless inhibition of behavior. In general, the first and second principal components can be associated to *reactive* components of temperament (i.e., activity, emotionality, sociability and positive/negative affect), whereas the third principal component, in contrast, seems to be exemplifying *regulated* aspects of temperament (i.e., effortful and inhibitory control; Valle-Krieger & Stringaris, 2016).

The simultaneous application of PCA to subscales of both general and specific-purpose measures did not yield notoriously different results, however some differences deserve a comment. As it is indicated in **Table 3.2B**, four, instead of three PCs with eigen values higher than 1 were extracted. Together, these component scores, explained 63.46% of the total variance. Overall, the first and second principal components from the prior solution reemerged,

albeit some minor differences. While CADS Daring was strongly correlated with the first principal component (PC1, *"approach"*), CADS Negative Emotionality showed the highest correlations with the second principal component (PC2, *"negative affect-arousal"*). Despite these changes in component's composition, their conceptual meaning remained largely unaltered. CADS Daring refers to aspects of sensation and novelty seeking and has been inversely associated with behavioral inhibition (Lahey, Applegate et al., 2008). Thus, it dovetails well with approach-oriented behaviors encompassed in PC1. CADS Negative Emotionality refers to the frequent experience of intense negative emotions with little provocation (Lahey, Applegate et al., 2008). Thus, it dovetails well with the affective component of temperament encompassed in PC2. The composition of the third principal component (PC3, *"inhibition"*) did not vary across PCA applications. However, a new principal component emerged (PC4), in which the highest correlations were observed for EAS-TS-FC Sociability (previously on the second PC, *negative affect-arousa*l) and CADS Prosociality. This fourth principal component, explaining 8.90% of the total variance, seems to be a representation of social aspects of temperament. On the one hand, the motivation to approach, seek others' companion and be warmly responsive to these interactions (i.e., EAS-TS-FC Sociability). On the other, a disposition to show concern for others (i.e., CADS Prosociality).

As complementary support to contextualize the findings presented above, in **Table 3.3** we show a conceptual outline emphasizing commonalities and distinctiveness between temperament models examined in this study.

3.3.2. The Utility of Broader vs. Narrower Temperament Traits Across Levels of Hierarchical Organization of DB

We anticipated a differential utility of broader and narrower temperament dimensions across different levels of the phenotypic hierarchy. Predictions were made on the level of analysis (higher vs. lower order) at which the effects of temperament factors (general vs. specific) were expected to operate (see **Figure 3.1,** *Hypothesis 2, 3*).

First, moderate effects of broad-band temperament dimensions, operationalized via Principal Component Analyses (PCA), were found at upper levels of the phenotypic hierarchy (i.e., the externalizing factor). These effects were significant for PC1 (*"approach", β*=.26, *p*<.000) and PC2 (*"negative affect-arousal"*, *β*=.24, *p*<.000), but not PC3 (*"inhibition", β*=-.04, *p*<.363, **Table 3.4**). Thus, suggesting that a broader style to approach novel, complex situations, impulsively and vigorously (PC1), as well as a proclivity to experience distress and negative affect frequently and intensively (PC2), appeared to map, separately, onto a latent dimension, statistically capturing the shared variance among ODD, ADHD and CU traits. In addition, associations of general temperament dimensions and phenotypic domains in the lower level of the hierarchy were also found. PC1, a summary score of dispositional approach-oriented behavior, yielded associations with ODD (*β*=.17, *p*<.000), CU traits (*β*=.10, *p*<.03) and ADHD (*β*=.39, *p*<.000). Thus, corroborating, along with the previous results, the existence of what appear to be unspecific broader dispositional influences conceptually related to impulsive behaviors. On the contrary, correspondences for the other principal components (P2 and P3), at the lower levels of the hierarchy, were restricted to particular problems, rather the

full array of behaviors examined. Specifically, negative affect-arousal (PC2) to ODD (β=.30, p<.000) and inhibition (PC3) to CU traits (β=-.16, p<.003).

Second, *specific traits* were found to predict specific operationalizations of DB at lower levels of the hierarchy. Importantly, beyond specific traits per se, we also found that *specific combinations of specific traits* distinctively predicted ODD, ADHD and CU traits (**Table 3.5)**. As regards for *specific traits*, CADS Negative Emotionality yielded, as expected, the less unequivocal associations. Because of its broader scope compared to the rest of traits comprised in the developmental propensity model (i.e., Prosociality, Daring) this is not surprising. Its effects were clearly prominent for ODD (β=.67, p<.000), but moderate associations were also found for ADHD (β=.42, p<.000). The utility of CADS Daring to differentiate among specific dimensions was, despite apparent, also limited. Effects were slightly stronger for ADHD (β=.21, p<.000), but associations with CU traits were also found (β=.16, p<.000). On the contrary, the discriminative utility of CADS Prosociality was evident by its unique associations with CU traits (β=-.61, p<.000), but not ODD (β=-.02, p<.546) or ADHD (β=-.04, p<.378). As regard for *specific combinations of specific traits*, higher levels of Negative Emotionality and Daring were associated to both ODD and ADHD. However, the effects of Negative Emotionality were prominent for the former, while the effects of Daring were more notable for the latter. CU traits were well defined by a very specific combination of the three socioemotional dispositions. Namely, very low levels of Prosociality (β=-.61, p<.000), with moderate levels of Daring (β=.16, p<.000) and Negative Emotionality (β=.21, p<.000). In addition to these correspondences at the lower level of the hierarchy, associations of specific traits with broader characterizations of DB were also identified. Specifically, high levels of Negative Emotionality (β=.66, p<.000), accompanied by moderate levels of Daring (β=.17, p<.000) and low Prosociality (β=-.15, p<.000) predicted higher levels of the externalizing factor.

Two conclusions can be apparently derived from these findings. Mapping a broader dispositional vulnerability characterized by dispositional approach-oriented behaviors into the externalizing factor at the higher level of the hierarchy seems possible. Not only directly, but also indirectly, via unspecific individual associations with ODD, ADHD and CU traits at the lower level of the hierarchy. Furthermore, both specific traits per se, as well as specific combinations of these traits, seem helpful to obtain a more refined picture of DB dispositional underpinnings at the lower levels of the phenotypic hierarchical structure.

3.3.3. Simultaneous Effects of Broader and Narrower Traits in the Lower Levels of Hierarchical Organization of DB

Our analyses revealed significant additive effects of broad-band dispositional tendencies assessed in general-purpose models, operationalized here via Principal Component Analyses (PCA), and more narrow-band assessed in specific-purpose models, assessed via The Child and Adolescent Disposition Scale (CADS; Lahey, Appelgate et al., 2008) *(Hypothesis 4)*.

Simultaneous and non-redundant effects were found in models predicting ADHD symptoms and CU traits (**Tables 3.6A and 3.6C**). On the one hand, levels of ADHD were defined by either PC1, a summary score capturing approach-oriented behavior (β=.31, p<.000), and CADS Negative Emotionality (β=.41, p<.000) and Prosociality (β=-.08, p<.034) or PC3, a

summary score capturing inhibition tendencies (β=-15., p<. 000), and CADS Negative Emotionality (β=.43, p<.000) and Daring (β=.23, p<.000). On the other hand, levels of CU traits were defined also by PC3 (β=-.10, p<.014) and CADS Negative Emotionality (β=.22, p<.000), Daring (β=.18, p<.000) and Prosociality (β=-.60, p<.000). Simultaneous but partially redundant effects were found for ODD (**Table 7B**). Levels of ODD were predicted by PC2, capturing affective aspects of temperament (β=.12, p<.000) as well as CADS Negative Emotionality (β=.44, p<.000) and Daring (β=.19, p<.000). A summary of these associations is shown in **Figure 3.2**.

Unexpected simultaneous, but partially redundant effects at higher levels of the phenotypic hierarchy were also found. Specifically, P1 (*"approach"*) and P3 (*"inhibition"*) along with CADS socioemotional dimensions accounted together for a significant amount of the variance of the externalizing factor (**Tables 7A and 7C**).

A summary of findings presented in subsections **3.2** and **3.3** can be found in **Figure 3.2**. Unique and additive associations of broad and narrow-band temperament traits with operationalizations of DB at different levels of breadth are shown. Importantly, convergences and divergences within and across levels of specificity within dispositional and phenotypic domains are emphasized.

3.3.4. Unique Contributions of Specific-Purpose Models

The results presented so far suggest that general-purpose models of temperament might be predominantly useful to identify broader dimensions associated to early DB. We hypothesized, however, an incremental validity of specific-purpose models to account for the temperament correlates of DB in a sample of children potentially at risk for psychopathology *(Hypothesis 5).*

An examination of this hypothesis would imply trying to provide answers to, at a minimum, two questions. First, is there as substantial increase in the percentage of variance explained, if a more targeted rather than broader operationalization of temperament, is embraced? Second, are specific-purpose models only useful, or mainly superior - as predicted- at lower levels of the phenotypic hierarchy?

Our analyses showed that the percentage of variance explained in the regression models in which the CADS socioemotional dimensions were introduced as predictors was notably higher than those in which principal components summarizing dispositional tendencies were considered (see **Tables 5** and **6**). The interpretation of this finding must be taken with caution, however, because both types of traits were not operationalized through comparable strategies (e.g., we used principal components instead of scale scores to define broad temperament traits and externalizing outcomes, and the CADS dimensions were measured at the same time-point, T3). Nonetheless, we take this result as preliminary evidence of the superiority of the developmental propensity model to provide an apparently more accurate picture of the temperament correlates of DB. In fact, the utility of CADS Emotionality, Daring and Prosociality dispositions to characterize a broader phenotypic vulnerability (i.e., the externalizing factor), beyond specific DB problems (i.e., ODD, ADHD and CU traits), was also proven.

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Together, this evidence suggests that the specific-purpose temperament model examined in our study, the developmental propensity model for conduct problems (Lahey and Waldman, 2003; 2005), might be a particularly useful and valuable framework to identity temperament traits, or specific combinations of them, that give raise to both specific and broader forms of externalizing problems in early childhood.

3.4. DISCUSSION

In the last decades, extraordinary advances on temperament and psychopathology research have occurred. It is now clear that the origins of early DB cannot be understood without consideration of individual differences in early appearing dispositional traits. However, important questions, some classical and more conceptual, others more a product of the contemporary research zeitgeist, need to be further investigated.

In this study, we examined some of these issues. We used an at-risk sample of preschoolers to test a) the extent to which general and specific-purpose temperament measures may serve indistinctively to assess dispositional antecedents of early DB, b) whether broader and narrower traits map into different levels of DB specificity, and c) how broader and narrower traits can simultaneously contribute to account for the heterogeneous forms of DB. In what follows, we discuss our findings in detail.

3.4.1. Temperament and DB: General, Specific Models of Temperament or Both?

As noted, few attempts have been made to compare the similarities and differences among the wide array of existing temperament models/measures. The scarce evidence supports, however, a certain degree of overlap between different questionnaires assessing temperament constructs (Mervielde & De Pauw, 2012). Overall, our findings support this idea. A degree of convergence across general-purpose models on a set of traits conceptually related to approach-oriented behaviors was found. Specifically, EAS Activity, CBQ-VS-F Surgency/Extraversion and the BAS subscale showed the highest correlations with this component. Thus, the dispositional core that is thought to represent a general vulnerability to DB, characterized by disinhibited and exuberant behavior, appears to be well-captured in general models of temperament. Whether this partial overlap might occur also with specific-purpose models, beyond between general ones, is a question unexplored in prior research. Our results suggest that, at least to some degree, such commonalities might also exist.

At the same time, these findings do not allow definite conclusions on the degree to which differences in terminology and traits operationalizations across temperament models represent true and meaningful differences on underlying temperament constructs (Zentner & Shiner, 2012). Important convergences seem evident at conceptual and empirical level (e.g., specific operationalizations of the items of the scales). Thus, while models and measures are not identical, they could, in fact, be capturing the same or similar dispositional tendencies. Nonetheless, the magnitude of correlations among the subscales of the measures administered in this study - only moderate – seem to be also indicating that temperament constructs across these models are not completely identical. In this sense, our results do not make a significant contribution to a longstanding debate in temperament and personality research (Block, 1995; Fountoulakis, & Gonda, 2019; Lawson & Robinson, 2021; Zuckerman et al., 1993). Rather,

they just corroborate that establishing the degree in which these models are similar and different, not in terminological but fundamentally substantive terms, remains still a challenge.

3.4.2. Temperament and DB: Unique Contributions of Specific-Purpose Models of Temperament

Most temperament measures were not developed to investigate the associations between dispositions and psychopathology (Carey, 2017). Such specific-purpose temperament models/measures are, overall, scarce. The developmental propensity model (Lahey & Waldman, 2003; 2005), operationalized through the Child and Adolescence Disposition Scale (CADS; Lahey, Appelgate et al., 2008), is an exception. A substantial number of studies demonstrate the associations among CADS dimensions and externalizing psychopathology (Class et al., 2019; Rhee et al., 2016; Taylor et al., 2013). Despite this evidence, it remains unclear whether opting for such an assessment strategy, thus focusing on child traits that might be specifically associated to a higher risk for conduct problems -Negative Emotionality, Daring and Prosociality-, could be more effective in revealing the temperament antecedents of DB, over a more general-purpose strategy (e.g., more generalist conceptualizations such as Buss and Plomin's, 1984 or Rothbart's, 2007). In this study, using a sample of children at risk for psychopathology, we showed that general and specific purpose measures may not be equally useful, thus interchangeable, to investigate the dispositional underpinnings of DB. This issue is critical for both research and clinical purposes due to the problems that might arise, paradoxically, from the existence of multiple temperament models, a potential source of confusion for clinicians and researchers alike (Zentner, 2020).

Our findings indicate that the developmental propensity model, a specific-purpose model advancing hypotheses regarding the socioemotional dispositions associated to an increased risk for externalizing behaviors, may be particularly useful to measure the temperamental antecedents of DB. Compared to general-purpose models, this conceptual framework could provide a unique contribution to the understanding and classification of DB phenomenology in early phases of the development. First, the three CADS dimensions showed distinctive patterns of associations with different forms of psychopathology: ODD, ADHD and CU traits. Therefore, these differences in magnitudes and patterns of associations support the discriminant validity of the CADS dimensions to differentiate across specific behavior problems within the externalizing spectrum. This finding is aligned with those of previous research, in which the differential associations of the CADS dimensions have been proved not only regarding externalizing behaviors (Lahey, Appelgate et al., 2008), but also wider representations of psychopathology (e.g., the general factor of psychopathology; Class et al., 2019). Second, individual differences in Negative Emotionality, Prosociality and Daring, were associated to broader operationalizations of externalizing psychopathology. That is, these three socioemotional dispositions contributed to explain, in a transdiagnostic manner, the shared variance of ADHD, ODD and CU traits, operationalized through an externalizing factor. This is consistent with evidence from genetically informed studies, suggesting that these three socioemotional dispositions might contribute to the covariation among DB (e.g., conduct disorder, ODD and ADHD; Taylor et al., 2013). Therefore, levels of Negative Emotionality, Prosociality, and Daring appear to perform better to predict childhood DB than levels of traits comprised in general-purpose models of temperament.

3.4.3. Temperament and DB: Mapping Broader and Narrower Temperament traits across Levels of Phenotypic Organization

The links between temperament traits and psychopathology in childhood are well known (Lahey 2004; Nigg, 2006; Rettew & McNee, 2005). However, since new organizing frameworks to define and organize psychopathological constructs have gained considerable notoriety in recent years (e.g., the HiTOP or the RDoC initiative), a change in how developmental psychopathology research is conceptualized and conducted, must be pursued to better understand the mechanistic origins of DB (Ostlund et al., 2021).

Hierarchical models of psychopathology postulate that psychopathology can be understood at various levels of specificity (Kotov et al., 2021). Despite hierarchically informed research is currently flourishing and has rapidly evolved in the last years, some developmental periods are considerably understudied. Here, we illustrate how hierarchically informed research can be conducted with youth (child) populations by focusing, specifically, on the hierarchical structure of externalizing problems in the preschool years. We provide support for two hypotheses with relevant conceptual and practical implications. First, we showed how temperament traits can be mapped into different levels of hierarchical organization of early DB. Second, we provided preliminary evidence on how their utility across particular levels of the hierarchy seems to vary as a function of their scope (i.e., broader vs. narrower traits). Overall, these findings are converging in suggesting a partial correspondence between temperament and externalizing problems, at different levels of breadth (Castellanos et al., 2016; Shields et al., 2021; Tackett, et al., 2013).

Specifically, consistent with our hypotheses and the literature upon which are based, approach-oriented and exuberant behaviors seem to be operating at the higher levels of the hierarchy (Beauchaine, & Neuhaus, 2008; Beauchaine et al., 2017; Martel et al., 2017). On the contrary, at the lower levels of the phenotypic structure, a nuanced picture of the dispositional underpinnings of the DB, seems to be achievable by turning to more fine-grained traits. As an illustrative example, while high Daring, and especially high Negative Emotionality showed only partial utility to discriminate between forms of DB, the potential of low Prosociality (i.e., low dispositional concern for others) to differentiate between CU traits and ADHD or ODD was clearly proved. Finally, at any particular level of the hierarchy, not only unique influences related, specifically, to each level of operationalization should be considered (e.g., the lowest, the intermediate, the highest), but also additional effects that might be operating concomitantly from other levels (Lahey et al., 2017). In this study, simultaneous influences of broad and dimension-specific mechanisms were found. That is, additive, and non-redundant, effects of broad-band and fine-grained dispositional tendencies, predicted, jointly, specific forms of DB. ADHD symptoms and CU traits, were both defined by overall high approach as well as all, or part, of the CADS socioemotional dispositions. Therefore, as some have previously emphasized, these results are suggesting that broad and dimension-specific etiological influences must be considered, at the same time, to better account for the etiologic and phenotypic heterogeneity of DB (Lahey et al., 2017; Lahey & Waldman, 2012).

Broadly, these findings supported the hypotheses of this study in the expected way, but some unanticipated results must be also discussed. Although tentatively hypothesized, a *predominant utility* of specific temperament dimensions at the lower levels of the hierarchy was

expected. We also expected that at this level of analysis, traits *per se* were sufficient to discriminate among various dimensions of externalizing psychopathology. We did not initially make predictions regarding the potential explicative value of *combinations of specific traits*. The results of our analyses call to question both assumptions. Firstly, while socioemotional dispositions from Lahey's and Waldman's developmental propensity model, predicted specific dimensions of DB, at the lower levels of the hierarchy, associations with the broader externalizing factor, *at the higher level of the hierarchy*, were also found. This seems conceptually compatible with the notion of the antisocial propensity proposed by these authors and supported by extensive research (Class et al., 2019; Rhee et al., 2016; Taylor et al., 2013). However, it refutes our hypothesis that fine-grained temperament traits are more valuable to predict specific forms of DB. Secondly, *combinations of traits*, beyond traits per se, contributed to define particular disruptive behaviors. Thus, revealing a degree of heterogeneity arising from within each hierarchical level that fits with well-stablished findings from prior research (e.g., Frick & Morris, 2004; Nigg et al., 2004). Interestingly, the combination of socioemotional dimensions defining CU traits was also compatible with Lahey's and Waldman's antisocial propensity. In contrast to the constellation characterizing the externalizing factor, however, particularly low levels of Prosociality, instead of particularly high levels of Negative Emotionality, were the prominent feature to predict higher levels of CU traits.

In sum, with this work, we are contributing to address some interesting issues. In a more applied vein, we began by exploring which model or measure of temperament could best assess temperament traits in young children at an increased risk for psychopathology. Then, at a more conceptual level, following the lead of prominent classification models of psychopathology (i.e., the HiTOP; Kotov et al., 2017), we provided promising insights on which are the temperament correlates of DB at different levels of specificity during the preschool years. Overall, our findings suggest that adopting a hierarchically informed approach to conduct developmental research might advance our understanding of the mechanistic origins of DB.

3.4.4. Strengths and Limitations

The present study has some major strengths. First, we assessed child temperament through a variety of measures. This is, in general, quite unusual in the literature. Studies tend to focus, reasonably, on a single theoretical/assessment approach. Our less restricted perspective, on the contrary, allowed us to obtain empirical data on the same sample of children using several temperament conceptualizations. Second, a specific-purpose model was examined along with general purpose frameworks, that have received, comparatively, more attention in prior research (see Mervielde & De Pauw, 2012). To date, studies examining the developmental propensity model (Lahey & Waldman, 2003) are, overall, less numerous. Third, we covered a wide range of early externalizing problems that, importantly, were modeled according to robust classical and contemporary theories on the structure of psychopathology (Achenbach, 1966; Kotov et al., 2021).

At the same time, several limitations with respect to the study design, measures and methods applied should be considered. First, concerns may arise on the circularity between temperament and DB rating-scales used to collect data for this work. This potential overlap is particularly problematic as one of our specific aims was to map temperament traits and disruptive behaviors at different levels of breadth. Although there is evidence that item

overlapping is not the primary source of the associations between temperament and psychopathology, confounding effects due to overlapping items are well-known (Lengua et al., 1998; Sanson et al., 1990). As an illustrative example, while the CADS was a measure deliberately developed to minimize item contamination and distinguish between traits and symptoms (Lahey, Appelgate et al., 2008), the CADS Prosociality scale might overlap substantially, or at least partially, with the callous unemotional scale of the CPTI CU traits subscale (Colins et al., 2014). This overlapping might be evident in items such as *"Does he/she feel bad for other children when they get hurt?"* and *"Often seems to be completely indifferent when other children are upset"* (from the CADS and CPTI, respectively). Thus, our mapping would be, to some degree, inherently flawed. Second, despite the acceptable reliability of the measures administered, concerns on their psychometric robustness are warranted. Most are adaptations of longer versions, that if applied in their original form, would have been very time-consuming for participating families. While there are benefits of using brief questionnaire measures in the context of large-scale longitudinal studies (see Watts, Smith et al., 2020 for a brief comment on that), important information and nuances might have been lost. Ultimately, this clearly threatens the construct validity of the constructs examined (Smith et al., 2000). Third, temperament scales used in this work were applied at different time points within the course of the longitudinal study from which the data were collected. Specifically, the EAS-TS-FC at T1, the CBQ-VSF at T2, the BIS/BAS scales and the CADS at T3. Therefore, the magnitude of correlations among measures, might be affected by other factors (e.g., the time of data collection) besides the true alleged similarities and differences between them. Relatedly, the estimates obtained might be biased due to common method variance, as only parent-reported data was used for this study. For example, it is likely that parents' reports on child's levels of ODD, ADHD and CU traits, could be influenced by their answers on the levels of temperament traits encompassing the antisocial propensity. Finally, we used a convenience sample of children at potential risk for psychopathology based on their scores on a screening questionnaire (i.e., the SDQ; Goodman, 2001). Opting for such a design instead of a representative sample, can also contribute to create false associations, resulting in biases in our findings.

3.4.5. Future Research

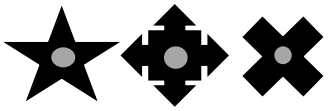
The findings presented above converge in suggesting an alignment between temperament and DB, if a hierarchical view to organize psychopathological constructs is assumed. Nonetheless, new research is needed to better understand the processes that give rise to these correspondences. First, more studies are needed to examine the replicability and generalizability of these findings through multi-informant and multimethod approaches, using different youth samples beyond at-risk for psychopathology children. As such, the possibility that the associations found here are only context-specific could be excluded. Second, our mapping does not reveal anything about the pathways from which socioemotional dispositions give rise to disruptive behaviors. Arguably, the spectrum model, which suggests that psychopathology may be an expression of early onset individual differences in functioning, offers a valid interpretation for these results (Clark, 2005; Tackett, 2006). However, further exploration of this hypothesis is needed. Third, future research should further test the influence of sociodemographic variables such SES and gender for their importance to propose and validate models of DB in early childhood (Egger & Angold, 2006; Lavigne et al., 1996; Lavigne

et al., 2012). Finally, a rigorous discussion on the clinical implications of these findings is needed.

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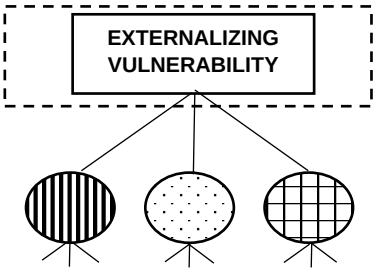
Figure 3.1. Hypotheses of the present study

1)



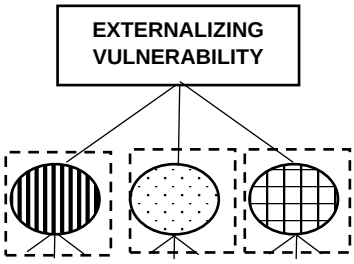
Hypothesis #1: a degree of overlap across general-purpose models/measures of temperament is assumed. Thus, broad band traits associated to DB are expected to be represented, to some extent, across such models

2)



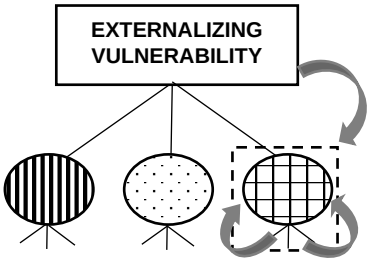
***Hypothesis #2*:** At higher levels of the hierarchical phenotypic organization, (i.e., externalizing factor), broader temperament influences are expected to operate predominantly

3)



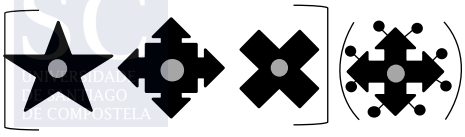
***Hypothesis #3*:** At lower levels of the hierarchical phenotypic organization (i.e., ODD, ADHD, CU traits), specific temperament influences are expected to operate predominantly

4)



***Hypothesis #4*:** At lower level of the hierarchical phenotypic organization additive effects of broad-band shared and dimension-specific temperament traits are anticipated

5)



***Hypothesis #5*:** despite a potential overlap expected between general and specific-purpose models/measures of temperament, the latter are anticipated to explain unique variance in relation to the development of DB

Table 3.1. Bivariate correlations between measures of temperament models considered for this study

	(a) The EAS Model (T1)				**(b) Rothbart's Model (T2)**			**(c) Gray's Model (T3)**		**(d) The Developmental Propensity Model (T3)**		
The EAS Model (T1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) ACT	-											
(2) SHY	-.45***	-										
(3) EMO	.35***	-.14***	-									
(4) SOC	.69***	-.67***	.27***	-								
Rothbart's Model (T2)												
(5) EFF CON	.13***	-.04	.18***	.19***	-							
(6) SUR/EXT	**.55*** **	**-.59*** **	.18***	**.52*** **	.10*	-						
(7) AFF NEG	.11***	-.02	**.42*** **	.17***	.52***	.01	-					
Gray's Model (T3)												
(8) BAS	.24**	-13*	.14**	.24***	.18**	.26***	.27***	-				
(9) BIS	.05	.06	.04	**.49*** **	.22***	.00	.25***	.49***	-			
The Developmental Propensity Model (T3)												
(10) DAR	**.47*** **	**-.37*** **	24***	.37***	.06	**.65*** **	.06	**.30*** **	-.03	-		
(11) NEG EMO	.28***	-.15**	**.46*** **	.19***	.00	.25***	**.34*** **	.20***	.01	.42***	-	
(12) PROS	.06	-.08	-.08	.18***	.27***	.02	.09	.19***	.27***	-.14**	-.26***	-

Note: *p<.05; **p<.001; ****p<.000

(a) EAS-TS-FC: The EAS Temperament Survey for Children (Buss & Plomin, 1984); (b) CBQ-VS: The Child Behavior Questionnaire Very-Short Form (Putnam & Rothbart, 2006); (c) The BIS/BAS scales (Muris et al., 2005); (d) CADS: The Child and Adolescent Disposition Scale (Lahey, Appelgate et al., 2008)

ACT: Activity; SHY: Shyness; EMO: Emotionality; SOC: Sociability; EFF CON: Effortful Control; SUR/EXT: Surgency/Extraversion; NEG AFF: Negative Affect; BAS: Behavioral Approach System; BIS: Behavioral Inhibition System; NEG EMOT: Negative Emotionality; DAR: Daring; PROS: Prosociality

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Table 3.2. Results of Principal Component Analysis with Varimax Rotation

(A) Subscales from general-purpose measures

EAS TS- C (T1)	Principal Component 1	Principal Component 2	Principal Component 3
Emotionality	.07	**.82**	.07
Activity	**.73**	.11	.07
Sociability	.45	**.55**	-.02
Shyness	**-.71**	-.07	.19
CBQ-VS-F (T2)			
Negative Affect	-.06	**.74**	.32
Surgency/Extraversion	**.87**	-.02	.06
Effortful Control	.00	.16	**.65**
BIS/BAS Scales (T3)			
BIS	-.04	.08	**.77**
BAS	**.55**	.06	.50
Eigen value	2.60	1.70	1.02
% Explained variance	28.93%	18.88%	11.30%

Note. Only Principal Components with an Eigenvalue >1 are shown. Primary loadings are in bold print.

(B) Subscales from general and specific-purpose measures

EAS TS- C (T1)	Principal Component 1	Principal Component 2	Principal Component 3	Principal Component 4
Emotionality	.02	**.78**	.09	.19
Activity	**.65**	.13	-.02	.28
Sociability	.20	.28	.04	**.75**
Shyness	**-.52**	.01	.23	-.49
CBQ-VS-F (T2)				
Negative Affect	-.06	**.73**	.34	.08
Surgency/Extraversion	**.86**	.02	-.04	.20
Effortful Control	.06	.07	**.68**	.02
BIS/BAS Scales (T3)				
BIS	-.01	.12	**.73**	.05
BAS	**.65**	.14	.42	-.04
CADS (T3)				
Negative Emotionality	.34	**.72**	-.14	-.17
Daring	**.89**	.03	.03	-.14
Prosociality	-.10	-.19	.49	**.61**
Eigen value	3.22	1.89	1.43	1.07
% Explained variance	26.84%	15.78%	11.94%	8.90%

Note. Only Principal Components with an Eigenvalue >1 are shown. Primary loadings are in bold print.

Table 3.3. Conceptual commonalities and distinctiveness across temperament models examined in this study

	General-purpose models/scales			***Specific-purpose model/scale***
	The EAS Model *(EAS-TS-C)*	**Rothbart's Model** *(CBQ-VS-F)*	**Gray's Model** *(BIS/BAS Scales)*	**The Developmental Propensity Model** *(CADS)*
COMMONALITIES				
Approach tendencies	*Activity*	*Surgency/Extraversion*	*BAS*	*Daring*
Inhibition tendencies		*Effortful Control*	*BIS*	-
Negative affect-Arousal	*Emotionality*	*Negative/Affect*	-	*Negative Emotionality*
DISTINCTIVENESS				
Effortless control	*Shyness*	-	*BIS*	-
Effortful control	-	*Effortful Control*	-	-
Low dispositional concern for others	-	-	-	*Prosociality*

Note: EAS-TS-FC: The EAS Temperament Survey for Children (Buss & Plomin, 1984); CBQ-VS-F: The Child Behavior Questionnaire Very-Short Form (Putnam & Rothbart, 2006); CADS**:** The Child and Adolescent Disposition Scale (Lahey, Appelgate et al., 2008)

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Table 3.4. Associations of broad temperament dimensions operationalized via Principal Component Analyses of general-purposes scales, and disruptive behavior at different levels of specificity

	Parent reported disruptive behavior, T3							
	Lower-order dimensions						**Higher-order factor**	
Temperament (T1, T2, T3) (general-purpose models)	**ODD**		**ADHD**		**CU traits**		**EXTER**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
PC1 *(approach)*	.08 (.02)	.17***	.18 (.02)	.39***	.05 (.02)	.10*	.21 (.04)	.26***
PC2 *(neg affect-arousal)*	.13 (.02)	.30***	.03 (.02)	.07	-.01 (.03)	-.02	.19 (.04)	.24***
PC3 *(inhibition)*	.00 (.02)	.01	-.03 (.02)	-.08	-.08 (.02)	-.16**	-.04 (.04)	-.04
R^2		.15***		.30***		.07**		.22***

Note: *p<.05; **p<.001; ****p<.000.
PC1, PC2 and PC3= Principal Components 1, 2 and 3; EXTER= second-order externalizing factor
Parenting practices (i.e., punitive, positive, and inconsistent), as well as sociodemographic covariates (i.e., sex, age, family SES) were controlled in these regression analyses. See **Supplementary Material for Chapter Three**, for tables with extended results.

Table 3.5. Associations of specific temperament dimensions operationalized through the CADS (Lahey, Appelgate et al., 2008), and disruptive behavior at different levels of specificity

	Parent reported disruptive behavior, T3							
	Lower-order dimensions						**Higher-order factor**	
Temperament *(T3)* (specific-purpose model)	**ODD**		**ADHD**		**CU traits**		**EXTER**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Negative Emotionality	.44 (.03)	.67***	.29 (.03)	.42***	.14 (.03)	.21***	.79 (.04)	.66***
Daring	.04 (.03)	.08*	.11 (.02)	.21***	-.46 (.03)	.16***	.15 (.03)	.17***
Prosociality	-.02 (.03)	-.02	-.03 (.03)	-.04	.08 (.02)	-.62***	-.20 (.44)	-.15***
R^2		.51***		.37***		.46***		.59***

Note:*p<.05; **p<.001; ****p<.000
Parenting practices (i.e., punitive, positive, and inconsistent), as well as sociodemographic covariates (i.e., sex, age, family SES) were controlled in these regression analyses. See **Supplementary Material for Chapter Three**, for tables with extended results.

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Table 3.6. Simultaneous effects of broad and narrow-band temperament traits across different levels of phenotypic specificity

(A)	***Parent reported disruptive behavior, T3***							
	Lower-order dimensions						**Higher-order**	
	ODD		**ADHD**		**CU traits**		**EXTER**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**
Sex	-.08 (.03)	-.09**	-.15 (.03)	-17.***	.04 (.03)	.04	-.18 (.05)	-.11***
Age	-.01 (.02)	-.02	.01 (.02)	.03	.02 (.02)	.04	.01 (.03)	.01
SES	-.05 (.02)	-.09*	-.13 (.03)	-.21***	-.04 (.03)	-.07	-.15 (.04)	-.14***
Parenting (T1)								
PUN	.09 (.04)	.09*	-.05 (.04)	-.05*	.08 (.05)	.08	.11 (.06)	.06
POS	-.03 (.04)	-.03	.01 (.05)	.01	.01 (.05)	.01	-.05 (.07)	-.03
INC	.01 (.03)	.01	.01 (.03)	.02	.07 (.03)	.08	.04 (.05)	.03
Temperament (general)								
PC1 *(approach)*	.00 (.02)	.01	.14 (.02)	.31***	.02 (.02)	.06	.07 (.03)	.09*
Temperament (specific, T3)								
Neg. Emo.	.44 (.03)	.67***	.28 (.03)	.41 ***	.14 (.03)	.21***	.79 (.04)	.66***
Daring	.04 (.03)	.08	.01 (.03)	.02	.07 (.03)	.13*	.10 (.04)	.11*
Prosociality	-.02 (.03)	-.02	-.06 (.03)	-.08*	-.47 (.03)	-.64***	-.22 (.04)	-.17***
R^2		.51***		.42***		.47***		.59***

Note:*p*<.05; ***p*<.001; ****p*<.000 ; PC1=Principal Component 1; PUN= Punitive; POS= Positive; INC= Inconsistent; Neg. Emo.= Negative Emotionality

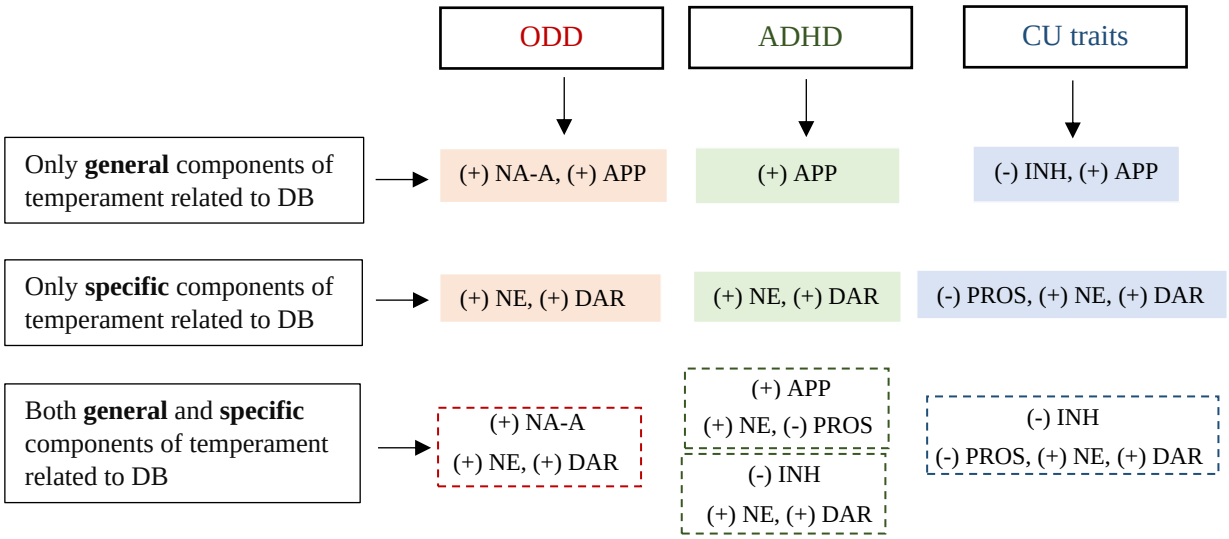
(B)								
	Lower-order dimensions						**Higher-order**	
	ODD		**ADHD**		**CU traits**		**EXTER**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**
Sex	-.09 (.03)	-.10**	-.18 (.04)	-.20***	.03 (.03)	.04	-.20 (.05)	-.13***
Age	-.01 (.02)	-.02	.00 (.02)	.01	.02 (.02)	.03	.00 (.03)	.00
SES	-.04 (.02)	-.07	-.13 (.03)	-.21***	-.04 (.03)	-.07	-.13 (.04)	-.13***
Parenting (T1)								
PUN	.08 (.04)	.09*	-.05 (.04)	-.05	.08 (.05)	.08	.10 (.06)	.06
POS	-.03 (.04)	-.02	.03 (.05)	.02	.01 (.05)	.01	-.04 (.07)	-.02
INC	.00 (.03)	.00	.02 (.03)	.02	.07 (.03)	.08	.04 (.05)	.03
Temperament (general)								
PC2 *(neg affect-arousal)* .05 (.02)		.12**	-.02 (.02)	-.06	-.01 (.02)	-02	.05 (.03)	.07
Temperament (specific, T3)								
Neg. Emo	.41 (.03)	.64***	.31 (.03)	.44***	.15 (.03)	.22***	.76 (.05)	.64***
Daring	.05 (.02)	.11*	.10 (.02)	.19**	.08 (.02)	.16***	.17 (.03)	.18***
Prosociality	-.03 (.03)	-.04	-.02 (.03)	-.03	-.46 (.03)	-.61***	-.21 (.04)	-.16***
R^2		.50***		.38***		.47***		.58***

Note:*p*<.05; ***p*<.001; ****p*<.000 ; PC2=Principal Component 2; PUN= Punitive; POS= Positive; INC= Inconsistent; Neg. Emo.= Negative Emotionality

(C)								
	Lower-order dimensions						**Higher-order**	
	ODD		**ADHD**		**CU traits**		**EXTER**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**
Sex	-.07 (.03)	-.07*	-.14 (.04)	-.16***	.06 (.03)	.06	-.14 (.05)	-.09**
Age	-.01 (.02)	-.02	.01 (.02)	.01	.02 (.02)	.04	.00 (.03)	.01
SES	-.05 (.02)	-.08*	-.12 (.03)	-.19***	-.04 (.03)	-.06	-.14 (.04)	-.13***
Parenting (T1)								
PUN	.09 (.04)	.10*	-.05 (.04)	-.05	.09 (.05)	.09	.12 (.06)	.07*
POS	-.02 (.04)	-.02	.06 (.05)	.05	.03 (.05)	.02	-. 01 (.07)	.00
INC	.00 (.03)	.01	.00 (.03)	.00	.06 (.03)	.07	.03 (.05)	.02
Temperament (general)								
PC3 *(inhibition)*	-.03 (.02)	-.06	-.07 (.02)	-.15***	-.04*	-10*	-.09 (.03)	-.11**
Temperament (specific, T3)								
Neg. Emo.	.45 (.03)	.67***	.30 (.03)	.43***	.15 (.03)	.22***	.80 (.04)	.67***
Daring	.05 (.02)	.09*	.12 (.02)	.23***	.09 (.02)	.18*	.17 (.03)	.19***
Prosociality	-.01 (.03)	-.01	.00 (.03)	.00	-.45 (.03)	-.60***	-.17 (.04)	-.13***
R^2		.52***		.40***		.46***		.60***

Note:*p*<.05; ***p*<.001; ****p*<.000 ; PC3=Principal Component 3; PUN= Punitive; POS= Positive; INC= Inconsistent; Neg. Emo.= Negative Emotionality

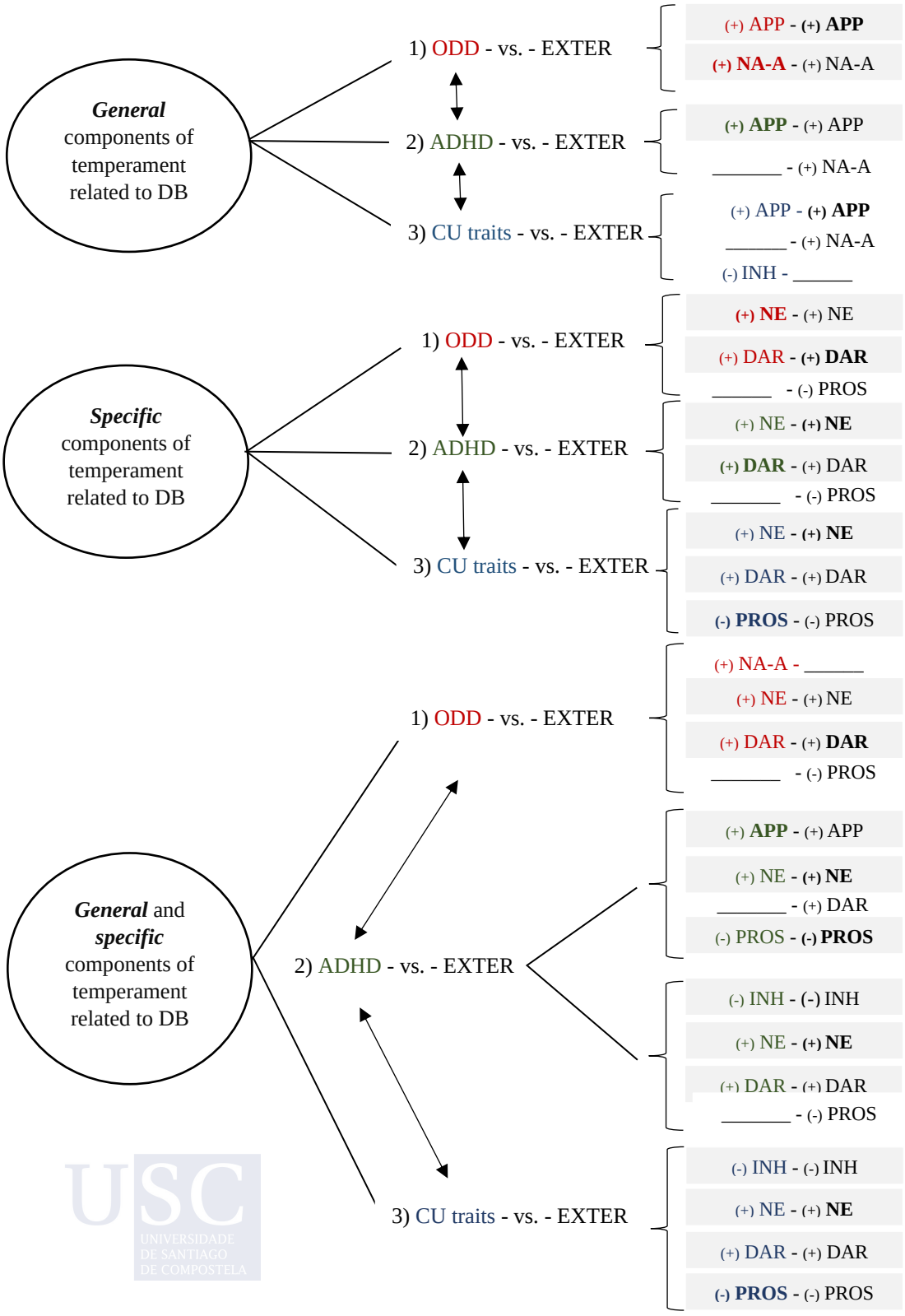
Figure 3.2. Dispositional characterization of ODD, ADHD and CU traits (separate and simultaneous influences of broad-band and fine-grained temperament traits are summarized)



Note. APP= approach (PC1); NA-A= negative affect-arousal (PC2); INH= inhibition (PC3); NE=Negative Emotionality; DAR= Daring; PROS= Prosociality

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Figure 3.3. Convergences and divergences on general and specific temperament traits of narrower operationalizations of DB 1) among each other (vertical) and 2) with the externalizing factor (horizontal)



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Note. APP= approach (PC1); NA-A= negative affect-arousal (PC2); INH= inhibition (PC3); NE=Negative Emotionality; DAR= Daring; PROS= Prosociality

Summary of this Study (Chapter Three)

- Hierarchical models of psychopathology postulate that mental health problems can be understood at various levels of breadth.

- Traditionally, predominant attention has been given to structural aspects of this alleged hierarchical organization (i.e., its components), rather than its correlates (e.g., personality traits).

- In child and developmental research, a way of further testing the validity of these hierarchical conceptualizations is by examining its temperament correlates. However, one key issue is that several partially overlapping conceptualizations of temperament exist.

- In this study, we exemplify how hierarchically informed research can be conducted with child populations. By focusing, specifically, on the hierarchical structure of externalizing problems in the preschool years, and drawing upon the diversity of temperament models and measures. Here:

  1. We identified relevant broader temperament traits in which general-purpose models of temperament converge (i.e., approach-oriented behaviors).

  2. We found a partial correspondence between broad and narrow-band temperament traits and externalizing problems, at different levels of specificity, as well as significant additive effects of these dispositional traits.

  3. We established the incremental utility of the developmental propensity model (Lahey & Waldman, 2003), a specific-purpose model of temperament, to better account for the temperament antecedents of DB at different levels of breadth.

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4 CHAPTER FOUR

A CLOSER LOOK AT THE HETEROGENEITY OF EARLY DISRUPTIVE BEHAVIOR: THE UPPS-P IMPULSIVE BEHAVIORS SCALE FOR PRESCHOOL CHILDREN

4.1. INTRODUCTION

Impulsivity is a broad and heterogenous construct widely studied but only partially understood. In the domain of developmental psychopathology, the term can be used, at least, with two intertwined meanings. First, to designate a relatively *stable personal disposition* to act on immediate urges before or despite consideration of negative consequences (i.e., *trait* impulsivity; DeYoung & Rueter, 2016). Second, to define a set of maladaptive behaviors, *or symptoms*, potentially signaling an emerging clinical problem (e.g., the behavioral impulsive component of ADHD; Martel et al., 2017). At this point, however, a broad, but comprehensive definition of impulsivity remains controversial and elusive. The debate on its unidimensional or multifaceted nature also persists (Strickland & Johnson, 2021). Despite this conceptual disagreement and operational inconsistencies, both general and more targeted definitions are at hand (see Castellanos-Ryan & Séguin, 2016; Congdon & Canli, 2008). Overall, it is generally agreed that the umbrella construct of impulsivity includes "behavior without adequate thought, the tendency to act with less forethought than do most individuals of equal ability and knowledge, or a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions" (International Society for Research on Impulsivity, 2021).

Strong evidence supports the central role of impulsivity in multiple forms of problematic behaviors and poorer developmental outcomes through childhood and adolescence. Associations with aggressive behaviors (Connor et al., 2019), disordered eating behaviors (Evans et al., 2019) or internalizing difficulties (Cosi et al., 2011), and poor academic achievement (Valiente et al., 2013) have been noted in the literature. However, the evidence regarding its concurrent and prospective associations with externalizing psychopathology is particularly compelling. Findings support the role of impulsivity on the initiation of physical fights, ODD and ADHD symptoms during middle-childhood, substance abuse problems and antisocial behavior later in the development, and adult criminal behavior (James & Taylor, 2007; González-Iglesias et al., 2012; Haas et al., 2017; Halperin et al., 1995; Luengo et al., 1994; Pardini et al., 2018). Thus, impulsivity is currently considered not only a transdiagnostic mechanism cross-cutting multiple forms of psychopathology but also a well-established risk factor associated to the development and maintenance of multiple externalizing problems (Beauchaine et al., 2017; Beauchaine & Neuhaus, 2008; Rodenacker et al., 2018). Despite its developmental relevance, however, the measurement of impulsivity in research and clinical

settings is tricky, and its mechanisms of influence remain overall poorly understood (Revill et al., 2020).

4.1.1. Assessing Impulsivity in Children: Perils and Promises

Several factors make impulsivity assessment complicated. First, its intrinsic heterogeneity, and the wide range of actions/behaviors the concept covers, thought to represent several underlying independent subfacets (Evenden, 1999a; Tsukayama et al., 2013). Also, its conceptual proximity with related, yet differentiable constructs, such as disinhibition (Gorenstein & Newman, 1980; Joyner et al., 2021) or sensation and novelty seeking (Bai & Lee, 2017). This would partially explain why, in impulsivity research, the so-called jingle-jangle fallacies abound (Block, 1995). As a result, not only the definitional struggle occurs, but also the wide variability on its operationalization across conceptual models and studies. Additionally, there are extra sources of confusion. Whereas in some empirical works, impulsivity is deliberately conceptualized as a trait (e.g., Zapolski & Smith, 2013), in others, ADHD symptoms have been used as the basis for its questionnaire assessment (e.g., Ahmad & Hinshaw, 2017). Thus, a variety of both temperament/personality measures and psychopathological ratings currently coexist within the impulsivity literature in children (Achenbach & Rescorla, 2001; Conners et al., 1998; Zaparniuk & Taylor, 1997). Beyond child self-report and parent-report questionnaires, laboratory measures aiming to capture behavioral manifestations of underlying traits are also available (e.g., the ability to suppress prepotent responses or delay gratification; Avila et al., 2004; Olson et al., 1999). A comprehensive revision of these multiple measures exceeds the aims of this study. Instead, only some of the most commonly used child and parent-reported scales of *trait impulsivity* will be briefly described.

Historically, well-known temperament questionnaires have been employed to assess child trait impulsivity or impulsivity-like traits through parent reports. As an example, the Emotional Activity, Sociability, and Impulsivity Inventory (EASI; Buss & Plomin, 1975). Likewise, the BIS/BAS scales for children (Muris et al., 2005), mirroring the BIS/BAS scales for adults (Carver & White, 1994) to measure Gray's (1991) behavioral inhibition and activation systems. The Barratt Impulsiveness Scale (BIS) for children in its standard (Cosi et al., 2008) and unidimensional forms (Mathias et al., 2018) can also be administered to obtain, respectively, Barratt's (1965) scores on motor, non-planning and attentional dimensions of impulsivity, as well as a total impulsivity score. More recently, new scales adopting a multidimensional conceptualization of impulsivity such as the UPPS-P Impulsive Behaviors Scale for children to measure Whiteside and Lynam's model (2001), have received increasing attention (Zapolski et al., 2010).

Beyond differences on how the trait is represented (i.e., specific items/indicators defining impulsivity), these instruments differ on the extent to which assumptions on the multidimensional nature of impulsivity are explicitly articulated. They share, at any rate, some major limitations. First, and foremost, they are overall lengthy questionnaires (e.g., 59 and 40 items, respectively, for adult and children standard forms; Lynam et al., 2006; Zapolski et al., 2010). In certain research contexts (e.g., large scale longitudinal designs), however, shorter versions would be more useful and less burdensome for participants (Watts, Smith et al., 2020). Second, in these instruments, an inquiry of how impulsivity is elicited, and which are its triggers

(e.g., emotional experience), is generally precluded. The UPPS-P Impulsive Behavior Scale is an exception (Cyders & Smith, 2008).

4.1.2. The UPPS/UPPS-P Model

In the last decades, the UPPS/UPPS-P model of impulsivity has received consistent and strong support in studies from personality, neuroscience, and psychopathology research (Owens et al, 2020; Pedersen et al., 2019; Sperry et al., 2018). The four pathways initially described by the authors -Lack of Premeditation, Negative Urgency, Sensation Seeking and Lack of Perseverance- are considered to represent four *separable processes* leading to impulsive behaviors rather than simply different facets of impulsivity (Whiteside & Lynam, 2001). *Lack of Premeditation* is defined as the tendency to act without forethought. *Negative Urgency* is described as the tendency to act rashly when experiencing intense negative emotions. *Sensation Seeking*, reflects the disposition to pursue novel, thrilling, or exciting activities. *Lack of Perseverance* represents the difficulty to maintain the focus on a task. *Positive Urgency*, later added to the initial formulation of the model, encompasses impulsive actions in intense positive emotional contexts (Cyders et al., 2007; Smith et al., 2007). These separable processes are measured by the UPPS and the UPPS-P Impulsive Behavior Scale, respectively (Lynam et al., 2006; Whiteside et al., 2005). Beyond the first-order factor structure of the UPPS-P Impulsive Behavior Scale, a second-order factor structure has been also proposed. By grouping Positive and Negative Urgency into Urgency, an account of impulsivity in which emotions are involved can be obtained (Cyders & Smith, 2008). By grouping lack of Premeditation and lack of Perseverance a broader domain reflecting deficits in Consciousness is attained. The resulting second-order factor structure would include, therefore, three factors: the broader dimensions of Urgency and deficits in Consciousness as well as Sensation Seeking. Deficits in Consciousness and Sensation Seeking would encompass impulsive behaviors in which the role of emotions is not salient.

To this point, the psychometric properties of the UPPS-P scales have been robustly probed in numerous studies, with a wide array of samples and features (Berg et al., 2015). The four-factor model of impulsivity has been replicated in several studies with both adult and youth samples (e.g., Miller et al., 2003; Zapolski et al., 2010). The five- factor structure, however, has been overall examined in a fewer number of studies and mostly with adult samples (Berg et al., 2015). Only a handful studies have examined children's impulsive behaviors based on the latest formulation of the UPPS model. However, these findings tend to converge on the validity and reliability of the five dimensions to assess impulsive behaviors in children measured via both self and parent reports (Zapolski & Smith, 2013).

Findings from preceding works with adult samples suggest that the five dimensions play different roles in problematic outcomes related to impulsivity (Anestis et al., 2007; Dick et al., 2010). For instance, Berg et al. (2015) demonstrated, through meta-analytic techniques, that while all five facets appear to be involved in some degree in certain antisocial behaviors (e.g., substance use), others, however (e.g., sensation seeking), seem to be distinctively related to specific problematic behaviors (e.g., psychopathy). Thus, given impulsivity heterogeneity, it would be expected that in children, too, the five dimensions would relate differently to different conditions, as it has been demonstrated in adults (Sharma et al., 2014). This is precisely what the literature suggests. Affect-based traits, Negative and Positive Urgency, have been shown to

predict aggression using both child and parent reports (Zapolski et al., 2013), but no anxiety symptoms (Marmornstein, 2013). Lack of Perseverance, and to a lesser extent, Lack of Premeditation, appear predominantly associated with ADHD symptoms (Zapolski et al., 2010). Sensation Seeking has been positively associated with conduct disorder and negatively related to separation anxiety during middle childhood in at risk samples (Marmornstein, 2013). Interestingly, Haas et al. (2017) recently demonstrated that trait Negative Urgency is involved in the emergence of both ODD and ADHD as well as CU behaviors in children aged 5 to 12. These findings are consistent with previous research, proposing that the tendency toward affect-driven rash action may underlie multiple externalizing behaviors (Settles et al., 2012).

4.1.3. This Study

This study builds upon previous evidence supporting the multifaceted nature of trait impulsivity (Evenden, 1999b; Moeller et al., 2001). Specifically, we adopt the operational definitions proposed in the UPPS/ UPPS-model of impulsivity (Cyders et al., 2007; Lynam et al., 2006; Whiteside & Lynam, 2001). Currently, both self and parent report forms of the UPPS-P exist to be used with children (Gunn & Smith, 2010; Zapolski & Smith, 2013). However, our literature review revealed the need of *shorter* measures (i.e., < 40 items) tapping the different separable pathways purported to underlie children's impulsive behaviors early in the development. In the last years, in fact, an increased interest on such abbreviated forms appears to have rapidly grown. *Self-reported short* versions (i.e., 20 items) of the UPPS-P Impulsive Behavior Scale for children as young as 8 (Geurten et al., 2018), adolescents aged 10 to 16 (Pechorro et al., 2021) and young adults up to 24 (Donati et al., 2021) are now available in different languages and cultural contexts (Wang et al., 2020). However, to our knowledge, no such version exists, to date, for children younger than 8 neither in English nor in Spanish. In Spanish, only an abbreviated version (i.e., 20 items) for children above 10 years of age has been recently developed (Caneto et al., 2020), but it has not yet been formally recognized by the International Society for Research on Impulsivity. Thus, the meaning and differential correlates of the UPPS-P scales in preschool children cannot be tested in our context. At least, not in a cost-effective, time-saving way required in large scale designs such as longitudinal studies (Watts, Smith et al., 2020). To address this gap, we adapted a short-form of the UPPS-P Impulsive Behavior Scale to be parent reported and used with preschool children aged 3 to 6 and tested its psychometric properties in a sample of Galician children. The objectives of the current study were 1) to test the factor structure and its invariance across genders and 2) to examine the convergent and discriminant validity of the UPPS-P first and second-order dimensions.

Our hypotheses for this study were informed by previous findings from child and adult research. As regards the factor structure of the UPPS-P scale, we hypothesized that we would identify a well-fitting correlated five and three-factor solution. Thus, we expected to replicate the primary and secondary structural configurations identified in older samples when longer forms of the UPPS-P scale are used (i.e., self and parent-reported forms of 40-items for children; Zapolski & Smith, 2013). Regarding the correlates of impulsivity dimensions, we expected to find moderate convergence between impulsivity dimensions and conceptually related temperament traits or motivational systems (e.g., the behavioral activation system; Watts, Smith et al., 2020). Finally, while we expected to find significant associations between specific

impulsivity dimensions and specific externalizing outcomes (e.g., Negative Urgency and aggressive behaviors; Zapolski et al., 2010), we also hypothesized that impulsive reactions initiated by negative and positive emotions, that is, emotion-triggered impulsivity, would predict separately and together with other impulsivity factors, multiple externalizing outcomes (Haas et al., 2017).

4.2. METHOD

4.2.1. Scale Adaptation

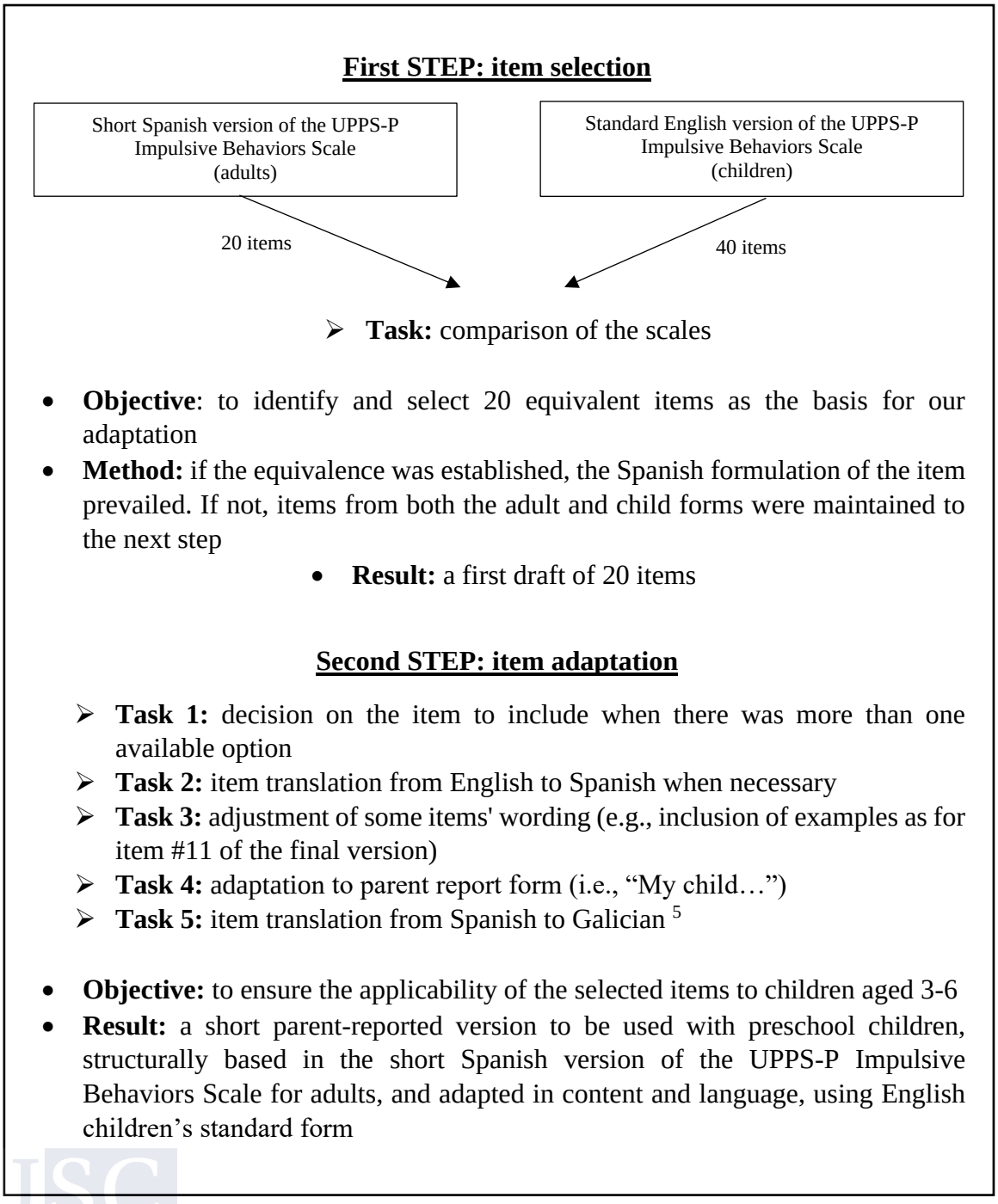
This adaptation was conducted with very specific purposes, within the context of a particular research, with unique design features; namely, an ongoing large-scale longitudinal study on child development, which started in 2017. So far, trait impulsivity conceptualized according to Whiteside & Lynam's model has been largely unaddressed in studies of this kind, due to the overall absence of abbreviated forms of the UPPS-P Impulsive Behavior Scale for children, including preschool children. Thus, in trying to address this gap, while tackling our most immediate research interests, we conducted the scale adaptation. A diagram detailing the process of item selection and scale adaptation is shown in **Figure 4.1.** A more extensive account of each phase of the process can be found in the supplementary material (see **Supplementary Material for Chapter Four)**. Two researchers participated in these tasks. As the basis to conduct our adaptation, we worked with two versions of the UPPS-P Impulsive Behavior Scale. On the one hand, the short-form of the UPPS-P scale for adults in Spanish (Candido et al., 2012), used as a reference to establish the general structure of the questionnaire (i.e., the number of items, their order, and broad content). On the other, the English standard form of the UPPS-P scale for children (Zapolski et al., 2010), that was used as a guide to adjust, when unavoidable, item content. To our knowledge, no version of the UPPS-P scale for children was available in Spanish at the time when we conducted our adaptation (i.e., 2019). Thus, the English version became our reference. Despite we tried to maintain consistency with the abbreviated version for adults to the extent possible, the wording of some statements was adapted to ensure their applicability to young children aged 3-6. For instance, in item 11 of the Lack of Perseverance subscale (i.e., *"he/she almost always finish the projects that he/she starts"*), an example was added (i.e., *"for instance, a drawing"*) to enhance the applicability of the item to children. The final questionnaire was composed of 20 items (see **Table 4.1**), rated on a 4-point Likert-type scale indicating the level of agreement with the statement ranging from 1 (totally agree) to 4 (totally disagree). We verified that every item included in the final version was present both in the adult short form and the children standard version (see **Supplementary Material for Chapter Four)**.

4.2.2. Sample

The target sample for the present study is from the ELISA Project. A total of 1688 children attending preschool at the time of data collection were selected from the third data wave (T3) of the longitudinal study (47.2% girls; mean age = 5.4 [range = 4-6]; SD = .65). Descriptive statistics of the target sample, and ELISA Project sample at T3, are shown in the supplementary material (see **Table 4.1S,** see **Supplementary Material for Chapter Four**). Note that most of these children were recruited in the first data collection of the ELISA Project, in the year of 2017 (83.29%, N = 1406). The rest (N = 282) were incorporated a year later, in 2018, through

a recruitment process aiming to expand the initial sample of the project. For this study, only children from the initial and enlargement sample who were attending preschool at the time of data collection were considered. Most children of this study sample were 6 (52.96%) and 5-year-olds (38.15%), with only the remaining 8.89% (N = 150) being 4-year-olds.

Figure 4.1. Phases and tasks in the process of the scale adaptation



[5] In Galicia, the region in the NW of Spain where ELISA Project is being conducted, two official languages coexist. Spanish, the official language of the Spanish nation, and Galician, the native language of Galicians. In all data collections, parents participating in ELISA Project can choose the language in which they prefer to fill the questionnaire. Thus, versions in Spanish and Galician are provided for all instruments included in the study.

4.2.3. Measures

Child Trait Impulsivity *(parent-reported)*

The UPPS-P Impulsivity Scale. A short version of the UPPS-P Impulsive Behavior Scale was provided to parents to assess trait impulsivity in our sample of preschoolers (see the Introduction section and, more specifically, the notes on scale adaptation). The final version contained 20 items, grouped into five subscales with 4 items each. The questionnaire assesses Lack of Premeditation (e.g., *"My child tends to stop and think before doing things"*, reverse scored), Lack of Perseverance (e.g., *"Finishes what he/she starts,"* reverse scored), Negative Urgency (e.g., *"Often makes matters worse because he/she acts without thinking when he/she upset"*), Positive Urgency (e.g., *"When really thrilled, he/she tends not to think about the results of his/her actions*), and Sensation Seeking (e.g., *"Likes new, thrilling things to happen"*). Each item was scored on a 4-point Likert-type scale ranging from 1 (totally agree) to 4 (totally disagree). In the current sample, the internal consistency of the scales was .72 for Lack of Premeditation, .83 for Negative Urgency, .74 for Sensation Seeking, .90 for Lack of Perseverance, .81 for Positive Urgency.

Child Temperament *(parent-reported)*

Approach-Avoidance Tendencies. We used an adapted version of the Muris BIS/BAS Scales (Muris et al., 2005), an age-downward version of the Carver and White BIS/BAS scales (Carver & White, 1994), developed for children aged 8 to 12 years. This measure assesses approach and withdrawal behaviors in response to environmental stimuli. The behavioral inhibition (BIS) and activation (BAS) system regulate avoidant and approach behavior, respectively. Our adaptation consisted of 10 items, including those with the higher factor loadings on Muris' adaptation, which were reformulated to a parent reported form (i.e., *"My child…"*). This selection resulted in 4 out of 7 items for the BIS subscale (e.g., *"he/she usually gets very tense when thinking something unpleasant is going to happen"* or *"worriers about making mistakes"*) and 6 out of 13 for the BAS subscale (e.g., *"he/she feels excited and full of energy when gets something she/he wants"* or *"when she/he wants something, usually goes all the way to get it"*). Each item was scored on a 4-point ranging from 0 (not true) to 3 (very true). The internal consistency of the scales was .68 and .77, for the BIS and the BAS subscales, respectively.

Fear Sensitivity. We assessed fearlessness via parent reports on a 6-item fear scale developed by Colins et al. (2014) with each item rated on a 4-point scale ranging from 1 (does not apply at all) to 4 (applies well). Items assessed fear sensitivity to both social (e.g., *"he/she never seems to get scared when someone is mad at him/her"*) and non-social situations (e.g., *"he/she is fearless and exposes him-/herself willingly to dangerous things"*). A fearlessness scale score was obtained by calculating the mean of the six items. Internal consistency for the fearlessness scale was .87.

Impulsive-Need of Stimulation. We assessed Impulsive-Need of Ntimulation via parent reports on the 10-item Impulsive-Need of Stimulation scale of The Child Problematic Traits Inventory (CPTI; Colins, et al., 2014), which was designed to be used with children aged 3-12, to assess psychopathic traits. Parents and teachers rated items on a 4-point scale, ranging from 1 (does not apply at all) to 4 (applies very well). Items of the scale assessed impulsivity (e.g., *"he/she often does things without thinking ahead"*) and facets of sensation seeking such as need

for stimulation (e.g., *"seems to have a great need for change and excitement"*), and proneness to boredom (e.g., *"seems to get bored quickly"*). An Impulsive-Need of Stimulation scale score was computed as the mean of the 10 items. The internal consistency of the scale was .85.

Externalizing Behavior *(parent and teacher-reported)*

Conduct Problems. Parents and teachers rated the child on items such as *"has beaten, torn, shoved, kicked, or thrown something on others without a reason"*, *"threatens others"* or *"does not follow important rules"* of the SOFIA Conduct Problems Scale (Colins et al., 2014). The 10-item scale is based on DSM-IV-TR criteria for ODD and conduct disorder (APA, 2000). Items are rated on a 5 -point scale ranging from 1 (never) to 5 (almost always). Internal consistency of the scale was .88 and .94 for the parent and teacher forms, respectively.

Attention-Deficit Hyperactivity Disorder. Parents and teachers rated child inattention, hyperactivity and impulsivity via the ASEBA School-Age form (Achenbach & Rescorla, 2001). Items from the scale assess behaviors such as "*he/she is impulsive, acts without thinking"*, *"is inattentive and gets easily distracted"* or *"does not finish what she/he starts"*. Items are rated on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). The internal consistency of the scale was .79 and .93 for the parent and teacher forms, respectively.

Psychopathic Traits. The Child Problematic Traits Inventory (CPTI) comprises 28 items assessing the interpersonal, affective and behavioral dimensions of psychopathic personality in early childhood (Colins, et al., 2014). That is, the Grandiose-Deceitful (GD) component (e.g., *"he/she seems to see himself/herself as superior compared to others"*), the Callous-Unemotional (CU) component (e.g., *"he/she does not become upset when others are hurt"*) and the Impulsive-Need for Stimulation (INS) component (e.g., *"he/she does not like waiting"*). Parents and teachers rated items on a 4-point scale, ranging from 1 (does not apply at all) to 4 (applies very well). Beyond scores for each of the three subscales, the CPTI provides a total global score by calculating the mean of the 28 items. In our sample, the internal consistency of the psychopathic traits global scale was .92 and .95 for parent and teacher forms, respectively.

Reactive Aggression. Parent and teacher reports on a 3-item subscale addressing aggressive behaviors exhibited in response to real or perceived threat or provocation were obtained (Dodge & Coie, 1987). Items such as *"when other child does something accidentally to him/her, he/she assumes that has been done on purpose and reacts angrily or fighting"* were rated on a 5-point scale ranging from 1 (never) to 2 (almost always). The internal consistency of the scale was .79 and .93 for parent and teacher forms, respectively.

Internalizing Symptoms *(parent and teacher-reported)*

Anxiety. We assessed anxiety symptoms (e.g., *"he/she is too dependent"* or *"too anxious, fearful"*) via parent and teacher reports on the ASEBA School-Age forms (Achenbach & Rescorla, 2001). Parents and teachers rated items on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). Internal consistency of the scale was .69 and .71 for parent and teacher forms, respectively.

Depression. We assessed depressive symptoms (e.g., "*there are a few things he/she enjoyed"* or *"cries a lot"*) via parent reports on the ASEBA School-Age form (Achenbach &

Rescorla, 2001). Parents and teachers rated items on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). Internal consistency of the scale was .59 and .72 for parent and teacher forms, respectively.

Covariates

Demographics. We included family SES, child age (in years) and child gender as demographic covariates in the regression analyses of this study. The same strategy described in the first empirical work (see **Chapter Two**) was adopted to operationalize these covariates.

2.4. Analytic Strategy

Statistical analyses were conducted in Mplus v. 8.0 (Muthén & Muthén, 2019) and IBM SPSS Statistics version 23 (IBM Corp, 2019).

***First Objective*.** To examine the factor structure of the abbreviated scale we conducted a set of confirmatory and exploratory factor analyses. Specifically, we first conducted a Confirmatory Factor Analysis (CFA) and then an Exploratory Structural Equation Modeling (ESEM) with target rotation, followed by a set of Exploratory Factor analyses with oblique rotation. This analytic strategy is intent a) to test the scale factor structure and b) to identify poor-functioning items within the hypothesized *a priori* structure, mirroring what has been done by other authors in recent studies (Watts, Smith et al., 2020). Such analytic approach might be particularly useful for scales that, like the UPPS-P, have already been extensively validated in other samples. Instead of relying exclusively on a confirmatory approach to test an a priori factor structure, we used ESEM with target rotation, to identify substantial deviations from the hypothesized structure not identified in a CFA solution (Asparouhov & Muthén, 2009). Despite sharing many characteristics with CFA, ESEM is a more flexible approach. By allowing each item to load into more than one factor, while both the number of factors and the hypothesized loadings of items onto factors are specified, relevant item cross-loadings can be identified (Marsh et al., 2014). Thus, poor functioning items within the hypothesized a priori structure can be distinguished. By comparing these results with those from a pure exploratory approach (EFA), further evidence on the existence of such items is collected. Different models were tested in this study. Both first and second-order structure of the UPPS-P were examined. Models were estimated with Mean and Variance-Adjusted Weighted Least Squares (WLSMV) given the ordinal nature of the data. To evaluate model fit, we used standard cut-offs for comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA) (Hu & Bentler, 1999). Then, we computed the internal consistency of the UPPS-P subscales using Cronbach's alpha. Measurement invariance across genders was also investigated.

***Second Objectiv*e.** To establish convergent and discriminant validity of the scale, we conducted bivariate and partial correlational analyses and multiple linear regression analyses. In the simplest regression models, first and second order UPPS-P-scales, were introduced as predictors of parent and teacher-reported conduct problems, ADHD, psychopathic traits and reactive aggression, controlling for child age, gender, and SES as covariates. In the more restrictive regression models, UPPS-P scales and concurrent levels of other externalizing problems were simultaneously introduced as predictors.

4.3. RESULTS

4.3.1. Factor Structure

First, CFA results showed that a correlated five-factor model conceptually equivalent to those observed in youth and adult literature fit the data well (X^2=894.23, df=160, p<.000; RMSEA=.06; CFI=.94; TLI=.92). In addition, a three-factor model, accounting for the second order structure of the UPPS-P scale fit the data similarly well (X^2=900.136, df=163, p<.000; RMSEA=.06; CFI=.94; TLI=.93, **Table 4.2**). For the primary factor structure, correlations among the five factors were of moderate magnitude (median intercorrelation=0.46). As expected, Positive and Negative Urgency (r=.67, p=.000) and Lack of Premeditation and Lack of Perseverance (r=.76, p=.000) were strongly correlated. Correlations of Positive Urgency with Sensation Seeking and Lack of Premeditation were also strong (r=.58, p=.000, r=.57, p=.000, respectively). Standardized factor loadings for items are summarized in **Figure 4.2a**. Each factor was overall well-defined (item loadings >.40), except for item 14 of the Sensation Seeking Scale (*"He/She likes new, thrilling things to happen"*) with a factor loading of .23. For the secondary structure, correlations among the three factors were of moderate magnitude. The Urgency scale showed the strongest relations with Sensation Seeking and Deficits in Consciousness (r=.62, p=.000, r=.54, p=.000, respectively). The pattern of factor loadings for items remained overall unaltered (**Figure 4.2b**).

Second, results from the ESEM with target rotation showed that a correlated five-factor model in which item cross-loadings were allowed *within* an a priori hypothesized and specified structure also fit the data well (X^2=685.44, df=100, p<.000; RMSEA=.06; CFI=.98; TLI=.96, **Table 4.2**). These analyses allowed for the identification of some item cross-loadings (**Table 4.3**). Item 2 of the Positive Urgency subscale (*"When he/she is really thrilled, he/she tends not to think about the results of his/her actions"*) also loaded onto the Lack of Premeditation subscale (.26). Item 6 of the Lack of Premeditation subscale (*"His/her thinking is usually careful and purposeful"*) also loaded on Lack of Perseverance subscale (.46).

Third, results from the EFA with oblique rotation showed that correlated five-factor model in which item cross-loadings were allowed *without* specifying an a priori hypothesized structure fit the data identically well to the ESEM solution (X^2=685.44, df=100, p<.000; RMSEA=.06; CFI=.98; TLI=.96, **Table 4.2**). The relevance of this purely exploratory approach goes beyond strictly testing structural hypotheses. It also provides further evidence on the existence of potentially poor-functioning items identified in the previous quasi-confirmatory steps (items 2 and 6, **Table 4.3**). Interestingly, none of these items stood out in the CFA solution due to an atypical loading pattern.

Finally, measurement invariance analyses revealed evidence on configural and metricl invariance across genders (**Table 4.4**). That is, beyond the same items measuring the five factors of our adapted UPPS-P scale, in both girls and boys, factor loadings could be also considered also equivalent across these groups.

4.3.2. Convergent and Discriminant Validity of the UPPS-P Dimensions

We used partial and bivariate correlational analyses to explore the convergent and discriminant validity for the UPPS-P scales. Results of these analyses are shown in **Table 4.5.**

All partial correlations controlled for relevant demographics (i.e., child age, gender, SES) and each of the UPPS-P facets. Temperament traits conceptually related to impulsivity (e.g., Fearlessness), as well as externalizing and internalizing psychopathology were both considered as external criteria. Overall, our results provided support for the convergent and discriminant validity for the UPPS-P scales. Notably, findings from partial and bivariate correlational analyses converged, despite of differences in magnitude. Only the former will be summarized here.

All UPPS-P scales, except for Negative Urgency, were associated with temperament dimensions conceptually and empirically related to impulsivity in the expected way. UPPS-P Lack of Premeditation manifested moderate positive associations with Fearlessness (*r*=.17, *p*=.000) and Impulsive-Need of Stimulation (*r*=.15, *p*=.000), as well as moderate negative associations with the BIS subscale (*r*=-.22, *p*=.000). Lack of Perseverance was moderately related to Impulsive-Need of Stimulation (*r*=.19, *p*=.000) and manifested small negative associations with the BIS subscale (*r*=-.08, *p*=.017). Sensation Seeking was positively and strongly associated with Fearlessness (*r*=.55, *p*=.000) and the BAS subscale (*r*=.35, *p*=.000), as well as moderately associated with Impulsive-Need of Stimulation (*r*=.27, *p*=.000). Positive Urgency manifested moderate positive associations with Impulsive-Need of Stimulation (*r*=.21, *p*=000), but was weakly associated with Fearlessness and the BAS subscale, respectively (*r*=.16, *p*=.000; *r*=.13, *p*=.000). Associations of Negative Urgency with other temperament dimensions related to impulsivity were overall small (e.g., *r*=.13, *p*=.000 for Impulsive-Need of Stimulation) or non-significant (e.g., *r*=-.06, *p*=.08 for Fearlessness).

As expected, the UPPS-P scales were more strongly associated with externalizing psychopathology than internalizing symptoms. First, among the externalizing outcomes examined, associations were more pronounced for ADHD and reactive aggression. However, significant relations emerged also for conduct problems and psychopathic traits. Lack of Premeditation (*r*=.22, *p*=.000), Lack of Perseverance (*r*=.32, *p*=.000) and Positive Urgency (*r*=.31, *p*=.000) manifested moderate positive associations with ADHD symptoms. Negative Urgency was positively associated with aggressive behaviors (*r*=.30, *p*=.000). Lack of Premeditation was positively associated with conduct problems *(r*=.16, *p*=.000). Sensation Seeking (*r*=.19, *p*=.000), Positive Urgency (*r*=.19, *p*=.000) and Lack of Perseverance (*r*=.18, *p*=.000), manifested moderate positive associations with psychopathic traits. Second, consistent with our hypotheses, associations between UPPS-P scales and internalizing-related indices were small or non-significant. Negative and Positive Urgency were both associated with Anxiety (*r*=.15, *p*=.000 and *r*=.14, *p*=.000, respectively) and, to a lesser extent, Depression (*r*=.09, *p*=.005 and *r*=.07, *p*=.041, respectively). Conversely, none of the non-affect driven UPPS-P scales (i.e., Lack of Premeditation, Lack of Perseverance and Sensation Seeking) were significantly associated with anxious or depressive symptoms.

4.3.3. Predictive Validity of the UPPS-P Dimensions: Externalizing Outcomes

We used multiple regression analyses to examine whether the contributions of each UPPS scale would be specific to various parent and teacher-reported externalizing indicators, and to which extent some might underlie multiple problematic behaviors. We expected to find significant associations between specific impulsivity dimensions and specific externalizing outcomes. However, we also hypothesized that impulsive reactions initiated by negative and

positive emotional states, that is, emotion-triggered impulsivity, would predict separately and together with other impulsivity factors, multiple externalizing outcomes.

Results of regression analyses in which first and second order UPPS-P dimensions were tested as predictors of multiple externalizing outcomes are shown in **Tables 6-9**.

4.3.3.1. First Order UPPS-P Impulsivity Dimensions

We tested models in which the effects of the UPPS-P scales were examined alone (model type "a") or along with those of concurrent externalizing psychopathology (model type "b"). By contrasting parent and teacher reports, not only the uniqueness and strength of the effects for each impulsivity dimension were probed, but also their replicability across informants. Overall, our analyses revealed, across models and informants, the influence of affect-driven behaviors, which alone or in combination with other impulsivity dimensions, predicted multiple externalizing indicators (i.e., conduct problems, ADHD symptoms, psychopathic traits and reactive aggression). The effects of Negative Urgency appeared specifically related to conduct problems and reactive aggression, while the effects of Positive Urgency were prominently salient for ADHD and psychopathic traits.

As for the tendency to act rashly when experiencing intense *negative emotions*, higher parent-reported Negative Urgency and Lack of Premeditation were associated to higher levels of parent and teacher-reported conduct problems. These effects, along with those of Sensation Seeking, remained significant, in parent but not teacher models, after controlling for concurrent levels of other externalizing behaviors (**Table 4.6**). Similarly, parent and teacher reported levels of reactive aggression were predicted by Negative Urgency, when controlling for sociodemographic covariates, but these effects failed to remain significant after controlling for the effects of other concurrent externalizing psychopathology in teacher models (**Table 4.9**).

As for the tendency to act rashly when experiencing intense *positive emotions*, parent and teacher-reported ADHD symptoms were associated with higher levels of Positive Urgency, Lack of Premeditation, Lack of Perseverance and Sensation Seeking in the most basic models. However, only Positive Urgency and Lack of Perseverance remained significant predictors across informants, after controlling for concurrent levels of other externalizing behaviors, in more complex models (**Table 4.7**). Higher levels of parent and teacher-reported psychopathic traits were predicted by higher Positive Urgency and Lack of Premeditation in the most basic models. However, only the effects of Positive Urgency, along with those of Lack of Perseverance and Sensation Seeking, remained significant, after controlling for the effects of other relevant covariates in parent, but not teacher models (**Table 4.8**).

Figure 4.3a shows a schematic of the associations between first-order dimensions of the UPPS-P and diverse externalizing outcomes. Consistent with our hypotheses impulsive behaviors elicited by negative and positive emotional states, predicted separately and together with other impulsivity factors, higher levels of an array of externalizing behaviors.

4.3.3.2. Second Order UPPS-P Impulsivity Dimensions

Second-order dimensions of the UPPS-P scale also manifested unique associations with different externalizing indicators. Deficits in Consciousness appeared predominantly associated

with conduct problems and reactive aggression. Urgency was prominently salient for ADHD, and both, Deficits in Consciousness and Urgency, were specifically related to psychopathic traits.

First, Deficits in Consciousness predicted higher levels of parent-reported conduct problems after controlling for concurrent levels of other externalizing behaviors. However, in teacher models these effects were found in the most basic models, after controlling for the effects of sociodemographic covariates and other second-order impulsivity dimensions (**Table 4.6**). A similar pattern of associations was found when examining reactive aggression as the externalizing outcome (**Table 4.9**). Deficits in Consciousness remained a significant predictor across informants only in the simplest models. Second, Urgency and Sensation Seeking were associated, across models and informants, with higher levels of parent and teacher-reported ADHD symptoms (**Table 4.7**). Finally, Deficits in Consciousness and Urgency predicted higher levels of psychopathic traits across models, but not informants. The effects remained significant only in parent but not teacher models (**Table 4.8**).

Figure 4.3b shows a schematic of the associations between second-order dimensions of the UPPS-P and diverse externalizing outcomes. The effects of affect-driven impulsivity (i.e., Urgency), seem to be more salient for ADHD and psychopathic traits, rather than conduct problems and reactive aggression for which Deficits in Consciousness appear more relevant.

4.4. DISCUSSION

Strong evidence supports the role of impulsivity in multiple forms of problematic behaviors and poorer developmental outcomes through childhood and adolescence. However, these links appear particularly robust for externalizing psychopathology (Beauchaine et al., 2017; James & Taylor, 2007; Pardini et al., 2018; Rodenacker et al., 2018). In fact, impulsivity seems unequivocally central to the externalizing phenomenology.

If impulsive behaviors are conceptualized as representing a trait rather than a symptom, their stability and sustained effects across the lifespan are somewhat presumed (Caspi, 2000). Thus, to understand these potentially pervasive influences, valid and reliable measures permitting to assess impulsivity early in development are needed. Ideally, these measures should have features which make them easily and readily incorporated into research designs oriented to these purposes. That is, longitudinal studies. However, the length of most of the available impulsivity scales has been to this point a major obstacle for this purpose (Watts, Smith et al., 2020). Consequently, the main goal of this work was to adapt and validate an instrument allowing the assessment of trait impulsivity based on the UPPS-P model in preschool children, in a time and cost-effective way.

Our findings suggested that impulsivity can be reliably and validly assessed in preschool children through an abbreviated form of the UPPS-P Impulsive Behavior Scale using parents as informants of child temperament-personality. Consistent with previous findings, confirmatory factor analyses supported the five-factor structure of the scale (Geurten et al., 2018; Pechorro et al., 2021; Zapolski & Smith, 2013). That is, Lack of Premeditation, Negative Urgency, Sensation Seeking, Lack of Perseverance and Positive Urgency appear to be, despite correlated, distinct constructs. In fact, the five different facets had different external correlates.

In addition, confirmatory factor analyses also supported the second order-factor structure of the UPPS-P scale. Thus, Urgency and Deficits in Consciousness, would serve to account, respectively, for the commonalities between Positive and Negative Urgency, and Lack of Premeditation and Lack of Perseverance.

Additional analyses emphasized that these conceptual differentiations might be useful to identify specific impulsive pathways to various forms of externalizing psychopathology. While Negative Urgency alone was related to reactive aggression, Negative Urgency and Lack of Premeditation were related to conduct problems. While Positive Urgency alone was related to psychopathic traits, Positive Urgency and Lack of Perseverance was related to ADHD symptoms. Notably, connections among broader accounts of affect-driven impulsivity (i.e., Urgency) and various forms of externalizing indicators (i.e., psychopathic traits and ADHD symptoms) were also found. Overall, these findings converge with previous research in suggesting that the tendency toward affect-driven rash action may underlie multiple externalizing behaviors (Settles et al., 2012).

4.4.1. Strengths and Limitations

The current study has some major strengths. First, this is the first time to our knowledge that the UPPS-P impulsivity dimensions are measured in the preschool period. Importantly, our findings indicate that assessing the five impulsive pathways purported by the model, reliably and validly in children as young as four years of age, is feasible through an abbreviated parent-reported measure. Moreover, he conceptual meaning of impulsivity dimensions seems to have remained apparently unaltered. Hence, the examination of trait impulsivity defined upon the UPPS-P model premises, *could* and *should* expanded to early developmental stages (i.e., the preschool years). By so doing, some well-supported hypotheses tested in older age samples could be also probed in this developmental period.

However, this work has important limitations that should be noted. One issue of major concern is that, at the time we conducted this adaptation (i.e., 2019), no short version of the UPPS-P scale for children had been developed, not even in English. Thus, we lacked a much-needed reference to conduct the adaptation of the scale for preschool children. Given the availability of such a short form in Spanish, for adults, we adopted it as our principal anchorage. We also worked with the English standard version for children to conduct changes and adaptations. However, we decided that to the extent possible, the existing adult form would prevail to maintain coherence with an already validated short scale, formally recognized by the International Society for Research on Impulsivity. However, it is likely that our adaptation fails to be, at times, all the developmentally-appropriate it should be. Future works should address this limitation and keep working towards a more developmentally appropriate and refined version of the scale. This is particularly important to optimally assess impulsivity in the group of younger children (i.e., 4-year-olds). There is also clearly a need to replicate and extend this work with other similar (e.g., community) and dissimilar (e.g., clinical) samples in future studies, and gather further support for scale validity through lab or observational measures related to trait impulsivity.

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Despite these limitations, we argue that there is still a meaning, and a certain essence of the impulsivity construct, that we are capturing with this proposed novel measure. Importantly,

we anticipate that despite future works could clearly improve our methods, these results would be overall replicated, and our preliminary conclusions supported.

4.4.2. Conclusion

The good psychometric properties of the UPPS-P Impulsive Behavior Scale adaptation presented in this study encourage further exploration. As some of our findings were replicated across models and informants, we argue that there is good reason to believe that individual differences on impulsivity dimensions can be assessed in 4- to 6-year-old children. Here, we are providing a shorter and easier to administer version that might help to reduce participant burden in particular research contexts. Future developmental, longitudinal and mechanistic-based research can build upon these findings and advance toward a better understanding of clinically significant levels externalizing problems in early childhood. For instance, by further exploring the paths through which the UPPS-P impulsivity facets relate to different aspects of the externalizing spectrum in specific and meaningful ways.

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Table 4.1. Descriptive statistics for each of the items of the parent-report UPPS-P short form

Items of the UPPS-P short form for preschoolers	**N**	**% Missing**	**Mean**	**SD**	**Min**	**Max**	**Skew**	**Kurtosis**
1. Mi hijo/a tiende a pararse y pensar antes de hacer cualquier cosa	1286	23.82	2.69	.75	1	4	-.36	-.06
2. Cuando está realmente contento/a, no suele pensar en las consecuencias de sus acciones	1286	23.82	2.77	.81	1	4	-.28	-.37
3. A veces, le gusta hacer cosas que dan un poco de miedo	1285	23.88	2.01	.96	1	4	.32	-1.09
4. Cuando está enfadado/a, suele actuar sin pensar	1283	23.99	2.74	.91	1	4	-.33	-.67
5. En general, le gusta asegurarse de que acaba las cosas que comienza	1283	23.99	2.77	.88	1	4	-.21	-.74
6. Su manera de pensar es organizada y centrada	1288	23.70	2.90	.81	1	4	-.31	-.46
7. Cuando está enfadado/a dice cosas de las que luego se arrepiente	1284	23.94	2.70	.94	1	4	-.38	-.71
8. Termina lo que empieza	1282	24.06	2.87	.80	1	4	-.24	-.51
9. Disfruta mucho corriendo riesgos	1284	23.94	1.80	.88	1	4	.75	-.45
10. Cuando está rebosante de alegría, tiene dificultades para controlarse	1286	23.82	2.24	.93	1	4	.16	-.93
11. Casi siempre finaliza las actividades que inicia (p.ej. dibujo)	1285	23.88	3.07	.83	1	4	-.51	-.50
12. Cuando está enfadado/a, con frecuencia empeora las cosas, porque actúa sin pensar	1287	23.76	2.47	.96	1	4	-.07	-.97
13. Antes de tomar una decisión, tiende a pensar en sus consecuencias positivas y negativas	1283	23.99	2.46	.78	1	4	-.15	-.44
14. Le gusta que ocurran cosas nuevas y sorprendentes	1283	23.99	3.37	.73	1	4	-1.02	.76
15. Cuando está muy contento/a, tiende a hacer cosas que pueden causarle problemas	1278	24.29	1.87	.83	1	4	.63	-.32
16. Es un niño/a eficiente y siempre completa sus tareas	1282	24.06	2.92	.81	1	4	-.27	-.61
17. Cuando se siente rechazado/a, frecuentemente dice cosas de las que luego se arrepiente	1277	24.35	2.19	.94	1	4	.24	-.91
18. Le gusta saber a qué atenerse antes de hacer algo diferente a lo habitual	1278	24.29	2.88	.79	1	4	-.39	-.20
19. Le gustan las experiencias y sensaciones nuevas y emocionantes, aunque den un poco de miedo y estén un poco en contra de las normas	1283	23.99	2.18	.90	1	4	.22	-.85
20. Suele actuar sin pensar cuando está feliz	1284	23.94	2.27	.89	1	4	.05	-.87

Table 4.2. Model fit statistics for confirmatory and exploratory factor models examining the first and second-order factor structure of the UPPS-P Impulsive Behavior Scale

	X^2 (df)	CFI	TLI	RMSEA (90% CI)
(1) Confirmatory Models(*CFAs*)				
5 factors (1st order)	894.23*** (160)	.94	.92	.060 (.056, .064)
3 factors (2nd order)	900.136*** (163)	.94	.93	060 (.056, .063)
(2) Cuasi-Confirmatory (*ESEM*)				
5 factors (Target)	685.44*** (100)	.98	.96	.067 (.063, .072)
(3) Exploratory (*EFAs*)				
1 factor	8646.45*** (170)	.72	.69	.197 (.193, .200)
2 factors	4266.99*** (151)	.87	.83	.145 (.142, .149)
3 factors	2187.21*** (133)	.93	.90	.110 (.105, .114)
4 factors	1364.07*** (116)	.96	.93	.091 (.087, .096)
5 factors	685.44*** (100)	.98	.96	.067 (.063, .072)
6 factors	460.40*** (100)	.99	.97	.059 (.053, .064)
7 factors	244.01*** (71)	.99	.98	.044 (.038, .050)

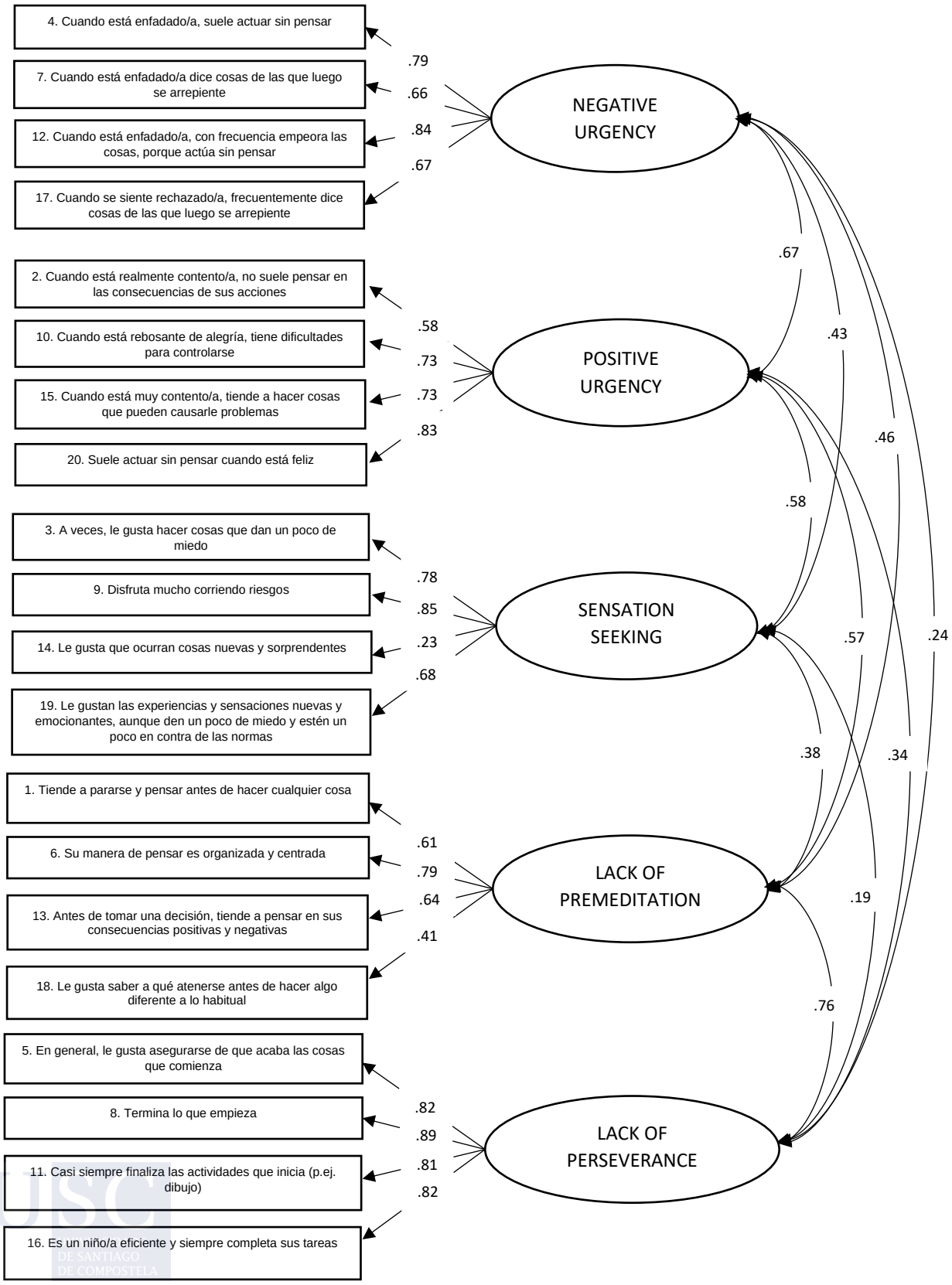
Note. $p<.001$***.

Table 4.3. Factor loadings from 5-factor CFA, 5-factor ESEM (with oblique target rotation) and 5-factor EFA (with goemin rotation)

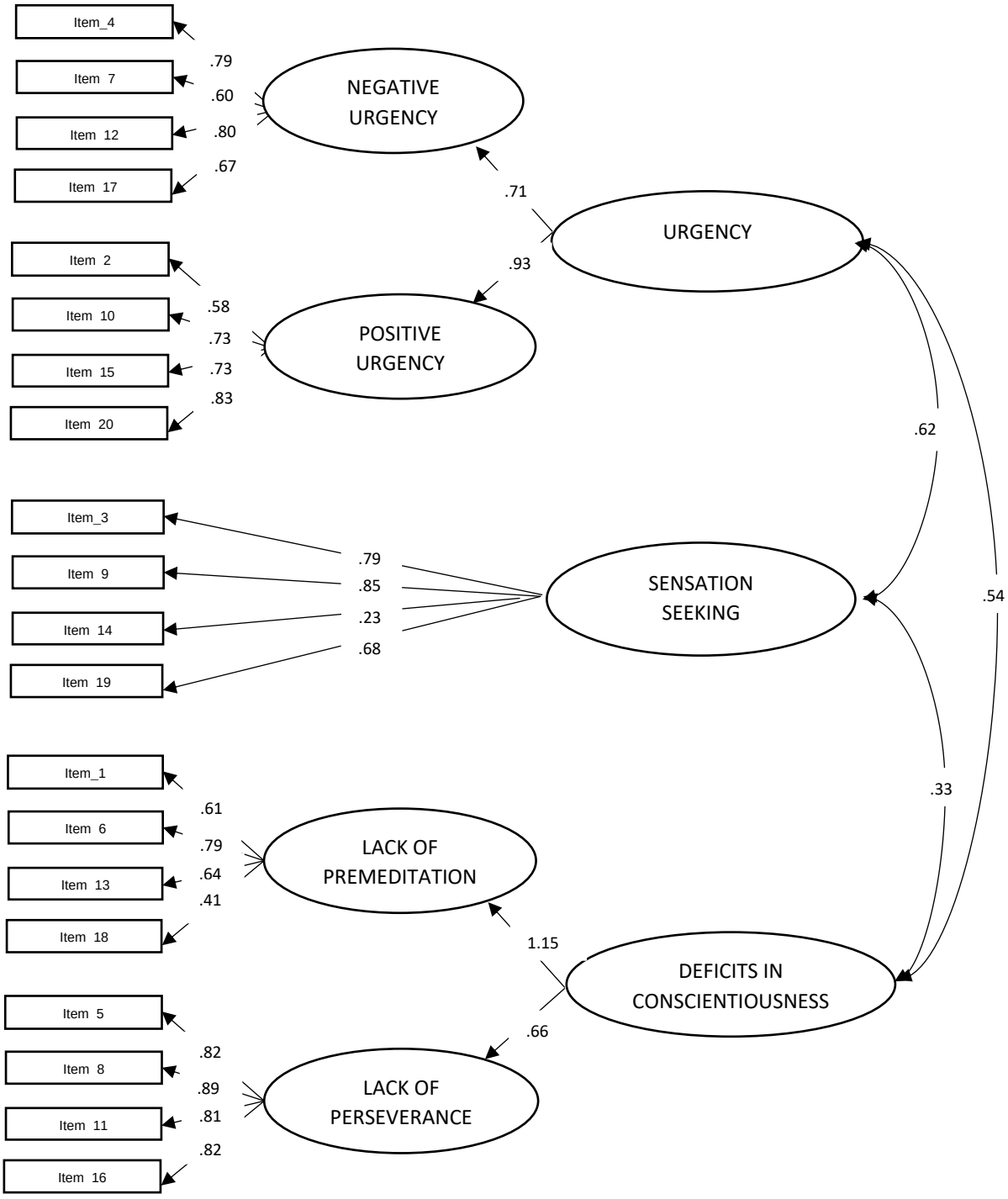
	(1) CFA					(2) ESEM					(3) EFA				
	LPRE	**NU**	**SS**	**LPER**	**PU**	**F1**	**F2**	**F3**	**F4**	**F5**	**F1**	**F2**	**F3**	**F4**	**F5**
LPRE															
Item 1	**.61**					**.59**	.01	.02	.01	**.16**	**.60**	.00	.03	**.07**	**.10**
Item 6	**.79**					**.44**	.03	-.01	**.46**	.05	**.42**	.01	.00	**.51**	.01
Item 13	**.64**					**.72**	**.09**	-04	-.01	**.10**	**73**	**.07**	-.03	**.06**	.03
Item 18	**.41**					**.53**	.00	**.19**	.03	**-.21**	**.49**	-.01	**.21**	**.07**	**-.24**
NU															
Item 4		**.79**				**.22**	**.72**	.00	**-.11**	*.06*	.32	**.70**	.01	**-.09**	.01
Item 7		**.66**				**-.10**	**.93**	.02	.00	**-.19**	-.01	**.92**	.03	.00	**-.21**
Item 12		**.84**				**.09**	**.74**	-.03	.02	**.12**	**.19**	**.73**	-.03	**.03**	**.08**
Item 17		**.67**				**-.16**	**.79**	.01	**.06**	.05	-.07	**.79**	.01	**.05**	.03
SS															
Item 3			**.78**			.03	.03	**.79**	**-.02**	.03	.04	.04	**.79**	-.02	.03
Item 9			**.85**			.03	**.05**	**.87**	.00	.01	.04	**.05**	**.87**	-.01	.01
Item 14			**.23**			-.02	**-.08**	**.43**	-.03	-.08	-.04	-.08	**.43**	-.03	-.07
Item 19			**.68**			-.04	**-.02**	**.69**	.04	**.11**	-.03	-.02	**.69**	.04	.11
LPER															
Item 5				**.82**		**.10**	.02	.00	**.81**	-.04	**.04**	.01	.00	**.85**	**-.05**
Item 8				**.89**		**.08**	-.01	-.02	**.89**	.02	.02	-.02	-.02	**.93**	.01
Item 11				**.81**		-.03	.01	.02	**.87**	**.05**	**-.08**	.01	.01	**.91**	.04
Item 16				**.82**		**.13**	.01	.03	**.78**	.02	.08*	.00	.03	**.82**	.01
PU															
Item 2					**.58**	**.26**	.00	**.06**	**-.13**	**.49**	**.33**	-01	**.06**	**-.10**	**.44**
Item 10					**.73**	**-.06**	**.05**	.02	.02	**.76**	.04	.05	.00	.04	**.72**
Item 15					**.73**	**-.14**	**.05**	**.11**	**.13**	**.74**	**-.05**	**.05**	.10	**.14**	**.70**
Item 20					**.83**	**.07**	.00	.00	-.03	**.86**	.18*	-.01	.00	-.01	**.80**

Note. Bolded= p<.05. LPE= Lack of Premeditation; NU= Negative Urgency; SS= Sensation Seeking; LPER= Lack of Perseverance; PU= Positive Urgency. Standardized factor loadings are shown for CFA and ESEM. Geomin rotated loadings are shown for EFA.

Figure 4.2 (A). First-order factor structure of the UPPS-P: correlated five factor model



´ **Figure 4.2 (B).** Second-order factor structure of the UPPS-P**:** hierarchical model



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Table 4.4. Measurement invariance by demographic characteristics

Confirmatory models (5-factor CFA)	***n***	X^2 **(df)**	**CFI**	**TLI**	**RMSEA (90% CI)**	**ΔX^2**	**ΔCFI**	**ΔRMSEA**
Fit indices by group : Gender								
Females	797	498.71*** (160)	.937	.926	.059 (.053, .064)			
Males	891	562.95*** (160)	.934	.922	.061 (.056, .067)			
Measurement Invariance								
Configural	1688	1865.80*** (320)	.995	.994	.076 (.072, .079)			
Metric	1688	1829.68*** (335)	.995	.995	.073 (.069, .076)	13.17 (15) p=.5894	0.000	0.003
Scalar	1688	1923.74*** (390)	.995	.995	.068 (.065, .071)	119.14 (70)***; p=.0002	0.000	0.008

Note. *p*<.001***.

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Table 4.5. Descriptive statistics, bivariate and partial correlations for UPPS-P subscales and external criterion variables

	M	*SD*	1. LPRE	2. NU	3. SS	4. LPER	5. PU	6. BIS	7. BAS	8. FEARL	9. INS	10. CP	11. ADHD	12. PSY. TR.	13. RAGG	14. ANX	15. DEP
1. LPRE	2.27	.57		.34***	.31***	.57***	.45***	-.32***	.05*	.37***	.47***	.41***	.55***	.43***	.28***	.07*	.17***
2. NU	2.25	.76	*.09***		.32***	.19***	.54***	-.01	.20***	.27***	.42***	.49***	.33***	.40***	.43***	.21***	.18***
3. SS	2.35	.65	*.13****	*.06**		.16***	.46***	-.12***	.44***	.66***	.46***	.30***	.36***	.38***	.19***	-.03	.07**
4. LPER	2.09	.73	*.52****	*-.02*	*-.05*		.30***	-.24***	-.03	.19***	.40***	.31***	.53***	.38***	.23***	.14***	.19***
5. PU	2.28	.69	*.21****	*.42***	*.32****	*-.06*		-.03	.28***	.45***	.53***	.41***	.53***	.49***	.32***	.21***	.21***
6. BIS	1.81	.60	*-.22****	*.05*	*-.08**	*-.08**	*.13****		.27***	-.16***	-.11***	-.15***	-.13***	-.17***	-.06*	.31***	.15***
7. BAS	1.94	.55	*-.08**	*.04*	*.35****	*-.04*	*.13****	*.33****		.33***	.35***	.13***	.23***	.22***	.15***	.04	.05
8. FEARL	1.56	.60	*.17****	*-.06*	*.55****	*-.06*	*.16****	*-.04*	*.06*		.53***	.39***	.47***	.53***	.31***	.06*	.11***
9. INS	2.07	.60	*.15****	*.13****	*.27****	*.19****	*.21****	*.05*	.25***	.26***		.52***	.65***	.86***	.45***	.27***	.31***
10. CP	1.67	.50	*.16****	*.32****	*.10***	*.06**	*.06*	*-.01*	*.01*	*.16****	*.27****		.50***	.60***	.70***	.30***	.30***
11. ADHD	.52	.42	*.22****	*.00*	*.10***	*.32****	*.31****	*.06**	*.17****	*.23****	*.40****	*.22****		.58***	.39***	.36***	.34***
12. PSY. TR.	1.61	.41	*.11****	*.14****	*.19****	*.18****	*.19****	*-.04*	*.09***	*.34****	*.78****	*.42****	*.30****		.55***	.28***	.30***
13. RAGG	1.62	.84	*.06*	*.30****	*.01*	*.09***	*.06*	*.04*	*.07**	*.16****	*.27****	*.63****	*.19****	*.43****		.27***	.22***
14. ANX	.38	.30	*-.08**	*.15****	*-.16****	*.12****	*.14****	*.35****	*.05*	*.06*	*.22****	*.24****	*.33****	*.19****	.19***		.56***
15. DEP	.18	.20	*.01*	*.09**	*-.01*	*.11***	*.07**	*.21****	*.03*	*.03*	*.21****	*.24****	*.24****	*.20****	*.15****	*.52****	

Note. p<.05*, p<.01**, p<.001***. *M* and *SD*: Descriptive statistics for mean subscale scores.

Bivariate correlations are presented along the top diagonal and partial correlations are italicized and presented along the bottom diagonal. All partial correlations controlled for relevant demographics (i.e., child age, gender, SES) and the UPPS-P facets.

LPE= Lack of Premeditation; NU= Negative Urgency; SS= Sensation Seeking; LPER= Lack of Perseverance; PU= Positive Urgency; BIS= Behavioral Inhibition System; BAS= Behavioral Activation System; FEARL=Fearlessness; INS= Impulsive-Need of Stimulation; CP= Conduct Problems; ADHD= Attention-deficit/hyperactivity disorder; Psy. tr.= Psychopathic traits; RAGG= Reactive Aggression; ANX= Anxiety; DEP= Depression

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Table 4.6. Cross-sectional associations of first and second order UPPS-P impulsivity dimensions with parent and teacher-reported levels of conduct problems

	Externalizing Outcomes: Conduct Problems															
	(a)				***(b)***				***(a)***				***(b)***			
Covariates (P)	**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher-reported**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.13 (.03)	-.14***	-.22 (.03)	-.18***	-.06 (.02)	-.07**	-.02 (.02)	-.02***	-.13 (.03)	-.13***	-.22 (.03)	-.18***	-.06 (.02)	-.07**	-.02 (.02)	-.02
Age	-.04 (.03)	-.04	.03 (.03)	.03	-.03 (.02)	-.04	-.04 (.02)	-.04	-.03 (.03)	-.03	.04 (.03)	.04	-.02 (.02)	-.02	-.03 (.02)	-.03*
SES	.00 (.02)	.00	-.04 (.03)	-.05	. 01 (.01)	.02	-.01 (.01)	-.02	.00 (.02)	.01	-.05 (.03)	-.06*	.01 (.01)	.01	-.01 (.01)	-.02
UPPS-P 1st order dimensions (P)																
NU	. 22 (.02)	.36***	.06 (.03)	.08*	.09 (.02)	.16***	.02 (.01)	.04	-	-	-	-	-	-	-	-
PU	.05 (.03)	.08	.11 (.04)	.12**	-.02 (.02)	-.03	.00 (.02)	.00	-	-	-	-	-	-	-	-
LPRE	.15 (.03)	.18***	.21 (.05)	.20***	.09 (.03)	.11**	.01 (.03)	.01	-	-	-	-	-	-	-	-
LPER	.04 (.02)	.07	.00 (.04)	.00	-.02 (.02)	-.03	-.02 (.02)	-.03	-	-	-	-	-	-	-	-
SS	.07 (.02)	.10**	.05 (.04)	.05	.05 (.02)	.07*	.00 (.02)	.00	-	-	-	-	-	-	-	-
UPPS-P 2nd order dimensions (P)																
URG	-	-	-	-	-	-	-	-	.16 (.03)	.20***	.18 (.04)	.17***	.04 (.02)	.05	-.02 (.02)	-.03
DCON	-	-	-	-	-	-	-	-	.31 (.03)	.40***	.19 (.04)	.20***	.10 (.02)	.14***	.03 (.02)	.03
SS	-	-	-	-	-	-	-	-	.06 (.02)	.09*	.06 (.04)	.06	.04 (.02)	.07*	.03 (.02)	.00
Concurrent Exter Behaviors (P,T)																
ADHD	-	-	-	-	.07 (.04)	.07*	.30 (.05)	.26***	-	-	-	-	.06 (.04)	.06	.30 (.05)	.26***
PSY. TR.	-	-	-	-	.21 (.04)	.19***	.36 (.05)	.37***	-	-	-	-	.20 (.04)	.19***	.36 (.05)	.37***
RAGG	-	-	-	-	.35 (.02)	.60***	.37 (.02)	.65***	-	-	-	-	.37 (.02)	.60***	.38 (.02)	.65***
R^2		.24***		.12***		.49***		.70***		.26***		.13***		.50**		.70***

Note. *p*<.05*, *p*<.01**, *p*<.001***. (a)= Models testing the effects of impulsivity facets controlling only for sociodemographic variables; (b)=Models in which the effects of other externalizing behaviors are also controlled. PE= Lack of premeditation; NU= Negative Urgency; SS= Sensation Seeking; LPER= Lack of Perseverance; PU= Positive Urgency; ADHD= Attention-deficit/hyperactivity disorder; PSY. TR.= Psychopathic traits; RAGG= Reactive Aggression. We modeled pathways from all covariates (age, sex, and SES) to all other predictors in the regression models.

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Table 4.7. Cross-sectional associations of first and second order UPPS-P impulsivity facets with parent and teacher-reported levels of ADHD

	Externalizing Outcomes: ADHD															
	(a)				***(b)***				***(a)***				***(b)***			
	Parent-reported		**Teacher- reported**		**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher-reported**	
Covariates (P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.06 (.02)	-.08**	-.15 (.02)	-.18***	-.04 (.02)	-.06***	-.05 (.02)	-.07**	-.06 (.02)	-.08**	-.15 (.02)	-.18***	-.05 (.02)	-.06*	-.06 (.02)	-.07***
Age	-.01 (.02)	-.02	.12 (.02)	.14	-.01 (.02)	-.02	.07 (.01)	.01***	-.02 (.02)	-.02	. 12 (.02)	.13***	-.02 (.02)	-.03	.07 (.01)	.09***
SES	-.06 (.02)	-.11	-.03 (.02)	-.06	-.06 (.01)	-.10	-.02 (.01)	-.04	-.06 (.01)	-.11***	-.04 (.02)	-.06*	-.06 (.01)	-.10***	-.02 (.02)	-.04*
UPPS-P 1st order dimensions (P)																
NU	.01 (.01)	.01	-.03 (.02)	-.06	-.03 (.01)	-.07*	-.04 (.01)	-.09***	-	-	-	-	-	-	-	-
PU	.19 (.02)	.34***	.11 (.03)	.18***	.15 (.02)	.29***	.03 (.02)	.06*	-	-	-	-	-	-	-	-
LPRE	.14 (.02)	.22***	.13 (.04)	.19***	.12 (.02)	.19***	.03 (.02)	.05	-	-	-	-	-	-	-	-
LPER	. 17 (.02)	.33***	.08 (.02)	.15**	.14 (.02)	.21***	.08 (.01)	.15***	-	-	-	-	-	-	-	-
SS	.06 (.02)	.11***	.06 (.03)	.09*	.03 (.02)	.06	.04 (.02)	.06*	-	-	-	-	-	-	-	-
UPPS-P 2nd order dimensions (P)																
URG	-	-	-	-	-	-	-	-	.33 (.02)	.49***	.22 (.02)	.31***	.28 (.02)	.43***	.12 (.02)	.19***
DCON	-	-	-	-	-	-	-	-	.17 (.02)	.27***	.06 (.02)	.09*	.10 (.02)	.16***	-.02 (.02)	-.04
SS	-	-	-	-	-	-	-	-	.08 (.02)	.13***	.07 (.02)	.12**	.04 (.02)	.07*	.04 (.02)	.07*
Concurrent Exter behaviors (P,T)																
CP	-	-	-	-	.06 (.03)	.09*	.27 (.04)	.44***	-	-	-	-	.05 (.03)	.07	.27(.04)	.44***
PSY. TR.	-	-	-	-	.24 (.04)	.28***	. 38 (.04)	.49***	-	-	-	-	.27 (.04)	.28***	.38 (.04)	.50***
RAGG	-	-	-	-	.02 (.02)	.04	-.05 (.02)	-.11*	-	-	-	-	.00 (.02)	.00	-.05 (.02)	-.12*
R^2		.36***		.18***		.37***		.57***		.39***		.20***		.42***		.57***

Note. *p*<.05*, *p*<.01**, *p*<.001***. (a)= Models testing the effects of impulsivity facets controlling only for sociodemographic variables; (b)=Models in which the effects of other externalizing behaviors are also controlled. PE= Lack of premeditation; NU= Negative Urgency; SS= Sensation Seeking; LPER= Lack of Perseverance; PU= Positive Urgency; CP= Conduct Problems; ADHD= Attention-deficit/hyperactivity disorder; PSY. TR.= Psychopathic traits; RAGG= Reactive Aggression. We modeled pathways from all covariates (age, sex, and SES) to all other predictors in the regression models.

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Table 4.8. Cross-sectional associations of first and second order UPPS-P impulsivity facets with parent and teacher-reported levels of psychopathic traits

	Externalizing Outcomes: Psychopathic Traits															
	(a)				***(b)***				***(a)***				***(b)***			
	Parent-reported		**Teacher- reported**		**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher-reported**	
Covariates (P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.03 (.02)	-.04	-.14 (.03)	-.14***	.04 (.02)	.07**	.02 (.02)	.02	-.03 (.02)	-.04	-.14 (.03)	-.14***	.03 (.02)	.05	.03 (.02)	.03
Age	.00 (.02)	.00	.09 (.03)	.09**	.02 (.02)	.02	.03 (.02)	.03	. 00 (.02)	.00	.10 (.03)	.10***	.01 (.02)	.02	.03 (.02)	.03
SES	-.02 (.02)	-.03	-.01 (.02)	-.01	-.01 (.01)	-.02	.02 (.01)	.03	-.02 (.02)	-.03	-.01 (.02)	-.02	.00 (.01)	.00	.02 (.01)	.03*
UPPS-P 1st order dimensions (P)																
NU	.08 (.02)	.16***	.02 (.03)	.04	.00 (.01)	.00	.01 (.01)	.01	-	-	-	-	-	-	-	-
PU	.13 (.02)	.25***	. 11 (.03)	.16**	.07 (.02)	.15***	.02 (.02)	.03	-	-	-	-	-	-	-	-
LPRE	.08 (.02)	.13**	.16 (.04)	.19***	.01 (.02)	.02	-.02 (.02)	-.02	-	-	-	-	-	-	-	-
LPER	.10 (.02)	.20***	.00 (.03)	.00	.04 (.01)	.09**	-.02 (.01)	-.03	-	-	-	-	-	-	-	-
SS	.11 (.02)	.19***	.03 (.03)	.04	. 07 (.01)	.14***	-.01 (.02)	-.01	-	-	-	-	-	-	-	-
UPPS-P 2nd order dimensions (P)																
URG	-	-	-	-	-	-	-	-	.19 (.02)	.30***	.13 (.03)	.16***	.06 (.02)	.11**	-.04 (.02)	-.04
DCON	-	-	-	-	-	-	-	-	.20 (.02)	.33***	.14 (.03)	.18***	.05 (.02)	.09**	. 02 (.02)	.03
SS	-	-	-	-	-	-	-	-	.11 (.02)	.20***	.04 (.03)	.06	.09 (.02)	.17***	-.01 (.02)	-.02
Concurrent Exter behaviors (P,T)																
CP	-	-	-	-	.18 (.03)	.27***	.39 (.05)	.49***	-	-	-	-	.16 (.03)	.24***	.36 (.04)	.49***
ADHD	-	-	-	-	.22 (.03)	.28***	.40 (.04)	.33***	-	-	-	-	. 25 (.03)	.32***	.41 (.04)	.35***
RAGG	-	-	-	-	.13 (.02)	.27***	.08 (.03)	.13*	-	-	-	-	.13 (.02)	.28***	.08 (.03)	.14**
R^2		.21***		.10***		.32***		.74***		.26***		.10***		.31***		.72***

Note. $p<.05$*, $p<.01$**, $p<.001$***. (a)= Models testing the effects of impulsivity facets controlling only for sociodemographic variables; (b)=Models in which the effects of other externalizing behaviors are also controlled. PE= Lack of premeditation; NU= Negative Urgency; SS= Sensation Seeking; LPER= Lack of Perseverance; PU= Positive Urgency; CP= Conduct Problems; ADHD= Attention-deficit/hyperactivity disorder; RAGG= Reactive Aggression. We modeled pathways from all covariates (age, sex, and SES) to all other predictors in the regression models.

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Table 4.9. Cross-sectional associations of first and second order UPPS-P impulsivity facets with parent and teacher-reported levels of reactive aggression

	Externalizing Outcomes: Reactive Aggression															
	(a)				***(b)***				***(a)***				***(b)***			
	Parent-reported		**Teacher- reported**		**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher- reported**		**Parent-reported**		**Teacher-reported**	
Covariates (P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.17 (.04)	-.12***	-.28 (.05)	-.17***	-.05 (.03)	-.04	-.04 (.03)	-.02	-.17 (.04)	-.12***	-.28 (.05)	-.17***	-.05 (.03)	-.04	-.04 (.03)	-.02
Age	-.02 (.04)	-.02	.01 (.05)	.01	.01 (.03)	.01	-.03 (.03)	-.02	-.01 (.04)	-.01	.02 (.05)	.01	.01 (.03)	.01	-.03 (.03)	-.01
SES	.00 (.03)	.00	-.04 (.03)	-.03	.01 (.02)	.01	.00 (.02)	.00	.00 (.03)	.00	-.05 (.03)	-.04	. 01 (.02)	.01	.00 (.02)	.00
UPPS-P 1st order dimensions (P)																
NU	.32 (.03)	.35***	.11 (.04)	.10*	.10 (.03)	.11***	.03 (.02)	.03	-	-	-	-	-	-	-	-
PU	.08 (.04)	.08	.12 (.06)	.10*	-.02 (.03)	-.02	-.01 (.04)	-.01	-	-	-	-	-	-	-	-
LPRE	.09 (.05)	.08	.26 (.07)	.18***	-.07 (.04)	-.06	.03 (.04)	.02	-	-	-	-	-	-	-	-
LPER	.09 (.04)	.09*	.00 (.05)	.00	.00 (.03)	.00	.01 (.03)	.01	-	-	-	-	-	-	-	-
SS	.00 (.04)	.00	.05 (.05)	.04	-.11 (.03)	-.11***	.00 (.03)	.00	-	-	-	-	-	-	-	-
UPPS-P 2nd order dimensions (P)																
URG	-	-	-	-	-	-	-	-	. 17 (.04)	.14***	.22 (.05)	.16***	-.05 (.04)	-.05	.04 (.03)	.03
DCON	-	-	-	-	-	-	-	-	.45 (.04)	.39***	.25 (.05)	.19***	.10 (.03)	.09**	.03 (.03)	.02
SS	-	-	-	-	-	-	-	-	-.03 (.04)	-.02	.06 (.05)	.05	-.13 (.03)	-.12***	.00 (.03)	.00
Concurrent Exter behaviors (P,T)																
CP	-	-	-	-	.85 (.05)	.63***	1.05 (.05)	.81***	-	-	-	-	.89 (.05)	.64***	1.06 (.05)	.78***
ADHD	-	-	-	-	.05 (.06)	.03	-.16 (.07)	-.08*	-	-	-	-	.02 (.06)	.01	-.16 (.07)	-.08*
PSY. TR.	-	-	-	-	.39 (.06)	.23***	. 23 (.07)	.14**	-	-	-	-	.39 (.06)	.28***	.24 (.07)	.14**
R^2	.18***		.10***		.50***		.70***		.21***		.11***		.50***		.72***	

Note. $p<.05$*, $p<.01$**, $p<.001$***. (a)= Models testing the effects of impulsivity facets controlling only for sociodemographic variables; (b)=Models in which the effects of other externalizing behaviors are also controlled. PE= Lack of premeditation; NU= Negative Urgency; SS= Sensation Seeking; LPER= Lack of Perseverance; PU= Positive Urgency; CP= Conduct Problems; ADHD= Attention-deficit/hyperactivity disorder; PSY.TR.= Psychopathic traits. We modeled pathways from all covariates (age, sex, and SES) to all other predictors in the regression models.

Figure 4.3 (A). Schematic of the associations between *first-order dimensions* of the UPPS-P and diverse externalizing outcomes

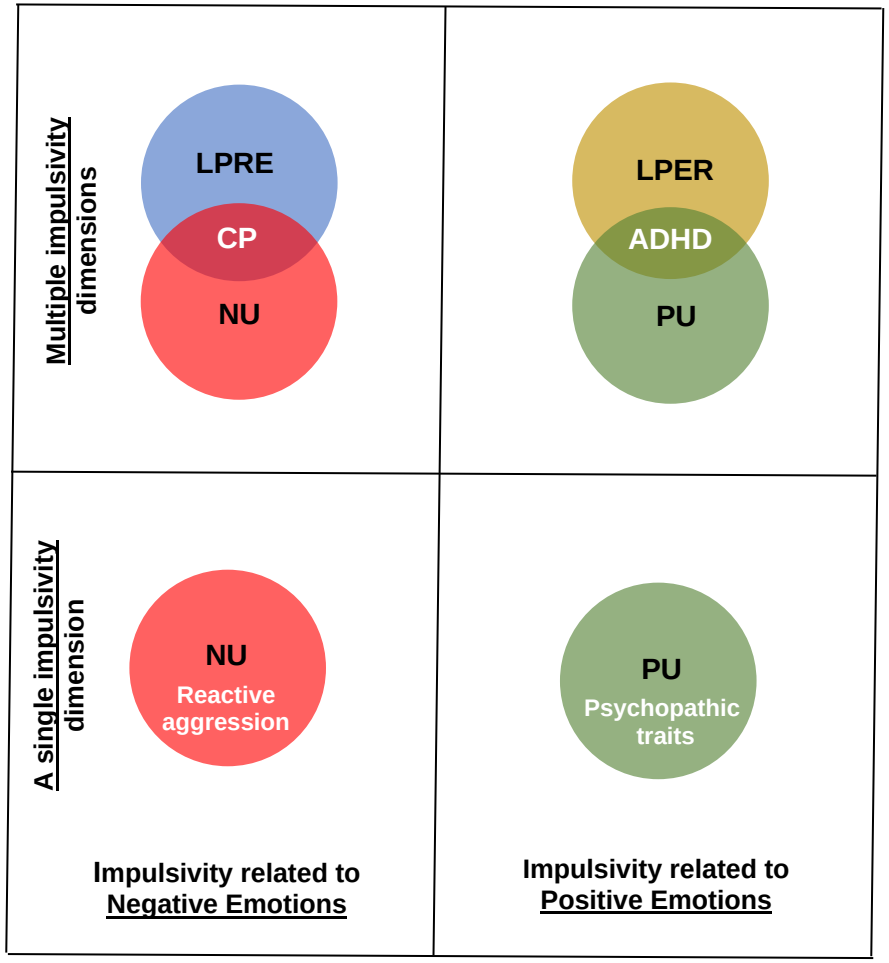
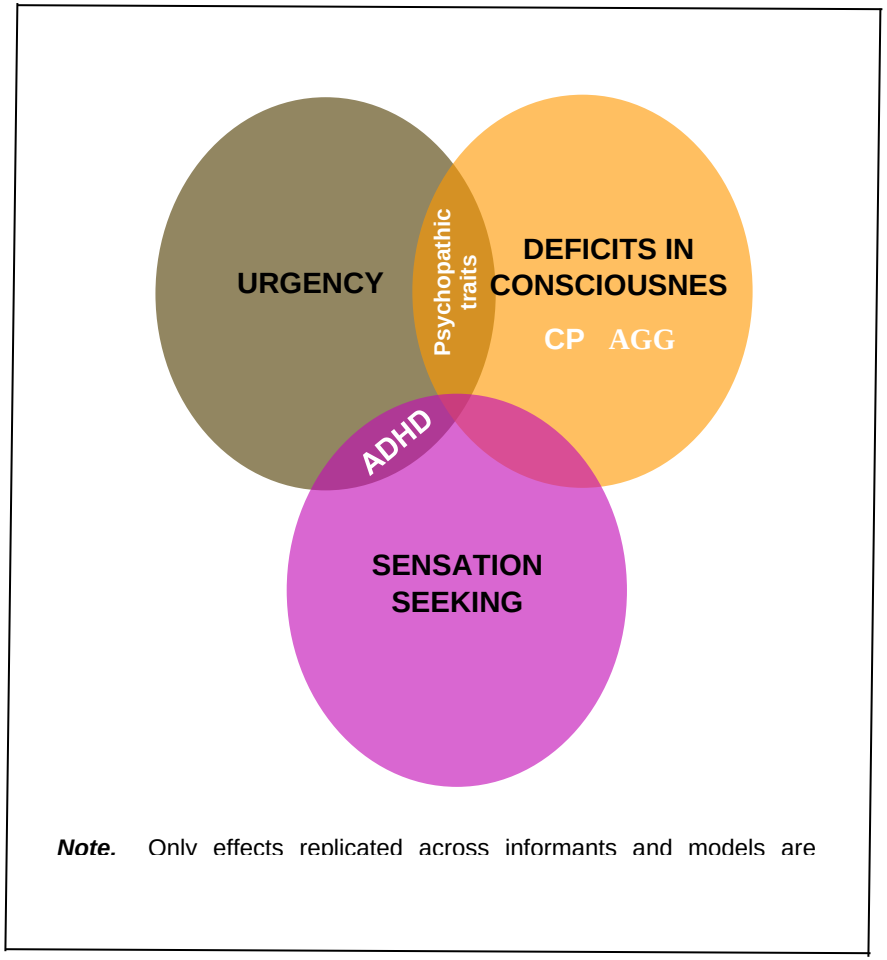


Figure 4.3 (B). Schematic of the associations between *second-order dimensions* of the UPPS-P and diverse externalizing outcomes



Note. Only effects replicated across informants and models are

Summary of this Study (Chapter Four)

- Impulsivity is associated to multiple forms of problematic behaviors and poorer developmental outcomes through childhood and adolescence. However, its associations with externalizing psychopathology are particularly robust.

- The UPPS/UPPS-P model of impulsivity (Cyders & Smith, 2007; Whiteside & Lynam, 2001) is theoretically sound and psychometrically robust, and has been extensively validated.

- In the last decades, various adaptations of the UPPS-P Impulsive Behavior Scale have been developed, including self and parent-reported forms for youth populations. However, a reliable and valid short version for young children is not currently available in the Spanish context. Only an abbreviated version for children above 10 years of age has been recently proposed (Caneto et al.,2020).

  In this study, we aimed to address this gap in literature

- We provide evidence on:

  1. The first and second order factor structure of the adapted form of the UPPS-P Impulsive Behavior Scale for preschool children
  2. The scale measurement and structural invariance across genders
  3. The convergent and discriminant validity of the UPPS-P first and second-order subscales

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5 CHAPTER FIVE

EMOTION-RELATED IMPULSIVITY IN CHILDHOOD: ANTECEDENTS AND OUTCOMES

5.1. INTRODUCTION

Impulsivity remains among the central research topics in contemporary psychology, across subdisciplines such as personality (DeYoung & Rueter, 2016), developmental (Beauchaine & Neuhaus, 2008) or genetically informed research (Mann et al., 2017). Conceptualized as a *personality trait* or a *psychiatric symptom*, it is implicated in multiple problematic behaviors and interpersonal difficulties (Sharma et al., 2014).

In the last decades, a renew interest on the *affective underpinnings* of impulsive behaviors has become evident due to the extensive recognition that impulsivity is not a unitary construct (Carver et al., 2008; Carver et al., 2011; Griffin et al., 2018; Dalley & Robins, 2017; Lynam & Miller, 2004). This trend has been favored by the emergence of new research approaches (e.g., the RDoC initiative) emphasizing the need to identify the transdiagnostic factors common to diverse mental health problems and their neurobiological foundations (Beauchaine & Zisner, 2017; Sanislow et al., 2010).

Emotion-based impulsivity refers to the proneness to act rashly when experiencing intense or extreme emotional states of both negative and positive valence (Billeux, 2017). It has been associated with negative outcomes such as aggressive and externalizing behaviors in childhood (Marmorstein, 2013; Zapolski & Smith, 2013) or uncontrolled eating, risky sexual behavior, mood disorders and drug abuse later in the development (Booth et al., 2018; Johnson et al., 2018; Peterson & Smith; 2017; Smith & Cyders, 2016; Zapolski et al., 2009). Recent meta-analytic research has also demonstrated that impulsive behaviors triggered by emotions predict not only a wide range of maladaptive life outcomes, but also the largest effects sizes (Berg et al., 2015). Since growing evidence supports the developmental and clinical relevance of emotional forms of impulsivity, a key research question is: which are their antecedents and outcomes in the earlier phases of the development?

In initial phases of the development, emotion-based impulsivity appears to be intrinsically related to other dispositional constructs. Examples are *reactivity* and *self-regulation* (Rothbart & Bates, 2006), *emotion-related self-regulation* (Eisenberg et al., 2010), *emotionality* (Buss & Plomin, 1984), 1996), *negative/positive affectivity* (Clark & Watson, 1999) or *irritability* (Leibenluft & Stoddard, 2013). Although a challenging task, delineating the limits among these concepts is worth the effort (Nigg 2017), as they are neither interchangeable with each other nor synonyms of affect-driven impulsivity. Whereas some appear to dovetail with the affective

component of a potential early dispositional vulnerability, others relate predominantly to the regulatory component of such a liability (see **Table 5.1** for a conceptual summary). Emotion-triggered impulsivity is likely to reflect deficits in both types of processes.

5.1.1. At the Intersection between Affect and Behavior

Contemporary research on affect-driven impulsivity took off with the UPPS-P model of impulsivity, that advanced new ways of parsing the heterogeneity of impulsive behaviors (Cyders & Smith, 2007; Whiteside & Lynam, 2001). In the initial formulation of the model, *Urgency* (i.e., *Negative Urgency*) was defined as the tendency to act rashly in response to negative emotions (e.g., sadness, fear and anger). Later, the construct of *Positive Urgency* was introduced to refer to rash actions taken in response to positive emotions such as joy or euphoria. Together, both conform an overall tendency to emotion-triggered impulsive behaviors (i.e., *Urgency*; Cyders & Smith, 2007).

Prior to Whiteside's & Lynam's formulation, the emotional determinants of impulsive behaviors were largely unexplored (Carver & Johnson, 2018). Diverse conceptualizations of impulsivity had emphasized behavioral (e.g., delay of gratification; Ainslie, 1975), cognitive (e.g., lack of reflection; Kagan, 1966) or physiological underpinnings of impulsivity (e.g., neural activity; Harmon-Jones et al., 1997), but rarely emotional components, and certainly not as elicitors of impulsive behaviors. In addition, in most models of personality, impulsivity has been conceptualized as emotionally neutral (Berg et al., 2015).

As a result, impulsive behaviors elicited by intense emotions are, overall, largely understudied. In youth literature, this gap in research seems particularly obvious. The lack of appropriate assessment tools has been a fundamental limitation. Providentially, self and parent-reported forms of the UPPS-P Impulsive Behavior scale have been recently adapted for children and adolescents in different languages and length formats, facilitating important advances in research (Donati et al., 2021; Pechorro et al., 2021; Watts, Smith et al., 2020; Zapolski et al., 2010). However, certain prevailing difficulties may continue to obscure or distract researchers from the much-needed examination of urgency-related behaviors across development. As an example, there is currently an ongoing debate on whether Positive and Negative Urgency should be considered separately or as a coherent conceptual unity. Findings from adult and young adult literature show that the associations of Negative and Positive Urgency look, on the surface, almost indistinguishable (Sperry et al., 2018), and that considering them as a single overarching construct is conceptually tenable (Billieux et al., 2021; Goh et al., 2020; Littlefield et al. 2016). Research has also shown that Positive Urgency is associated with negative rather than positive affect (Sperry et al., 2018), but Urgency is distinct from an overall tendency toward intense positive or negative affectivity (Peterson & Smith, 2019).

5.1.2. Early Antecedents of Emotion-related Impulsivity in Childhood

A handful of recent studies with adult populations have begun to delve into the origins of trait affect-driven impulsivity (Johnson et al., 2016; King et al., 2018; Pearlstein et al., 2019; Sanchez-Roige et al., 2019; Sharpe et al., 2021). The state of affairs with youth populations is, on the contrary, still nascent. The scarce evidence accumulated tends to converge, however,

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with previously reported findings in the larger literature on youth impulsivity in some remarkable ways:

1) Multiple factors including individual characteristics of children (e.g., temperament), and family environment (e.g., parenting practices) seem to be involved in these complex developmental processes (Nigg, 2016; Olson et al., 2002).

2) Early temperament traits are expected to play an essential role in the phenomenology of impulsive behaviors (Frick et al., 2018; Martel & Nigg, 2006). In particular, the reactive and regulatory components of temperament which are viewed by some as the core systems of early trait organization (Derryberry & Rothbart, 1997; Rothbart, 1989).

3) Contextual risk factors are also implicated on individual differences on impulsivity. For instance, adversity defined in more general (e.g., stressful life events; King et al., 2013) and specific terms (e.g., punitive and inconsistent parenting behaviors; Cecil et al., 2012; Olson et al., 2002 or childhood maltreatment; Liu, 2019) have been found to be precursors of impulsive behaviors in childhood.

As noted, although these associations remain overall poorly studied in research on affect-driven impulsivity with youth populations, some longitudinal and cross-sectional findings are at hand. Waddell et al. (2021) recently showed that anger reactivity, as well as a latent variable capturing the shared variance between anger reactivity and child effortful control, assessed at 5 and 8 years of age, predicted later levels of Negative Urgency in adolescence. Furthermore, early adverse childhood experiences (e.g., parental abuse or neglect) retrospectively reported by a sample of college students, were associated to higher levels of Negative Urgency in young adulthood (Espeleta et al., 2018). Interestingly, Wardell et al. (2016) had previously obtained similar findings with a sample of adolescents. Finally, less parental education attainment, potentially reflecting a structural socioeconomic disadvantage, has been shown to be associated with children's Negative Urgency at 9-10 years of age (Assari, 2021). A major gap of this body of research is, nevertheless, that little is known of *whether* and *how* temperament and parenting behaviors and characteristics might contribute, *interactively*, to the individual differences in affect-driven impulsivity. These interactive effects are, on the contrary, well-documented in the larger developmental and child impulsivity literature (Kiff et al., 2011; Olson et al., 1999; Rioux et al., 2020).

5.1.3. Outcomes of Emotion-related Impulsivity in Childhood: Externalizing Behaviors

Urgency predicts both internalizing and externalizing psychopathology (Johnson et al., 2013; Johnson et al., 2018; Smith et al., 2013; Wray et al., 2012). Here, we briefly summarize only the main findings from youth literature regarding externalizing problems in childhood. Two kinds of evidence will be described. First, a body of research that has addressed the role of "*emotional impulsivity"* (Rosen & Factor, 2015), *"affective decision making"* (Castellanos-Ryan & Séguin, 2016) or *"affective risk taking"* (Nigg & Nagel, 2016) in children and youth with ADHD symptoms. Second, studies in which the outcomes of emotion-triggered impulsivity, as defined in Whiteside's and Lynam's model (i.e., Negative and Positive Urgency) are specifically explored.

While some prior research had indicated that deficits in non-emotion and emotion-based processes may be largely independent in children with ADHD (Hinshaw, 2003), recent findings converge with most previous literature in suggesting that, emotional impulsivity is a central feature of ADHD (Colder & Chassin, 1997; Forslund et al., 2016; Graziano & Garcia, 2016; Nigg et al., 2004). Thus, playing an important role in the emotional and behavioral functioning of children with clinically significant levels of inattention, restlessness and/or overall impulsiveness (Barkley & Fischer, 2010; Kleberg et al. 2021; Morris et al., 2020; Walerius et al., 2014). This evidence is of major importance, since it explicitly situates affect-driven impulsivity within the nomological network of ADHD, which has historically served as the paradigmatic phenotype for the study of impulsive behaviors in childhood.

Within the UPPS-P framework, affect-based traits, Negative and Positive Urgency, have been shown to predict aggression using both child and parent reports during middle childhood (Zapolski et al., 2013). Negative Urgency, alone, has been reported as a predictor of conduct disorder (Marmornstein, 2013), and positive smoking expectancies among substance naïve children of 12 years of age (Dir et al., 2016). During the adolescent period, Positive Urgency has been linked to binge drinking (Tomko et al., 2016). Interestingly, Haas et al. (2017) recently demonstrated that Negative Urgency is involved in the emergence of both ODD and ADHD as well as CU behaviors in children aged 5 to 12. These findings are consistent with previous research, proposing that the tendency toward affect-driven rash action may underlie multiple externalizing behaviors (Settles et al., 2012).

Based on the literature reviewed above, some of these research questions seem to need further answers: Do reactive and regulatory components of temperament account for individual differences in emotion-based impulsivity in childhood? To what extent are any observed relationships between child temperament and later emotion-related impulsivity a function of variations in parental characteristics? By which unique and interactive processes higher levels of affect-driven impulsivity contribute to explain higher levels of externalizing behaviors observed in childhood (i.e., ADHD, ODD and CU traits? Is emotion-related impulsivity a transdiagnostic vulnerability to multiple externalizing behaviors?

5.1.4. This Study

In this study, we capitalize on the UPPS-P model of impulsivity and its potential utility for conceptualizing affect-driven impulsive behaviors in childhood, while we extend previous research in some important ways.

First, we operationalize affect-driven impulsivity as a single trait (i.e., Urgency), building upon converging evidence from different analytic approaches (i.e., latent and network analysis) that supports such decision (Berg et al., 2015; Billieux et al., 2021). To date, in most research with adult and youth populations, either only Negative Urgency was examined (e.g., Booth et al., 2018) or two separate scores for Negative and Positive Urgency were used (e.g., Zapolski et al., 2013). Here, we rely, instead, on a unique dimension comprising impulsive behaviors triggered by intense or extreme emotions without regard of their valence (e.g., anger or joy). Second, we investigate the developmental antecedents and outcomes of emotionally based impulsivity, largely unexplored in prior research on impulsivity. Importantly, we focus on early childhood, a critical developmental phase to examine these processes, inasmuch as it is when

regulatory aspects of behavior become increasingly and coherently organized (Rothbart, 1989; Rothbart & Bates, 2006). Third, we examine the interactive effects of different impulsivity components beyond its main independent effects. Although Whiteside's and Lynam's (2001) proposed that Negative Urgency, Lack of Premeditation, Lack of Perseverance and Sensation Seeking serve as four *separable pathways* underlying distinct processes implicated on impulsive behaviors, here, we also explore their interactions. Findings from adult literature in which moderation effects among specific impulsivity components are established support adopting this analytic approach (e.g., Lack or Premeditation with Negative Urgency or Sensation Seeking to predict, respectively, risky sexual behavior or risky driving; Curry et al., 2018; Luk et al., 2017). Finally, genetically informed studies show that impulsivity is heritable (Bevilacqua & Goldman, 2013; Bezdjian et al., 2011). Thus, in understanding individual differences in impulsivity, parental personality traits related to affect-driven impulsivity (e.g., Neuroticism or Consciousness; Berg et al., 2015) should be examined because of their potential influences on the levels of child affect-driven impulsivity.

In sum, we aim to address two sets of issues. First, the antecedents and potential driving mechanisms of emotion-based impulsivity. Second, the role of affect-driven behaviors on externalizing outcomes during childhood. The major purposes of this study were:

1) To identify the independent and interactive contributions of child temperament (e.g., reactive and regulatory aspects), parenting style (e.g., punitive practices) and parent's personality (e.g., Neuroticism) to children's later levels of Urgency.

2) To identify the independent and interactive contributions of affect and non-affect driven impulsivity to concurrent and prospective levels of children's externalizing problems.

Our hypotheses are informed by the literature described above. First, regarding *the antecedents* of affect-driven impulsivity in childhood, we hypothesized that child temperament, parenting practices and parent personality would independently predict child's levels of Urgency. Specifically, in line with findings from prior research, higher levels of reactivity, defined as the arousal of motor, affective and sensorial systems (i.e., Negative Affect and Surgency/Extraversion; Rothbart & Bates, 2006), were expected to be longitudinally associated with a tendency to rash actions in response to intense emotions (Waddell et al., 2021). Also, harsh parenting practices such as physical or verbal punishment (Espeleta et al., 2018; Wardell et al., 2016). Relatedly, we speculate that parent's levels of Neuroticism, a personality trait associated to Negative Urgency in the literature, would predict higher levels affect-driven impulsivity in children (Berg et al., 2015; Sharma et al., 2014). Beyond these independent associations, interactive effects between child and parent factors, whereby parent behaviors or characteristics moderate the effects of child temperament were also expected (Kiff et al., 2011). Second, regarding *the outcomes* of affect-driven impulsivity in childhood, we hypothesized that affect-driven impulsivity would be a transdiagnostic factor common to diverse forms of externalizing behavior. Specifically, we anticipate that it would contribute to explain concurrent and prospective levels of ADHD, ODD and CU traits, thus, replicating findings from previous research (Haas et al., 2017). At the same time, we speculate that a differentiation among problematic behaviors is feasible through and examination of potential interactions between impulsive behaviors initiated and non-initiated by emotions.

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5.2. METHOD

5.2.1. Sample

Data for this study is from the ELISA Project. Specifically, we used data from three data waves for this work: waves 2, 3 and 4. Across the text describing this particular study, they will be referred to as T1, T2 and T3, respectively. Only parent-reports were used in this study. Wave 2 (T1) was collected in the Spring of 2018 (81.3% of the parents of the initial sample, n= 2467, participated). Wave 3 (T2) was collected one year later, in the Spring of 2019 (73.2% of the parents of the initial sample participated). Wave 4 (T3) was collected two years later, in the Spring of 2021 (45.7% of the parents of the initial sample participated filling the questionnaire). The drop in participation in the last data collection was due to the several contingencies (e.g., imposed restrictions) derived from the COVID-19 pandemic. However, overall considered, retention rates were high. At T1, children were 4 to 7 years of age (M = 5.35 years, SD = .92), 5 to 8 at T2 (M = 6.32 years, SD = 0.81) and 7 to 10 at T3 (M = 8.4 years, SD = .95).The sample was equally distributed in terms of gender across data waves. At T1, 80.9% of the mothers and 93.4% of fathers were employed. Only 3.4% of the families reported daily financial concerns and 66.7% reported feeling supported by their extended families and friends in the upbringing of their child.

5.2.2. Measures

Child variables

Temperament *(T1, parent-reported)*

Reactivity and Regulation. We used The Child Behavior Questionnaire Very- Short Form (CBQ-VS-F; Putnam, & Rothbart, 2006) to assess child temperament. Parents filled this 36-item questionnaire using a 7-point scale ranging from 1 (extremely untrue of my child) to 7 (extremely true of my child), to characterize their child on three broad temperament dimensions. Namely, *Surgency/Extraversion* (i.e., activity level, positive emotionality and extraversion, e.g., *he/she often rushes into new situations, likes to go high and fast when pushed on a swing*); *Negative Affect* (i.e., the tendency to experience fear, sadness and frustration frequently and intensely, e.g., *he/she is very difficult to soothe when upset, gets angry when can't find something to play with*); *Effortful Control* (i.e., the ability to choose a course of action under conditions of conflict, to plan for the future, and to detect errors, e.g., *approaches places s/he has been told are dangerous slowly and cautiously, is good at following instructions*). The internal consistency of the scales was .69 for *Surgency/Extraversion*, .72 for *Negative Affect*, and .69 for *Effortful Control*. Because it is conceptually justified, a composite score of Surgency/Extraversion and Negative Affect, reflecting the arousal of motor, affective and sensorial systems was used in this study to operationalize child's temperamental reactivity (Rothbart & Bates, 2006). The Effortful Control Scale was used to assess child's temperamental regulation.

Affect-driven impulsivity *(T2, parent-reported)*

Urgency. Negative and Positive Urgency were measured via a parent-reported short version of the UPPS-P Impulsive Behavior Scale adapted and validated within the context of

the ELISA Project (see **Chapter Four**). The Negative Urgency subscale included 4 items assessing rash action in response to intense negative emotional states (e.g., *"he/she often makes matters worse because he/she acts without thinking when he/she upset"* or *"often says things that later regrets when he/she is upset"*). The Positive Urgency subscale included 4 items assessing rash action in response to intense positive states (e.g., *"when really thrilled, he/she tends not to think about the results of his/her actions"* or *"often acts without thinking when he/she is happy"*). Each item was scored on a 4-point Likert-type scale ranging from 1 (totally agree) to 4 (totally disagree). In the current sample, the internal consistency of the scales was .85 and .80, respectively for Negative and Positive Urgency. A composite score of Negative and Positive Urgency was used as a broader operationalization (i.e., Urgency, Lynam et al., 2006) of child's affect-driven impulsivity.

Externalizing Problems *(T1, T2, T3, parent-reported)*

Oppositional-Defiant Behaviors. At T1 and T2, child oppositional and defiant behaviors such as *"he/she is disobedient at school"*, *"disobedient at home"* or *"argues a lot"* were assessed via parent reports on the ODD- DSM5-oriented scale of the ASEBA School-Age forms (Achenbach & Rescorla, 2001). Parents rated each item on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). At T3, parents indicated to which extent items such as *"he/she often fights with others"*, *"often loses temper"*, *"often lies or cheats"* included in the Conduct Problems scale of Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) applied to their child. The 5 items comprising the subscale were rated on a 3-point scale from 0 (not true) to 2 (absolutely true). Internal consistency of the scales was α=.76 and .76 for the CBCL measures, at T1 and T2, respectively, and .60 for the SDQ measure, at T3.

Inattentive, Hyperactive and Impulsive Behaviors. At T1 and T2, child inattention, hyperactive and impulsive behaviors were measured via parent reports on the ADHD-DSM5-oriented scale of the ASEBA School-Age form (Achenbach & Rescorla, 2001). Items assessing behaviors such as *"he/she is impulsive, acts without thinking"*, *"is inattentive and gets easily distracted"* or *"does not finish what she/he starts"* were rated on a 3-point scale ranging from 0 (not true) to 2 (absolutely true). At T3, parents indicated to which extent items such as *"he/she is restless, overactive"*, *"thinks things out before acting"*, *"easily distracted"* included the Hyperactivity-Inattention subscale of Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) applied to their child. Items were rate on a 3-point scale from 0 (not true) to 2 (absolutely true).The internal consistency of the scales was α=.79 and .80 for the CBCL measures, at T1 and T2, respectively, and .80 for the SDQ measure, at T3.

CU traits. We used the 10-item CU traits scale of The Child Problematic Traits Inventory (CPTI; Colins, et al., 2014), to assess CU behaviors at T1, T2 and T3. Parents rated items such as *"he/she usually does not seem to share others' joy and sorrow"*, *"seldom remorseful when has done something not allowed"* or *"does not become upset when others are being hurt"* on a 4-point scale, ranging from 1 (does not apply at all) to 4 (applies very well). The internal consistency of the scale was acceptable across time points (α=.88, .89, .87, at T1, T2, T3, respectively).

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Parent variables

Harsh Parenting Practices *(T1, self-reported).* Punitive parenting practices were measured via The Alabama Parenting Questionnaire-Preschool Revision (APQ-Pr) adapted by de la Osa et al. (2014). The *Punitive Scale* comprises 5 items addressing parenting behaviors such as *"I slap him/her when he/she has done something wrong"*, *"I yell/scream at him/her when he/she has done something wrong"*, rated on a 5-point Likert-type scale ranging from 1 (never) to 5 (always). The internal consistency of the scale was α=.60.

Parental Personality *(T2, self-reported).* Mother/father tendency to experience negative affect was measured via the *Neuroticism scale* of the Mini-IPIP Scales (Donnellan et al., 2006). The scale includes 4 items assessing behaviors such as *"I get upset easily"* or *"I have frequent mood swings"* assessing a general proneness to negative affect. Each item is rated on a 5-point Likert-type scale ranging from 1 (totally agree) to 5 (totally disagree). The internal consistency of the scale was .68.

Covariates

Non-affect-driven Impulsivity *(T2, parent-reported).* Lack of Premeditation, Lack of Perseverance and Sensation Seeking were measured via parent reports on a short version of the UPPS-P Impulsive Behavior Scale adapted and validated within the context of the ELISA Project (see **Chapter Four**). Each of the scales includes 4 items scored on a 4-point Likert-type scale ranging from 1 (totally agree) to 4 (totally disagree). An item example for Lack of Premeditation is *"My child tends to stop and think before doing things"* (reverse scored); for Lack of Perseverance: *"Finishes what he/she starts"* (reverse scored) and for Sensation Seeking: *"Likes new, thrilling things to happen"*. The internal consistency of the scales was .72 for Lack of Premeditation, .90 for Lack of Perseverance and .74 for Sensation Seeking. In this study, a composite of Lack of Premeditation and Lack of Perseverance, was used to operationalized Deficits in Consciousness (Lynam et al., 2006).

Child Arousal *(T2, parent-reported).* Child's tendency to show distress and become easily aroused was measured via the *Emotionality subscale* of the he Emotionality Activity Sociability (EAS) Temperament Survey for Children (EAS-TS-FC, Buss & Plomin, 1984). The 5 items of this scale can be taken as indicators of not only the tendency to experience distress, but also a tendency to be in a state of high autonomic arousal (e.g., *"he/she cries easily"* or *"he/she reacts intensely when upset"*). Each item was scored on a 5-point scale ranging from 1 (not characteristic or typical of my child) to 5 (very characteristic). The internal consistency of the scale in the current sample was .71.

Demographics. We included family SES, child age (in years) and child gender as demographic covariates in the regression analyses of this study. The same strategy described in the first empirical work (see **Chapter Two**) was adopted to operationalize these covariates.

5.2.3. Analytic Strategy

First, bivariate correlations were computed to examine relationships between the study variables in SPSS Statistics version 26 (IBM, 2019). Second, regression analyses using affect-driven impulsivity either as a dependent variable predicted by child and parent characteristics,

or as an independent variable predicting multiple externalizing behaviors, cross-sectionally and longitudinally, were conducted in Mplus v. 8.0 (Muthén and Muthén, 2019). To examine the antecedents of emotion-based impulsivity, three kinds of models were separately specified. Namely, those in which a) only temperament traits, b) temperament traits and parenting practices or c) temperament traits and parent personality were introduced as predictors. Such models had two relevant features. In each of them, both main and interactive effects of predictors were included, and these predictors were entered sequentially in the analysis, through different steps. For each of the models, each of the hypothesized predictor was first introduced separately along with sociodemographic variables (step 1), to then be included simultaneously along with other predictors and potential interactions (step 2). To examine the concurrent and prospective externalizing outcomes of affect-driven impulsivity we followed a similar procedure. We started by analyzing the main effects of affect and non-affect driven impulsivity separately, to then explore their simultaneous and interactive effects in successive models. Control variables (e.g., demographics and other relevant covariates such as previous levels of externalizing difficulties or parent-parent reports on child's arousal) were considered in these analyses. All the interaction terms were mean-centered prior to the moderation test. Two-way and three-way interactions were analyzed.

5.3. RESULTS

Table 5.2 shows the correlations among the study variables. These preliminary analyses indicated that child temperament was significantly and moderately correlated with parent's behaviors and parental traits, thus supporting our analytic strategy to test their interactive effects when predicting affect-driven impulsivity. Specifically, temperamental reactivity manifested moderate positive associations with both punitive practices (r=.19, p=.000) and parental levels of Neuroticism (r=.19, p=.000), while regulation manifested a negative association with harsh parenting (r=-.11, p=.000). Overall, both child and parent characteristics were moderately related to Urgency. In particular, associations of reactivity, punitive parenting practices, and Neuroticism with affect-driven impulsivity were positive (r=.33, r=.30, r=.22, p=.000, respectively). Conversely, the association of regulation with Urgency was negative and weaker (r=-.09, p=.000). In addition, higher levels of child Urgency were strongly correlated with higher levels of concurrent and prospective externalizing behaviors (range r=.31-.54, r=.27-.41, p=.000, respectively). Higher levels of child Urgency were also strongly correlated with higher levels of child's arousal, measured via parent reports on behavioral indicators of activation (r=.52, p=.000). Since higher levels of child's arousal were also moderately correlated with higher levels of concurrent and prospective externalizing behaviors (range r=.23-.58, r=.16-.39, respectively), our decision to included it as a control variable in models exploring the outcomes of affect-driven impulsivity is warranted.

5.3.1. Antecedents of Emotion-based Impulsivity in Childhood

First, we tested the effects of child temperamental reactivity and regulation as antecedents to later levels of Urgency in separate models (**Table 5.3).** Results showed that child temperamental reactivity and regulation made independent contributions to parent reported levels of affect-driven impulsivity, in that higher levels of reactivity (b=35, SE=.02 p=.000, 95% CI [29,38], **Table 5.3, model 1**) and lower levels of temperamental regulation (b=-.07, SE=.02 p=,000 95% CI [-.12, -.02], **Table 5.3, model 2**) were associated with a disposition to

rash action in response to intense emotional states. These effects remained significant after introducing both predictors simultaneously in the same model along with their interaction. No moderation effects were found, however, between child temperamental reactivity and regulation to predict later affect-driven impulsivity (*b*=.01, *SE*=.03 *p*=.71, 95% CI [-.05, -.07], **Table 5.3, model 3**).

Second, we examined a series of models in which beyond temperament traits, either parenting behaviors (i.e., punitive parenting practices, **Table 5.4**) or parent personality traits (i.e., Neuroticism, **Table 5.5**) were introduced as main predictors of child's Urgency. Across models, parenting practices such as spanking or screaming at the child when he/she has done something wrong, made independent contributions to prospective parent-reported levels of child Urgency, over and above those of child's temperamental reactivity and regulation. Furthermore, there was a significant interaction between parental punitive practices and child's temperamental regulation, in that lower levels of parental punitive behaviors amplified the effects of lower levels of regulation to predict higher levels of child Urgency (*b*=.15, *SE*=.04, *p*=.000, 95% CI [.06,.23], **Table 5.4, model 2.3, Figure 5.1**). Across models, parental Neuroticism also made independent contributions to concurrent parent-reported levels of Urgency, over and above those of child's temperamental reactivity and regulation. However, no moderation effects between parent's levels of Neuroticism and child's temperamental reactivity and regulation were found (**Table 5.5, model 2.3**).

5.3.2. Externalizing Outcomes of Emotion-based Impulsivity in Childhood

We began by analyzing the cross-sectional effects of child affect-driven impulsivity on levels of ODD, ADHD and CU traits in separate models **(Tables 5.6, 5.7, 5.8).** Child Urgency was significantly and independently associated with all the externalizing behaviors examined. Effects were similar in magnitude for ODD (*b*=.12, *SE*=.01, *p*=.000, 95% CI [.09,.14], **Table 5.6, model 1**) and ADHD (*b*=.13, *SE*=.01, *p*=.000, 95% CI [.10,.15], **Table 5.7, model 1**), but smaller for CU traits (*b*=.06, *SE*=.01, *p*=.000, 95% CI [.04,.09], **Table 5.8, model 1**).

Next, in conducting a stringent test of our hypotheses, we re-examined these independent effects, by considering them simultaneously to those of non-affect driven impulsivity, and the interactions between affect and non-affect driven impulsivity. In these models, the independent effects of child-affect-driven impulsivity remained significant over and above those of non-affect-driven impulsive traits (i.e., Deficit in Consciousness and Sensation Seeking) to predict parent-reported levels of externalizing behaviors (**models 3.3, in Tables 5.6, 5.7, 5.8**). However, new associations were found. Along with Urgency, Deficits in Consciousness predicted higher levels of ODD (*b*=.06, *SE*=.01, *p*=.000, 95% CI [.03,.09], **Table 5.6, model 3.3**). Along with Urgency, Deficits in Consciousness and Sensation Seeking predicted both higher levels of ADHD and CU traits. Importantly, Deficits in Consciousness appeared differentially associated with ADHD, in such that the magnitude of these effects was higher (*b*=.25, *SE*=.01, *p*=.000, 95% CI [.22, .28], **Table 5.7, model 3.3**), compared to those observed for CU traits (*b*=.03, *SE*=.01, *p*=.000, 95% CI [.05, .11], **Table 5.8, model 3.3**). Interactive effects were found between affect and non-affect-driven impulsivity traits to predict externalizing behaviors. Specifically, the associations of higher levels of Urgency with higher levels of ODD (*b*=.08, *SE*=.02, *p*=.000, 95% CI [.05, .12] and ADHD (*b*=.11, *SE*=.02, *p*=.000,

95% CI [.08, .15]), were amplified by higher levels of Deficits in Consciousness (**Tables 5.7 & 5.8, models 3.3, Figures 5.2A and 5.2B**).

Finally, we tried to replicate these cross-sectional findings in longitudinal analyses, by analyzing the prospective associations of child affect-driven impulsivity with parent-reported levels of ODD, ADHD and CU traits two years later **(Tables 5.9, 5.10, 5.11).** As before, in the more complex models, affect-driven impulsivity was significantly and independently associated with ODD (*b*=.05, *SE*=.02, *p*=.01, 95% CI [.01, .09], **Table 5.9, model 3.3**) and CU traits (*b*=.05, *SE*=.02, *p*=.04, 95% CI [.00, .09], **Table 5.11, model 3.3**). However, no significant associations with ADHD were found (*b*=.00, *SE*=.02, *p*=.87, 95% CI [-.04, .05], **Table 5.10, model 3.3**). Only non-affect driven impulsivity, Deficits in Consciousness (*b*=.08, *SE*=.02, *p*=.000, 95% CI [.04, .11],**)** and Sensation Seeking (*b*=.12, *SE*=.03, *p*=.000, 95% CI [.07, .18], predicted parent-reported levels of ADHD prospectively (**Table 5.10, model 3.3**). Thus, our cross-sectional results were not fully replicated longitudinally. Finally, no moderation effects between affect and non-affect-driven impulsivity were found to predict any of the disruptive behaviors examined.

5.4. DISCUSSION

Growing evidence supports the clinical and developmental relevance of emotion-based dispositions to rash action. These emotional forms of impulsivity are thought to represent a transdiagnostic liability implicated in processes giving raise to various forms internalizing and externalizing psychopathology (Berg et al., 2015; Carver et al., 2018; Johnson et al., 2013). Their study is, therefore, of paramount importance. The current work aimed to examine the antecedents and outcomes of affect-driven impulsivity in childhood, largely understudied in prior research. The findings discussed below, may have implications for our understanding of the phenomenology of affect-driven impulsivity in early phases of the development, underscoring the importance of this construct for future studies in developmental psychopathology research.

First, our results converge with those of previous studies in suggesting that a multifactorial and transactional approach is needed to examine the precursors of child's Urgency. That is, multiple factors (i.e., child characteristics, contextual risk) as well as the associations of these factors through moderation processes need to be considered to parse these relations (Cecil et al., 2012; Kiff et al., 2011; Olson et al., 1990; Rioux et al., 2018). Our analyses revealed strong independent effects of child's temperamental reactivity, harsh parenting practices and parents' levels of trait Neuroticism on levels of child affect-driven impulsivity. Overall, these findings are largely consistent with emerging literature which is starting to explore the antecedents of emotion-triggered impulsivity in childhood. Except for parental levels of trait Neuroticism whose predictive value, to our knowledge, has not been explored in any previous work, comparable associations can be found in the literature (Espeleta et al., 2018; Waddell e al., 2021; Wardell et al., 2016). Notably, interactive relations between child temperament and parent' behaviors and characteristics were also found.

We hypothesized that temperamental reactivity defined according to Rothbart's psychobiological model (i.e., Negative Affect and Surgency/Extraversion; Rothbart, 1989) would predict higher levels of affect-driven impulsivity. We found that these effects remained

significant over and above those of temperamental regulation (i.e., Effortful Control; Rothbart, 1989) with substantially stronger effect sizes. These findings suggesting the preponderance of the reactive aspects of temperament, over regulatory components to account for levels of affect-driven impulsivity. As noted, this finding is consistent with previous evidence from impulsivity and affect-driven impulsivity research with youth samples (Frick et al., 2018; Waddell et al., 2018). However, considering the larger conceptual and empirical literature, comparable effects and, perhaps more importantly, interactive contributions of reactive and regulative components would be expected, because implicit to any notion of impulsivity seems de idea of deficits or "failures" or disruptions in regulation processes (Nigg, 2017). We hypothesized that harsh parenting operationalized as the frequent use of physical and verbal punishment would predict higher levels of affect-driven impulsivity. We found that the effects of such a parenting style remained significant over and above those of child temperament factors. Contrary to prior research, we did not explicitly assess physical or verbal abuse (e.g., hitting the child so hard that an injury was caused; Espeleta et al., 2018) but what could be considered, instead, as milder, or more socially accepted forms of these parental behaviors (e.g., screaming at the child when he/she has done something wrong). Even so, this association still emerged. We hypothesized that high levels of parental trait Neuroticism would predict higher levels of child's affect-driven impulsivity. Our results support this hypothesis, but this association, is unsurprising. Personality traits, in general, and impulsivity, in particular, are heritable (Bevilacqua et al, 2013). Thus, *among* and *along with* others, there is a genetic pathway partially explaining why the offspring of impulsive parents would be expected to be more impulsive than their counterparts with less impulsive progenitors (Bezdjian et al., 2011). Since Neuroticism and Consciousness are personality traits related to Negative Urgency (Berg et al., 2015; Sharma et al., 2014; Whiteside & Lynam, 2001), investigating the relations of parental levels of trait Neuroticism with children's tendency to emotion-based rash action seems pertinent. Finally, we also hypothesized additive and interactive relations between child temperament and parent' behaviors and characteristics. We did find such a moderation effect, whereby lower levels of parent-reported use of punitive practices, amplified the effects of lower child regulation in predicting emotion-based impulsivity. However, the interpretation of this finding is problematic. For one thing, the main effects of temperamental regulation and punitive parenting practices were in the expected direction based on the existing literature: lower levels of child regulation and higher levels of punitive parenting practices predicted, independently, higher levels of child Urgency. For another, over and above those main effects, lower temperamental regulation predicted the highest levels of Urgency at lower levels of parental punitive strategies. So far, no similar findings have been reported in the literature. There is thus the possibility that such a significant interaction may be just a statistical artifact, which cannot be replicated with other data.

Second, according to our analyses, impulsive behaviors triggered by emotions are associated with higher levels of parent-reported ODD, ADHD and CU traits, concurrently, and higher levels of parent-reported ODD and CU traits, longitudinally. This finding partially replicates the results of Haas et al. (2017). Contrary to these authors, however, we used an overarching operationalization of affect-driven impulsivity encompassing expressions of both Negative and Positive Urgency, instead of Negative Urgency alone. Taken together, results from past literature and the current study appear to indicate that Negative Urgency operates as a

transdiagnostic factor for externalizing psychopathology (Settles et al., 2012; Smith et al., 2016; Wray et al., 2012). Nonetheless, we expand prior research by showing that an overall disposition to rash action in response to intense emotional states (i.e., Urgency), rather than Negative Urgency, *alone*, might be the underlying common liability for multiple externalizing behaviors.

Prior to this work, connections between emotional forms of impulsivity and externalizing behaviors linked to the "hot developmental pathway" to conduct problems (e.g., aggressive behaviors) had been reported in child literature (Marmorstein, 2013, Zapolski et al., 2013). Relatedly, burgeoning evidence has shown that emotional impulsivity is a central feature of ADHD beyond inattention, restlessness, and overall impulsiveness (Barkley et al., 2010; Kleberg et al., 2021; Morris et al., 2020; Walerius et al., 2018). Some of our findings are, thus, relatively easy to interpret. Nonetheless, since a) associations between CU traits and affect-driven impulsivity conceptualized according to the UPPS-P framework have been rarely examined (Haas et al., 2017 is an exception), b) the traditional prevailing view is that CU traits are defined by low levels of anxiety or neuroticism (Frick et al., 2014) and c) irritability and CU traits appear only moderately associated (Stringaris & Goodman, 2009b), others are more difficult to discuss. Even so, interpreting the association between general Urgency and CU traits becomes easier if some available evidence is also considered. First, primary and secondary variants of CU traits have been identified (Graig et al., 2021). That is, children with CU traits can be differentiated based on their hypoarousal (primary variant) and hyperarousal (secondary variant) to emotional cues, linked, respectively, to temperamental or environmental risk. Therefore, there is a group of children displaying high levels of CU behaviors who tend to experience negative emotions (e.g., anxiety) in response to emotional cues, and could be therefore more prone to act impulsively in such emotional state, considering the documented relation that we have just corroborated in this study between higher levels of reactivity and higher levels of Urgency. Second, moderate correlations between Positive Urgency and Sensation Seeking have been reported in the child literature (e.g., r=.35 in Watt's et al., sample of middle school aged children [2020] or r=.50 in Donati's et al., sample of adolescents [2021]). Sensation Seeking, in turn, has been associated with psychopathy in adult research and is thought to be determined, at least in part, by a high threshold for fear (i.e., high fearlessness; Berg et al., 2015). High fearlessness, at the same time, has been shown to be a precursor of CU traits in childhood (Waller & Wagner, 2019). Together, this evidence could help us to understand why an overall measure of Urgency comprising both Negative and Positive Urgency would account for higher levels of CU traits.

Finally, while considering affect-driven impulsivity as a transdiagnostic factor for childhood externalizing behaviors could help us in understanding what dispositional tendencies ODD, ADHD and CU traits may have in common, a key research goal is also to discover which other factors contribute to make them distinguishable. In this study, we tested whether non-affect driven impulsivity, by its interactions with affect-driven impulsivity, could contribute to this purpose. That is, if impulsive behaviors in which emotions are non that salient (i.e., Deficits in Consciousness, Sensation Seeking) moderate the effects of impulsive behaviors in which emotions are salient (i.e., Urgency), differentially for ODD, ADHD and CU traits. We did find interactive effects between affect and non-affect driven impulsivity, however, contrary to what was expected, they lacked specificity. Higher levels of Deficits in Consciousness amplified the

effects of high levels of Urgency for both ODD and ADHD, with effects of similar magnitude. One explanation for this lack of specificity is that broader trait dimensions were used in this study (i.e., Deficits in Consciousness instead of Lack of Premeditation and Lack of Perseverance). Arguably, a more fine-grained trait differentiation could have yielded a different pattern of associations. Contrary to our hypotheses, the independent effects of affect and non-affect-driven impulsivity, rather than their interaction, provided the most nuanced picture of ODD, ADHD and CU traits in both cross-sectional and longitudinal analyses.

In summary, we provide preliminary evidence on the antecedents and externalizing outcomes of emotion-based impulsivity in childhood, a trait-mechanism scarcely studied in early phases of the development. These findings can help to illuminate future venues for research, assessment, and intervention and a better understanding of the developmental pathways leading to early externalizing behaviors.

5.4.1. Strengths and Limitations

This study has some major strengths. One of our main contributions is to have expanded the analysis of the antecedents of affect-driven impulsivity beyond dispositional factors to contextual risk factors, by building upon pieces of recent evidence starring to accumulate (Espeleta et al., 2021; Wardell et al., 2016). Another significant contribution is that the UPPS-P model of impulsivity is examined in relation to Rothbart's psychobiological model of temperament (Rothbart, 1989). This is particularly important because in establishing the correlates of UPPS-P facets of impulsivity in childhood *temperament traits*, as defined in classical models of temperament, have been rarely connected (e.g., Geurten et al., 2018; Watts, Smith et al., 2020; Zapolski et al., 2010; Zapolski et al., 2013). Yet, since temperament during childhood is thought to be the antecedent of later personality, an examination of these associations seems warranted.

At the same time the results of this work should be interpreted in light of several limitations. First and foremost, the key constructs in this study, affect and non-affect driven impulsivity, were measured via a parent-reported short version of the UPPS-P scale adapted and validated within the context of the ELISA Project (see **Chapter 4**). Although our findings suggested that impulsivity traits can be reliably and validly assessed through an abbreviated form of the UPPS-P scale using parents as informants of child temperament/personality, a soundest alternative would have been to have used a validated measure. Since no instrument was available for our study purposes (i.e., abbreviated form, in Spanish for children < 8 of age) this was not possible. Second, despite grounded in recent evidence (Billieux et al., 2021; Goh et al., 2020), the decision to use a single construct to operationalize affect-driven impulsivity, has its downsides. A distinction between Positive and Negative Urgency, could have certainly increased measurement sensitivity and predictive utility. Third, we used a community sample. As our study focused on the developmental precursors of impulsivity in non-referred children, our findings might be not generalizable to clinical samples. Relatedly, participating families were primarily middle-class, and therefore our findings may not generalize to families experiencing high levels of economic hardship and other associated risks which has been specifically associated to impulsivity (King et al., 2013) and affect-driven impulsivity (Assari, 2021).

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5.4.2. Future Research

Future research can build upon these limitations. First, it should be tested if the results presented above are overall replicable using separate operationalizations of affect-driven impulsivity (i.e., Negative and Positive Urgency) or, on the contrary, adopting a broader conceptualization, as in this study, implicates the significant loss of measurement sensitivity. Second, mechanisms underlying trait affect and non-affect-driven impulsivity should be better elucidated, for example, by using lab and psychophysiological methods to identify their behavioral and neurocognitive correlates (Johnson et al., 2020). Finally, in expanding this work, future studies should advance towards specifying a developmental model of Urgency starting in the preschool years.

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Table 5.1. Temperament traits or dispositional constructs conceptually related to emotion-based impulsivity

Domain	Trait	Definition		Examples of measures
Affective	*Reactivity*	Emotional, motor, and attentional reactivity measured by latency, intensity and recovery of response	Rothbart, & Bates, 2006	The Children's Behavior Questionnaire (Rothbart et al., 2001)
	Emotionality	The tendency to be aroused easily and intensely, expressed in a primordial emotion identified as distress	Buss & Plomin, 1984	The EAS Temperament Survey for Children (Buss & Plomin, 1984)
	Negative/positive affectivity	Affect systems which are manifested as general biobehavioral systems of withdrawal- approach, respectively	Clark, & Watson, 1999	The Positive and Negative Affect Schedule for Children (Laurent et al., 1999)
	Irritability	Excessive reactivity to negative emotional stimuli. An affective (i.e., anger) and behavioral (i.e., aggression) component.	Leibenluft, & Stoddard, 2013	The Affective Reactivity Index (Stringaris et al., 2012)
Regulatory	*Self-regulation*	Processes such as effortful control that modulate reactivity	Rothbart, & Bates, 2006	The Children's Behavior Questionnaire (Rothbart et al., 2001)
	Emotion-related self-regulation	Processes used to manage and change if, when, and how (e.g., how intensely) one experiences emotions and emotion-related motivational and physiological states, as well as how emotions are expressed behaviorally	Eisenberg et al., 2010	The Children's Behavior Questionnaire (Rothbart et al., 2001)

Table 5.2. Descriptive Statistics and bivariate correlations among the study variables

	M or % (*SD*)	1.	2.	3.	4.	5.	6.	.7	.8	.9	.10	.11	.12	.13	.14	.15	.16	.17
1. Sex *(T1)*	48.8 % (girls)	-																
2. Age *(T1)*	5.34 (.92)	.03	-															
3. SES *(T1)*	-.002 (.71)	-.03	-.06*	-														
4. Reactivity *(T1)*	4.30 (.63)	.00	.00	-.13***	-				.									
5. Regulation *(T1)*	5.11 (.77)	.26***	-.01	-.09***	.10***	-												
6. Punitive *(T1)*	1.74 (.43)	-.02	-.01	-.07***	.19***	-.11***	-											
7. Neuroticism *(T2)*	2.99 (.79)	.02	-.01	-.13***	.18***	-.02	.27***	-										
8. Urgency *(T2)*	2.37 (.65)	-.1***	-.01	-.08**	33***	-.09***	.30***	.22***	-									
9. DCONS *(T2)*	2.14 (.58)	-.13***	-.09*	-.11***	.20***	-.36***	.22***	.18***	.41***	-								
10. SS *(T2)*	2.29 (.67)	-.03	-.06*	-.10***	.37***	.02	.16***	.11***	.43***	.23***	-							
11. Arousal *(T2)*	2.93 (.83)	.02	-.04	-.07***	.32***	-.02	.24***	.27***	.52***	.29***	.16***	-						
12. ODD *(T2)*	.56 (.40)	-.1***	-.04	-.12***	.36***	-.11***	.33***	.25***	.54***	.39***	.28***	.58***	-					
13. ADHD *(T2)*	.52 (.42)	.14***	-.03	-.20***	.34***	-.23***	.24***	.25***	.49***	.62***	.34***	.41***	.56***	-				
14. CU traits *(T2)*	1.32 (.42)	-.1***	-.03	-.10***	.13***	-.17***	.23***	.11***	.31***	.28***	.21***	.23***	.41***	.35***	-		.	
15. ODD *(T3)*	.27 (.29)	-.09*	-.04	-.10***	.28***	-.15***	.26***	.15***	.41***	.36***	.22***	.39***	.53***	.44***	.32***	-		
16. ADHD *(T3)*	.70 (.50)	.16***	-.04	-.11***	.33***	-.24***	.21***	.19***	.41***	.54***	.33***	.30***	.40***	.69***	28***	.53***	-	
17.CU traits *(T3)*	1.23 (.36)	.11***	.01	-.11***	.11***	-.13***	.19***	.09*	.27***	.24***	.19***	.16***	.27***	.26***	.59***	.44***	.30***	-

Note. p<.05*, p<.01**, p<.001***. *M* and *SD*: Descriptive statistics for mean subscale scores; DCONS= Deficits in Consciousness (a composite of the Lack of Premeditation and Lack of Perseverance UPPS-P subscales); SS= Sensation Seeking; ODD= Oppositional Defiant Disorder; ADHD= Attention-deficit/hyperactivity disorder; CU traits= Callous Unemotional traits.

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Table 5.3. Longitudinal associations between reactive and regulatory components of temperament and later levels of Urgency

	Dependent Variable is parent-reported Affect-Driven Impulsivity: Urgency (T2)											
	(1) Reactivity Only				**(2) Regulation Only**				**(3) Reactivity x Regulation**			
Predictors (T1)	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.14	.03	(-.15, -.06)	.00	-.11	.03	(-.17, -.04)	.00	-.10	.03	(-.16, -.04)	.00
Age	-.02	.02	(-.06, .03)	.44	-.02	.02	(-.06, .02)	.33	-.01	.02	(-.05, .02)	.36
SES	-.04	.02	(-.09, .01)	.09	-.09	.02	(-.13, -.04)	.00	-.04	.02	(-.09, .00)	.04
Temperament												
Reactivity	.35	.02	(.29, .38)	.00	-	-	-	-	.36	.02	(.31, .40)	.00
Regulation	-	-	-	-	-.07	.02	(-.12, -.02)	.00	-.09	.02	(-.13, -.05)	.00
Reactivity x Regulation	-	-	-	-	-	-	-	-	.01	.03	(-.05, -07)	.71
R^2	.13***				.08**				.15***			

Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval

Table 5.4. Longitudinal associations between temperament, harsh parenting practices and later levels of Urgency

	Dependent Variable is parent-reported Affect-Driven Impulsivity: Urgency (T2)															
	(1) Parenting Only				**(2) Temperament x Parenting**											
					(2.1) Reactivity Only				**(2.2) Regulation Only**				**(2.3) Reactivity x Regulation**			
Predictors (T1)	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.10	.03	(-.16, -.04)	.00	-.13	.03	(-.19, -.07)	.00	-.11	.03	(-.17, -.05)	.00	-.09	.03	(-.15, -.03)	.00
Age	-.01	.02	(-.04, .02)	.37	-.01	.02	(-.04, .02)	.43	-.01	.02	(-.05, .02)	.36	-.01	.02	(-.04, .02)	.57
SES	-.03	.02	(-.07, .01)	.18	-.02	.02	(-.07, .02)	.28	-.06	.02	(-.11, -.02)	.00	-.03	.02	(-.08, .01)	.14
Temperament																
Reactivity	.32	.02	(.27, .36)	.00	.31	.02	(.26, .35)	.00	-	-	-	-	.32	.02	(.27, .37)	.00
Regulation	-.07	.02	(-.11, -.03)	.00	-	-	-	-	-.04	.02	(-.08, .00)	.04	-.08	.02	(-.12, -.03)	.00
Rea x Reg	.02	.03	(-.04, .07)	.58	-	-	-	-	-	-	-	-	-.01	.03	(-.06, .06)	.94
Parenting																
Punitive	.35	.04	(.28,c.42)	.00	.36	.03	(.29, .43)	.00	.43	.04	(.36, .50)	.00	.35	.03	(.28, .42)	.00
Tem x Par																
Rea x Pun	-	-	-	-	.03	.05	(-.07, .14)	.53	-	-	-	-	.00	.05	(-.11, .11)	.99
Reg x Pun	-	-	-	-	-	-	-	-	.15	.04	(.06, .23)	.00	.15	.04	(.06, .29)	.00
Rea x Reg x Pun	-	-	-	-	-	-	-	-	-	-	-	-	.05	.07	(-.08, .18)	.45
R^2	.17***				.16***				.11***				.18***			

Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval; Rea= Reactivity; Reg= Regulation; Pun= Punitive parenting practices

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Table 5. 5. Cross-sectional associations between temperament, parental levels of trait Neuroticism and later levels of Urgency

	Dependent Variable is parent-reported affect-driven Impulsivity: Urgency (T2)															
	(1) Parent Personality Only				**(2) Temperament x Parent Personality**											
					(2.1) Reactivity Only				**(2.2) Regulation Only**				**(2.3) Reactivity x Regulation**			
Predictors	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.10	.03	(-.16, -.04)	.00	-.14	.03	(-.20, -.08)	.00	-.11	.03	(-.17, -.05)	.00	-.10	.03	(-.16, -.05)	.00
Age	-.02	.02	(-.05, .01)	.33	-.02	.02	(-.05, .02)	.33	-.02	.02	(-.05, .01)	.27	-.02	.02	(-.05, .01)	.24
SES	-.03	.02	(-.07, .02)	.24	-.02	.02	(-.06, .03)	.43	-.06	.02	(-.10, -.01)	.01	-.02	.02	(-.07, .02)	.27
Temperament (T1)																
Reactivity	.33	.02	(.28, .38)	.00	.32	.02	(.27, .37)	.00	-	-	-	-	.33	.02	(.29, .38)	.00
Regulation	-.09	.02	(-.13, -.05)	.00	-	-	-	-	-.06	.02	(-.10, .02)	.00	-.08	.02	(-.12, -.04)	.00
Rea x Reg	.02	.02	(-.04, .08)	.56	-	-	-	-	-	-	-	-	.00	.03	(-.06, .06)	.96
Parent Person (T1)																
Neuroticism	.14	.02	(.10, .18)	.00	.14	.02	(.10, .18)	.00	.18	.02	(.14, .22)	.00	.14	.02	(.10, .18)	.00
Tem x Par Per (T1)																
Rea x Neu	-	-	-	-	.07	.03	(.01, .13)	.03	-	-	-	-	.05	.03	(.00, .11)	.07
Reg x Neu	-	-	-	-	-	-	-	-	.03	.03	(-.03, .09)	.28	.03	.03	(-.02, .08)	.28
Rea x Reg x Neu	-	-	-	-	-	-	-	-	-	-	-	-	-.03	.04	(-.11, .04)	.38
R^2	.16***				.15***				.08***				.16***			

Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval; Rea= Reactivity; Reg= Regulation; Neu= Neuroticism (parental trait)

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Table 5.6. Cross-sectional associations between affect, non-affect driven impulsivity and their interactions and levels of oppositional and defiant behaviors

	Dependent Variable is parent-reported ODD (T2)																			
	(1) Affect-driven Impulsivity Only				**(2) Non-affect-driven Impulsivity Only**				**(3) Affect x Non-affect- driven Impulsivity**											
									(3.1) DCONS Only				**(3.2.) SS Only**				**(3.3) DCONS and SS**			
Predictors	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.06	.01	(-.08, -.03)	.00	-.06	.01	(-.09, -.03)	.00	-.05	.01	(-.05, -.05)	.00	-.06	.01	(-.08, -.03)	.00	-.05	.01	(-.08, -.02)	.00
Age	.00	.01	(-.01, .02)	.66	.00	.01	(-.01, .02)	.51	.00	.01	(-.01, .02)	.49	.00	.01	(-.01, .02)	.59	.00	.01	(-.01, .02)	.45
SES	-.02	.01	(-.04, .00)	.06	-.02	.01	(-.04, .00)	.05	-.01	.01	(-.03, .00)	.13	-.02	.01	(-.04, .00)	.11	-.01	.01	(-.03, .01)	.20
Externalizing (T1)																				
ODD	.41	.02	(.37, .46)	.00	.39	.02	(.35, .44)	.00	.40	02.	(.36, .44)	.00	.41	.02	(.37, .45)	.00	.39	.02	(.35, .44)	.00
Arousal (T2)																				
Emotionality	.15	.01	(.13, .17)	.00	.15	.01	(.13, .17)	.00	.14	.01	(.12, .16)	.00	.15	.01	(.13, .17)	.00	.14	.01	(.12, .16)	.00
Affect-driven Impulsivity (T2)																				
URG	.12	.01	(.09, .14)	.00	-	-	-	-	.10	.01	(.08, .13)	.00	.11	.01	(.08, .13)	.00	.10	.01	(.07, .12)	.00
Non-affect-driven Impulsivity (T2)																				
DCONS	-	-	-	-	.07	.01	(.04, .09)	.00	.06	.01	(.04, .09)	.00	-	-	-	-	.06	.01	(.03, .09)	.00
SS	-	-	-	-	.02	.01	(.00, .04)	.00	-	-	-	-	.02	.01	(.00, .04)	.09	.02	.01	(.00, .04)	.12
Interactive Effects (T2)																				
URGxDCONS	-	-	-	-	-	-	-	-	.09	.02	(.06, .12)	.00	-	-	-	-	.08	.02	(.05, .12)	.00
URGxSS	-	-	-	-	-	-	-	-	-	-	-	-	.04	.02	(.01, .07)	.02	.02	.02	(-.02, .05)	.31
UxDCONxSS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.00	.02	(-.05, .05)	.99
R^2	.42***				.38***				.42***				.42***				.41***			

Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval; ODD= Oppositional Defiant Behavior; URG= Urgency; DCONS= Deficits in Consciousness (a composite of the Lack of Premeditation and Lack of Perseverance UPPS-P subscales); SS= Sensation Seeking

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Table 5.7. Cross-sectional associations between affect, non-affect driven impulsivity and their interactions and levels of inattentive and hyperactive/impulsive behaviors

	Dependent Variable is parent-reported ADHD (T2)																			
	(1) Affect-driven Impulsivity Only				**(2) Non-affect-driven Impulsivity Only**				**(3) Affect x Non-affect- driven Impulsivity**											
									(3.1) DCONS Only				**(3.2.) SS Only**				**(3.3) DCONS and SS**			
Predictors	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.07	.01	(-.09, -.04)	.00	-.06	.01	(-.08, -.03)	.00	-.05	.01	(-.07, -.02)	.00	-.07	.01	(-.10, -.04)	.00	-.05	.01	(-.07, -.02)	.00
Age	.00	.01	(-.01, .02)	.69	.01	.01	(.00, .03)	.05	.01	.01	(.00, .02)	.20	.01	.01	(-.01, .02)	.45	.01	.01	(.00, .02)	.11
SES	-.05	.01	(-.07, -.03)	.00	-.04	.01	(-.06, .02)	.00	-.04	.01	(-.06, -.02)	.00	-.05	.01	(-.07, -.03)	.00	-.04	.01	(-.06, -.02)	.00
Externalizing (T1)																				
ADHD	.49	.02	(.45, .53)	.00	.38	.02	(.35, .42)	.00	.39	.02	(.34, .41)	.00	.47	.02	(.44, .51)	.00	.37	.02	(.33, .40)	.00
Arousal (T2)																				
Emotionality	.06	.01	(.04, .08)	.00	.07	.01	(.05, .09)	.00	.05	.01	(.03, .07)	.00	.07	.01	(.05, .09)	.00	.05	.01	(.03, .07)	.00
Affect-driven Impulsivity (T2)																				
URG	.13	.01	(.10, .15)	.00	-	-	-	-	.09	.01	(06., .11)	.00	.10	.01	(.07, .13)	.00	.07	.01	(.04, .09)	.00
Non-affect-driven Impulsivity (T2)																				
DCONS	-	-	-	-	.26	.01.	(.23, .29)	.00	.24	.01	(.22, .27)	.00	-	-	-	-	.25	.01	(.22, .28)	.00
SS	-	-	-	-	.07	.01.	(.05, .09)	.00	-	-	-	-	.06	.01	(.03, .08)	.00	.06	.01	(.03, .08)	.00
Interactive Effects (T2)																				
URGxDCON	-	-	-	-	-	-	-	-	.12	.01	(.09, .15)	.00	-	-	-	-	.11	.02	(.08, .15)	.00
URGxSS	-	-	-	-	-	-	-	-	-	-	-	-	.03	.02	(.00, .06)	.07	.01	.01	(-.02, .04)	.45
UxDCONxSS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.03	.02	(-.08, .01)	.09
R^2			.44***				.49***				.49***				.44***				.50***	

Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval; ADHD= Attention-deficit hyperactivity disorder; URG= Urgency; DCONS= Deficits in Consciousness (a composite of the Lack of Premeditation and Lack of Perseverance UPPS-P subscales); SS= Sensation Seeking

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Table 5.8. Cross-sectional associations between affect, non-affect driven impulsivity and their interactions and levels of inattentive and callous unemotional traits

	Dependent Variable is parent-reported CU traits (T2)																			
	(1) Affect-driven Impulsivity Only				**(2) Non-affect-driven Impulsivity Only**				**(3) Affect x Non-affect- driven Impulsivity**											
									(3.1) DCONS Only				**(3.2.) SS Only**				**(3.3) DCONS and SS**			
Predictors	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.05	.02	(-.08, -.01)	.00	-.04	.02	(-.07, -.01)	.01	-.04	.02	(-.07, -.01)	.01	-.05	.02	(-.08, -.02)	.00	-.04	.01	(-.07, -.01)	.01
Age	.00	.01	(-.01, .02)	.89	.00	.01	(-.01, .02)	.53	.00	.01	(-.01, .02)	.70	.00	.01	(-.01, .02)	.76	.00	.01	(-.01, .02)	.65
SES	-.02	.01	(-.04, .00)	.07	-.01	.01	(-.04, .01)	.22	-.02	.01	(-.04, .01)	.17	-.02	.01	(-.04, .00)	.09	-.01	.01	(-.04, .01)	.22
Externalizing (T1)																				
CU traits	.53	.03	(.47, .58)	.00	.52	.03	(.47, .58)	.00	.52	.03	(.46, .57)	.00	.52	.03	(.47, .58)	.00	.51	.03	(.46, .57)	.00
Arousal (T2)																				
Emotionality	.04	.01	(.02, .07)	.00	.05	.01	(.03, .07)	.00	.04	.01	(.01, .06)	.00	.05	.01	(.02, .07)	.00	.04	.01	(.01, .06)	.00
Affect-driven Impulsivity (T2)																				
URG	.06	.01	(.04, .09)	.00	-	-	-	-	.05	.01	(.02, .08)	.00	.05	.02	(.02, .08)	.00	.08	.02	(.01, .07)	.01
Non-affect-driven Impulsivity (T2)																				
DCONS	-	-	-	-	.08	.02	(.04, .11)	.00	.07	.02	(.04, .10)	.00	-	-	-	-	.03	.01	(.05, .11)	.00
SS	-	-	-	-	.03	.01	(.01, .06)	.01	-	-	-	-	.03	.01	(.00, .05)	.04	.01	.02	(.00, .06)	.02
Interactive Effects (T2)																				
URGxDCON	-	-	-	-	-	-	-	-	.01	.02	(-.03, .06)	.56	-	-	-	-	.01	.02	(-.03, .06)	.57
URGxSS	-	-	-	-	-	-	-	-	-	-	-	-	.00	.02	(-.04, .04)	.86	.01	.02	(-.03, .05)	.65
UxDCONxSS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.06	.04	(-.13, .01)	.11
R^2	.38***				.39***				.38***				.38***				.38***			

Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval; CU traits= Callous Unemotional Traits; URG= Urgency; DCONS= Deficits in Consciousness (a composite of the Lack of Premeditation and Lack of Perseverance UPPS-P subscales); SS= Sensation Seeking

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Table 5.9. Longitudinal associations between affect, non-affect driven impulsivity and their interactions and levels of oppositional and defiant behaviors

	Dependent Variable is parent-reported ODD (T3, two years later)																			
	(1) Affect-driven Impulsivity Only				**(2) Non-affect-driven Impulsivity Only**				**(3) Affect x Non-affect- driven Impulsivity**											
									(3.1) DCONS Only				**(3.2.) SS Only**				**(3.3) DCONS and SS**			
Predictors	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.02	.01	(-.05, .00)	.11	-.02	.01	(-.05, .00)	.10	-.02	.01	(-.05, .01)	.22	-.03	.01	(-.05, .03)	.08	-.02	.01	(-.05, .01)	.19
Age	.00	.01	(-.02, .01)	.80	.00	.01	(-.02, .01)	.89	.00	.01	(-.02, .01)	.83	.00	.01	(-.02, .01)	.79	.00	.01	(-.02, .01)	.82
SES	-.02	.01	(-.04, .00)	.05	-.02	.01	(-.04, .00)	.05	-.02	.01	(-.04, .00)	.07	-.02	.01	(-.04, .00)	.06	-.02	.01	(-.04, .00)	.08
Externalizing (T1)																				
ODD	.28	.03	(.22, .37)	.00	.26	.03	(.20, .32)	.00	.25	.03	(.19, .31)	.00	.27	.03	(.21, .33)	.00	.25	.03	(.19, .31)	.00
Arousal (T2)																				
Emotionality	.04	.01	(.02, .06)	.00	.04	.01	(.02, .06)	.00	.04	.01	(.01, .06)	.00	.04	.01	(.02, .06)	.00	.04	.01	(.01, .06)	.00
Affect-driven Impulsivity (T2)																				
URG	.06	.02	(.03, .09)	.00	-	-	-	-	.05	.02	(.02, .09)	.00	.06	.02	(.03, .10)	.00	.05	.02	(.01, .09)	.01
Non-affect-driven Impulsivity (T2)																				
DCONS	-	-	-	-	.07	.02	(.04, .10)	.00	.07	.02	(.03, .10)	.00	-	-	-	-	.07	.02	(.03, .10)	.00
SS	-	-	-	-	.01	.01	(-.02, .03)	.67	-	-	-	-	.00	.01	(-.02,.03)	.68	.00	.01	(-.02, .03)	.77
Interactive Effects (T2)																				
URGxDCON	-	-	-	-	-	-	-	-	.05	.02	(.01, .09)	.01	-	-	-	-	.04	.02	(.00, .09)	.07
URGxSS	-	-	-	-	-	-	-	-	-	-	-	-	.03	.02	(-.01,.07)	.13	.02	.02	(-.02, .06)	.29
UxDCONxSS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.01	.03	(-.07, .06)	.84
R^2	.23***				.21***				.22***				.23***				.22***			

Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval; ODD= Oppositional Defiant Behavior; URG= Urgency; DCONS= Deficits in Consciousness (a composite of the Lack of Premeditation and Lack of Perseverance UPPS-P subscales); SS= Sensation Seeking

Table 5.10. Longitudinal associations between affect, non-affect driven impulsivity and their interactions and levels of inattentive and hyperactive/impulsive behaviors

	Dependent Variable is parent-reported ADHD (T3, two years later)																			
	(1) Affect-driven Impulsivity Only				**(2) Non-affect-driven Impulsivity Only**				**(3) Affect x Non-affect- driven Impulsivity**											
									(3.1) DCONS Only				**(3.2.) SS Only**				**(3.3) DCONS and SS**			
Predictors	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.07	.02	(-.12, -.03)	.00	-.07	.02	(-.11, -.03)	.00	-.06	.02	(-.10 -.02)	.00	-.07	.02	(-.12, -.03)	.00	-.07	.02	(-.11, -.02)	.00
Age	.00	.01	(-.03, .02)	.72	.00	.01	(-.02, .03)	.90	.00	.01	(-.02, .02)	.94	.00	.01	(-.02, .02)	.99	.00	.01	(-.02, .03)	.82
SES	.00	.02	(-.04, .03)	.77	.00	.02	(-.03, .03)	.88	.00	.02	(-.03, .03)	.91	.00	.02	(-.04, .03)	.78	.00	.02	(-.03, .03)	.93
Externalizing (T1)																				
ADHD	.77	.03	(.71, .84)	.00	.66	.04	(.59, .74)	.00	.70	.04	(.62, .78)	.00	.76	.03	(.69, .83)	.00	.68	.04	(.60, .76)	.00
Arousal (T2)																				
Emotionality	.00	.02	(-.03, .03)	.96	.01	.01	(-.01, .04)	.33	.00	.02	(-.03, .03)	.91	.01	.02	(-.02, .04)	.53	.01	.02	(-.02,.04)	.52
Affect-driven Impulsivity (T2)																				
URG	.07	.02	(.02, .11)	.00	-	-	-	-	.04	.02	(.00, .08)	.07	.02	.02	(-.02, .07)	.29	.00	.02	(-.04, .05)	.87
Non-affect-driven Impulsivity (T2)																				
DCONS	-	-	-	-	.13	.03	(.08, .19)	.00	.13	.03	(.07, .18)	.00	-	-	-	-	.08	.02	(.04, .11)	.00
SS	-	-	-	-	.08	.02	(.04, .12)	.00	-	-	-	-	.08	.02	(.04, .12)	.00	.12	.03	(.07, .18)	.00
Interactive Effects (T2)																				
URGxDCON	-	-	-	-	-	-	-	-	-.07	.03	(-.13, -.02)	.01	-	-	-	-	-.06	.03	(-.12, .00)	.07
URGxSS	-	-	-	-	-	-	-	-	-	-	-	-	-.06	.03	(-.11, -.01)	.03	-.03	.03	(-.09, .02)	.24
UxDCONxSS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.01	.05	(-.08, .10)	.78
R^2	.48***				.44***				.45***				.48***				.45***			

Note: Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval; ADHD= Attention-deficit hyperactivity disorder; URG= Urgency; DCONS= Deficits in Consciousness (a composite of the Lack of Premeditation and Lack of Perseverance UPPS-P subscales); SS= Sensation Seeking

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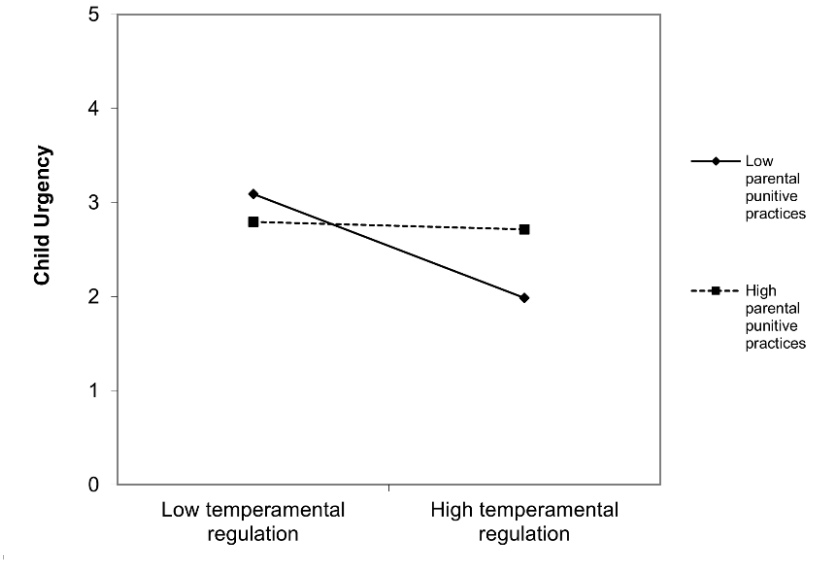
Table 5.11. Longitudinal associations between affect, non-affect driven impulsivity and their interactions and levels of inattentive and callous unemotional traits

	Dependent Variable is parent-reported CU traits (T3, two years later)																			
	(1) Affect-driven Impulsivity Only				**(2) Non-affect-driven Impulsivity Only**				**(3) Affect x Non-affect- driven Impulsivity**											
									(3.1) DCONS Only				**(3.2.) SS Only**				**(3.3) DCONS and SS**			
Predictors	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***	**B**	**SE**	**95% CI**	***p***
Sex	-.04	.02	(-.07,.00)	.03	-.04	.02	(-.07, .00)	.03	-.03	.02	(-.07, .00)	.05	-.04	.02	(-.07, .00)	.03	-.03	.02	(-.07, .00)	.05
Age	.00	.01	(-.01, .02)	.58	.01	.01	(-.01, .01)	.46	.01	.01	(-.01, .02)	.53	.01	.01	(-.01, .03)	.51	.01	.01	(-.01, .03)	.49
SES	-.02	.01	(-.05, .01)	.14	-.02	.01	(-.05, .01)	.18	-.02	.01	(-.05, .01)	.16	-.02	.01	(-.05, .01)	.14	-.02	.01	(-.05, .01)	.15
Externalizing (T1)																				
CU traits	.47	.04	(.40, .55)	.00	.47	.04	(.39, .54)	.00	.46	.04	(.39, .54)	.00	.47	.04	(.39, .54)	.00	.46	.04	(.39, .54)	.00
Arousal (T2)																				
Emotionality	.00	.01	(-.02, .03)	.90	.01	.01	(-.01, .04)	.18	.00	.01	(-.03, .02)	.96	.00	.01	(-.02, .03)	.81	.00	.01	(-.02,.03)	.96
Affect-driven Impulsivity (T2)																				
URG	.06	.02	(.02, .10)	.00	-	-	-	-	.05	.02	(.01, .09)	.01	.05	.02	(.01, .10)	.01	.05	.02	(.00, .09)	.04
Non-affect-driven Impulsivity (T2)																				
DCONS	-	-	-	-	.04	.02	(.01, .07)	.01	.03	.02	(.00, .07)	.05	-	-	-	-	.03	.02	(.00, .07)	.06
SS	-	-	-	-	.03	.01	(.00, .05)	.04	-	-	-	-	.02	.01	(-.01, .05)	.23	.02	.01	(-.01,.04)	.25
Interactive Effects (T2)																				
URGxDCON	-	-	-	-	-	-	-	-	.00	.02	(-.05, .05)	.95	-	-	-	-	.01	.03	(-.04, .06)	.78
URGxSS	-	-	-	-	-	-	-	-	-	-	-	-	-.02	.02	(-.06, .02)	.42	-.02	.02	(-.06, .03)	.44
UxDCONxSS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-.01	.03	(-.07, .04)	.66
R^2	.34***				.34***				.34***				.34***				.34***			

Note: *p<.05; **p<.001; ****p<.000. CI= Confident Interval; CU traits= Callous Unemotional Traits; URG= Urgency; DCONS= Deficits in Consciousness (a composite of the Lack of Premeditation and Lack of Perseverance UPPS-P subscales); SS= Sensation Seeking

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Figure 5.1. Interactive effects between child and parent characteristics at T1 to predict levels of child affect-driven impulsivity at T2 *(longitudinal associations)*

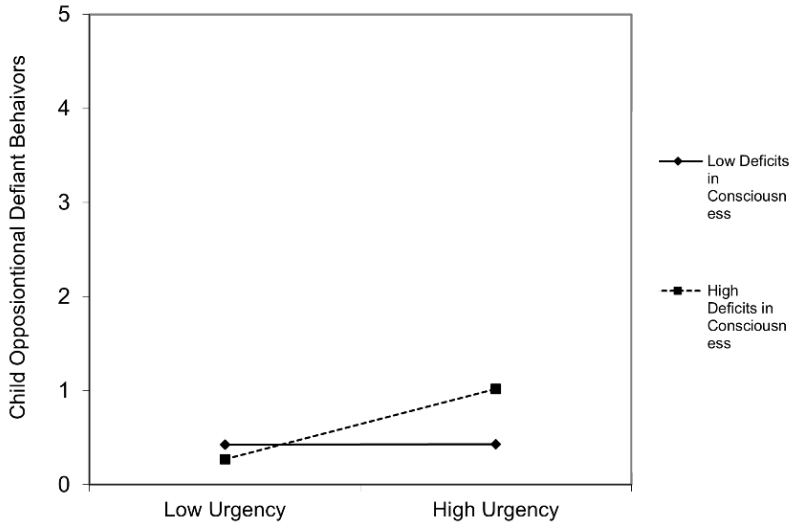


Note. Lower temperamental regulation was related to higher levels of Urgency when parents report a less frequent use of punitive strategies

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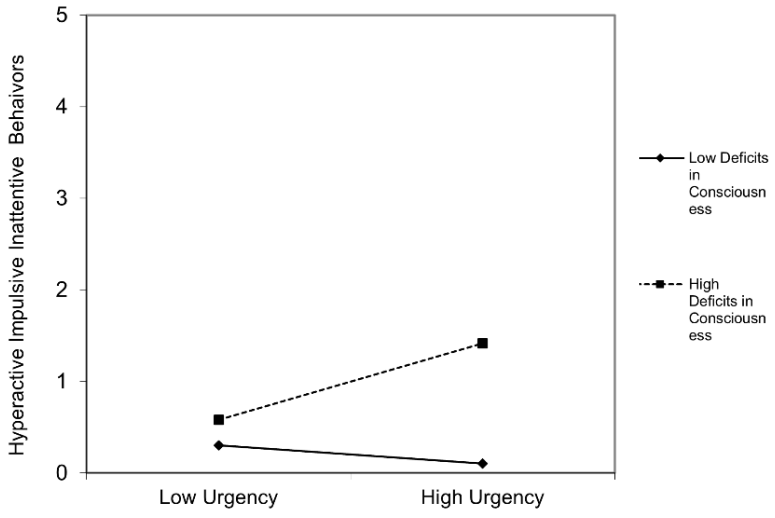
Figure 5.2. Interactive effects between affect and non-affect-driven impulsivity to predict externalizing behaviors at T2 *(cross-sectional associations)*

(A) Outcome variable: *ODD*



Note. Beyond the main effects of affect-driven impulsivity, higher levels of Urgency predicted higher levels of child oppositional and defiant behaviors at higher levels of parent-reported Deficits in Consciousness

(B) Outcome variable: *ADHD*



Note. Beyond the main effects of affect-driven impulsivity, higher levels of child Urgency predicted higher levels of child inattention, hyperactivity and impulsivity behaviors at higher levels of parent-reported Deficits in Consciousness

Summary of this Study (Chapter Five)

- Emotion triggered impulsivity refers to the proneness to act rashly when experiencing intense or extreme emotional states of both negative or positive valence (e.g., anger or joy).

- Affect-driven impulsivity, defined in terms of the UPPS-P model (i.e., Urgency, Cyders & Smith, 2007; Whiteside & Lynam, 2001), has been associated to multiple externalizing behaviors. However, little is known about its antecedents and outcomes in early childhood.

- In this study, we aimed to address this gap in literature.

- We provide evidence on:

    1. The associations of child temperament, harsh parenting practices and parent's personality with child's levels affect-driven impulsivity early in the development.

    2. The associations of affect-driven impulsivity with an array of distinguishable externalizing behaviors both concurrently (i.e., ODD, ADHD, CU traits) and prospectively (i.e., ODD, CU traits).

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6 CHAPTER SIX
CONCLUDING REMARKS

6.1. Summary and Discussion of Findings

In this dissertation we analyzed the heterogeneity of DB in the preschool years, focusing, specifically, on the phenotypic and etiological variability that characterizes the externalizing spectrum. The empirical work of this thesis was articulated upon data-driven, structural models of psychopathology and temperament theory and research. Our hypotheses were tested using a large sample of preschoolers from Galicia in north-west Spain, a longitudinal design, multiple informants, and robust statistical methods. Here, we will try to summarize and discuss the main findings of the thesis as integrally as possible. In previous chapters, results of each study have been already presented and analyzed in detail.

The **first study** examined the heterogeneity of the presentations of DB. By applying Structural Equation Modelling (SEM) analyses, we obtained a well-fitting hierarchical model in which both first and second order factors were specified. This hierarchical solution established, at the higher order level, a supraordinate externalizing factor, which is broader and *heterogeneous in nature* because it comprises the aggregated variance of ODD, ADHD and CU traits. At the lower order level, the model is defined by subordinate subfactors, each of which is, respect itself, a *homogeneous construct* and, by definition, a narrower, more specific domain. In further analyses we found that this structural configuration was replicable using different operationalizations of CU traits, apparently indicating a meaningful and non-random covariation pattern. Since CU traits have been largely understudied in prior and contemporary structural research, their inclusion in the present investigation is, per se, a novel contribution, most notably, because we also obtained a similar pattern of findings with different measures of CU traits. Although we are showing how the externalizing construct may serve to reflect the shared variance among ODD, ADHD, and CU traits, we are not claiming that ODD, ADHD, and CU traits are in fact the same thing. Prior research has shown that they are correlated but distinct constructs, which can be discerned empirically and clinically (Aebi et al., 2013; Kolko & Pardini, 2010; Waschbusch et al., 2004). In fact, their distinctiveness and similarities have already been modeled statistically, in earlier studies, using correlated factor models (Willoughby et al., 2011; Willoughby et al., 2014), and have been articulated, conceptually, through the cold and hot pathways to early externalizing problems (Waller et al., 2015). Our findings do not contradict these notions. Rather, they may help to expand such valuable heuristics by indicating that an additional, less differentiated pathway is similarly feasible. Despite the fact that the externalizing construct is certainly *not* a novel contribution (Achenbach, 1966; Achenbach, 2020; Achenbach & Edelbrock, 1978), what is new about our

study is the particular set (s) of items that we used to estimate the CU traits specific factor, accounting for variance within the broader externalizing factor (see methods 1, 2, 3 in **Chapter Two**). To date, most evidence from similar studies comes from using five items selected ad hoc from the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) which are intended to serve as behavioral indicators of CU traits. Nonetheless, reports on the reliability of this 5-item measure are, overall, lacking (e.g., Willoughby et al., 2011; Willoughby et al., 2014). Thus, our decision to use seemingly more reliable, and valid measures to operationalize the CU traits factor (e.g., The Child Problematic Traits Inventory, CPTI, Colins et al., 2014) seems warranted. However, because of this decision, the meaning of the externalizing factor we have extracted in this study might diverge slightly from what can be found in the literature and this deserves a brief comment.

The externalizing construct was formally introduced by Thomas M. Achenbach, and initially applied to childhood disruptive behavior, and then to adult antisocial conduct (Achenbach, 1966; Achenbach, 2020). Within this view, the latent externalizing vulnerability is exemplified, in the first years of life, by observable behaviors reflecting conflict with others and social conventions (e.g., aggression, disobedience, hyperactivity; Achenbach & Edelbrock, 1978). Krueger and colleagues later applied the construct to adolescence and adulthood antisocial behaviors, departing from Achenbach's formulation in two important ways. At one level, not only behaviors, but also personality traits such as impulsivity were thought to account for significant variation within the externalizing spectrum (Krueger et al., 2002). At another level, the externalizing factor was decomposed into two components: disinhibition and antagonism, represented, respectively, by substance use and callousness-aggression (Krueger et al., 2007). More recently, an externalizing factor was also incorporated into the HiTOP system (Kotov et al., 2021). On the surface, this latest operationalization is conceptually closer to that of Krueger and colleagues, yet some differences may exist. For instance, it remains unclear whether Krueger's antagonism (Krueger et al., 2002) might be better viewed as representing the HiTOP antagonistic externalizing subspectra, or as it indeed appears, the HiTOP antisocial behavior subfactor, into which disinhibited and antagonistic externalizing subspectra cohere (Krueger et al., 2021). As for our conceptualization of the externalizing factor, there are several ways in which it departs from those just described. As noted, in prior structural research CU traits were rarely and poorly represented. By contrast, in the current study, we identified a few alternatives upon which prior operationalizations of CU traits could be improved and expanded. Unlike Krueger's approach, personality/temperament traits were not explicitly modeled along with externalizing behaviors in any of our studies, although the dimensionality between temperament/personality and psychopathology is fully acknowledged in these works (Latzman et al., 2021; Wright et al., 2021). Finally, unlike the HiTOP framework, which is largely adevelopmental in its current version, we sought to achieve a developmentally-appropriate representation of externalizing behaviors in early childhood.

Overall, the results of the first study align with those of prior research in two essential ways. First, the multidimensionality of DB is, once again, demonstrated. Consistent with available evidence our findings revealed distinct differentiable components within the externalizing spectra (Bolhuis et al., 2017; Olson et al., 2013; Tremblay, 2010). At the same time, we showed how externalizing behaviors coalesce into a *potentially meaningful*

externalizing construct, in the preschool years, in line with research findings for earlier and later developmental periods (e.g., infancy; Lorber et al., 2015, or adolescence and early adulthood; Carragher et al., 2014; Farmer et al., 2009). Indeed, we provide preliminary evidence on the prospective predictive utility of the overarching externalizing factor over and above specific externalizing problems. However, a reasonable concern regarding this finding may be that measures based in diverse problems tend, in general, to be good predictors, regardless of the outcomes predicted (Achenbach, 2021). As such, the associations found in this study may be viewed as purely anecdotic. However, as DeYoung and colleagues (2022, p.19) have pointed out, claiming that broader dimensions are generally less useful than narrower dimensions "is an unwarranted assertion, for which no good evidence exists". Both the HiTOP and the RDoC approaches in fact propose otherwise, by explicitly emphasizing the utility of spectra constructs and transdiagnostic neurobiological vulnerabilities (Insel et al., 2010; Kotov et al., 2021). Consistent with these hypotheses, our results suggest that not only narrower, but also, broader phenotypic characterizations may be useful towards a better understanding of the causes and correlates of DB. However, this conclusion needs to be strengthened.

In the **second study** we sought to provide further evidence for this hierarchical model of externalizing behaviors in the preschool years, which included, contrary to prior research, a latent CU traits factor and a broader externalizing factor. This was critical for two reasons. First, the externalizing factor is, as previously discussed, *a statistically-derived construct* and, as such, a potential function of decisions involving the particular set of items used, the methods selected for factor analysis, or the sample size considered to be optimal for estimation (Achenbach, 2021; Sellbom & Tellegen, 2019). Second, there are enough reasons to believe that statistically derived constructs are far from sufficient to create thorough descriptions of psychopathology and, also, that studying mechanisms underlying psychopathology is not, per se, a useful approach if these efforts are not tied to psychopathology descriptions (Conway & Simms, 2020; Lilienfeld, 2014; Zachar, 2020). Consequently, to further test the hypothesis that the externalizing factor, and by extension the hierarchical model, possesses a degree of psychological meaning, significance, and predictive utility, it was necessary to establish its relations with other important correlates at the theoretical and clinical level. This was the objective of the second study. We attempted to *link empirically derived phenotypes* identified in the first study, including the broader externalizing factor, *with temperament traits* at different levels of specificity (i.e., more general and narrower traits).

As hypothesized, our analyses revealed a partial correspondence between broad-band and narrow-band temperament traits and broader and finer characterizations of externalizing problems. At one level, we identified broad dispositional traits represented in general-purpose models of temperament (i.e., approach-oriented behaviors), that appear to map onto the externalizing factor. Thus, at least partial evidence is provided as to the validity of the second order factor and by extension the hierarchical phenotypic organization itself. Since associations between impulsivity and externalizing psychopathology are well-established in the literature, this result is not surprising (Beauchaine et al., 2017; Martel et al., 2017; Rodenacker et al., 2018). However, given that most of this evidence is not grounded in studies that examine broader conceptualizations of the DB phenotype (i.e., the externalizing construct), our findings do substantially complement previous research. At another level, beyond broad temperament

traits, we showed how turning to more fine-grained temperament dimensions can provide a more nuanced dispositional characterization of DB. Our analyses revealed distinctive patterns of associations among Negative Emotionality, Prosociality and Daring (Lahey & Waldman, 2003; 2005), with ODD, ADHD and CU traits factors, therefore supporting the discriminant validity of these psychobiological dimensions to differentiate between specific behavior problems at lower levels of the phenotypic organization. The relevance of this finding must be measured in terms of its implications for a long-pursued goal in psychopathology research: to characterize allegedly differentiable forms of DB on the basis of their allegedly differentiable etiologies (Rutter & Pickles, 2016).

In general, the results summarized above are consistent with a large body of research that emphasizes the connections between the structure of psychopathology and the structure of temperament and personality traits across development (Caspi et al., 2005; Castellanos-Ryan et al., 2016; Latzman et al., 2021; Mezquita et al., 2015; Watts et al., 2019). However, in interpreting these findings, it is also necessary to evaluate the alternative hypothesis that sample selection biases affecting the data used in the second study could have made these associations easier to emerge. By selecting a group of children oversampled for their higher risk for psychopathology, the ranges of variation of temperament and psychopathology are certainly restricted. Yet, since levels of emotional and social difficulties, beyond levels of conduct problems and hyperactivity-inattention, were adopted also as criteria for selecting the sample (i.e., the total difficult score of the Strengths and Difficulties Questionnaire, SDQ; Goodman, 2001), such hypothetical biases might not be especially decisive in explaining this alignment between temperament traits and externalizing psychopathology.

As anticipated, our findings dovetail with current views on the hierarchical structure of psychopathology and its underlying causal influences (Kotov., 2021; Lahey et al., 2017). However, they extend prior literature by providing preliminary evidence on *the simultaneous effects* of broader and narrower temperament traits, characterizing specific externalizing phenotypes. So far, these etiological influences have been investigated separately and, for this reason, this finding has two relevant implications. First, we exemplified how parsing both types of effects, within a hierarchical view, is feasible not only conceptually, but also empirically. Second, we preliminarily probed that, together rather than separately, these broader and narrower traits are likely to yield a more comprehensive picture of the dispositional underpinnings of DB.

In addition, in the second study we established the utility of the developmental propensity model, a specific-purpose model of temperament, deliberately designed to investigate the associations between specific dispositions and conduct problems (Lahey & Waldman, 2003; 2005). Considering its utility in accounting for temperament antecedents of DB at different levels of breadth, this model seems particularly in tune with hierarchical conceptualizations of externalizing psychopathology. Even so, it has a significant limitation. The Child and Adolescent Dispositional Scale (CADS; Lahey et al., 2008) does not, despite being a measure developed with the specific purpose of testing the dispositional determinants of conduct problems, includes the kind of broader dimension of impulsivity usually associated to externalizing behaviors. While our results indicated that CADS Daring coheres with other

approach-oriented behaviors into the same principal component (see **Chapter Three**), Daring and overall impulsivity/disinhibition do not seem to be the same thing. Thus, in practical terms and for applied clinical and/or research purposes, the CADS would have to be used along with other general-purpose measures to examine the dispositional underpinnings of externalizing problems more comprehensively (e.g., the BIS/BAS scales; Muris et al., 2005).

In the **third** and **fourth study** we aimed to advance our understanding of the etiological heterogeneity of DB. More specifically, we were interested in examining the extent to which a *trait-like mechanism(s)* may be conferring vulnerability to ODD and ADHD as well as CU traits. We speculated that a particular set of impulsive behaviors related to a child's inhibition/constraint capacities when faced with intense emotional states may be operating at this *transdiagnositic level*. Such speculation is less a radical departure from earlier evidence than it is an attempt to qualify our knowledge on nonspecific dispositional risk associated to DB. That is, we do not question neither the idea that impulsivity underlies the externalizing spectrum, nor the notion that externalizing psychopathology is certainly a type of "disinhibitory psychopathology" (Martel et al., 2017; Tackett, 2006; Rodenacker et al., 2018). However, we believe that this is probably an *insufficient account* of the *shared dispositional risk* giving raise to the phenotypic affinities among various forms of DB. While disinhibitory tendencies are certainly present across a variety of externalizing problems, these phenotypes are also often underpinned by other relevant dispositional tendencies of an affective nature (e.g., negative emotionality or emotion regulation; Beauchaine & Zisner, 2017; Singh & Waldman, 2010; Zastrow et al., 2018). The construct of Urgency (i.e., affect-driven impulsivity), proposed by Whiteside and Lynam (2001), enables the connection of these two lines of evidence, because it is located just at the very intersection between behavior (i.e., impulsivity) and affect (i.e., emotional experience). Whereas research findings on affect-driven impulsivity have accumulated over the last decades in adult literature, studies with youth samples, within the UPPS-P framework, have not been possible until very recently (Zapolski et al., 2010). As an illustrative example, in the Spanish context we currently lack a UPPS-P measure for children that has been formally recognized by the International Society for Research on Impulsivity. Therefore, exploring the developmental and clinical implications of affect-driven impulsivity in childhood and early childhood is, at this moment, not possible by means of a questionnaire inquiry in our context. Evidence indicates, however, that the examination of this trait in preschool populations is very much justified. First, from early in development children experience an array of emotions resulting from changes in their internal and external environment (Rothbart & Bates, 2006). Emotions such as fear or anger, indeed, are observable from the first few months of life (Buss & Plomin, 1984). Second, while children learn to apply strategies to modulate this reactivity (i.e., Effortful Control; Rothbart, & Bates, 2006), failures in such regulatory processes are known to occur (Nigg, 2017). Thus, instruments that capture such interconnections between affect and behavior, through measures of Urgency, are needed, yet currently lacking. To address this significant gap in the literature, in **the third study** of this thesis, we sought to adapt and validate the UPPS-P Impulsive Behavior Scale (Cyders & Smith, 2007; Whiteside & Lynam, 2001) to be used with children, and constituting an abbreviated form (i.e., 20 items) to be completed by parents. Our results support the factor structure of the scale, its invariance across genders, and its optimal psychometric properties in a large sample of preschoolers. Importantly, the convergent and discriminant validity of the UPPS-P first and second-order subscales were also established. These findings fit with those of previous works

with youth populations of different ages (e.g., middle-school aged children and adolescents) and cultural backgrounds (e.g., American or Italian samples; Donati et al., 2021; Geurten et al., 2018; Pechorro et al., 2021; Watts, Smith et al., 2020). However, they expand prior research by covering, for the first time, a specific developmental period previously unaddressed: the preschool years.

In **the final study** we attempted to look more closely into the nomological network of affect-driven impulsivity in early childhood by identifying its *precursors and externalizing outcomes*. As expected, both child and parenting factors were found to predict prospective levels of impulsive behaviors triggered by negative and positive emotions. In addition, associations of affect-driven impulsivity and various forms of DB were found cross-sectionally and longitudinally. However, because of the recent and widespread recognition of the importance of transdiagnostic risk factors some of these findings warrant further discussion (Dadds & Frick, 2019; Eaton, 2017; Krueger & Eaton, 2015).

Although our results are compatible with conceptualizing emotion-based dispositions to rash action as a transdiagnostic factor for externalizing behavior in early childhood, we do not claim that affect-driven impulsivity *necessarily underlies* ODD, ADHD and CU traits at an etiological level. Such causal inference is unwarranted. In addition, we are not arguing that the status of impulsivity within the transdiagnostic risk literature for externalizing psychopathology, should be downgraded in favor of the construct of Urgency. Such conclusion is not afforded. We do concede, however, that more evidence is needed to strengthen and validate the preliminary findings that we are presenting. Especially so, due to some conceptual issues that can be used to call into question the interpretability, and perhaps more importantly, the utility of these results. A first challenge comes from having to define and meaningfully apply the term "transdiagnostic". In strictly metaphysical terms, it is very improbable that a given mechanism could be considered completely transdiagnostic. Indeed, our own findings support this idea, as the magnitude of associations appeared to vary as a function of the specific problem predicted. Thus, commonalities and distinctiveness among problems could hypothetically be identified on the basis of the same alleged cross-cutting risk mechanism. In addition, transdiagnostic factors pose other problems. Although probably easier to identify than specific features differentiating specific disorders, predictors expected to account for *a lot*, may end up accounting *for little*. Hence, as previously discussed, rather than concentrating on either broad-band or narrow-band vulnerabilities, a perhaps more fruitful approach would be to try to accommodate and understand both (Dadds & Frick, 2019).

Beyond impulsivity, affective dispositional traits have been also recognized in the transdiagnostic literature (e.g, negative emotionality; Beauchaine & Zisner, 2017). However, their effects appear to be *stronger* for internalizing than externalizing psychopathology (Garstein et al., 2012). Thus, by also introducing an affective dimension to dispositionally characterize externalizing behaviors, through the hybrid construct of Urgency, some questions are expected to arise. Jonhson et al. (2020) have recently proposed that Urgency is associated with the p-factor of psychopathology. That is, a general factor accounting for a substantial proportion of comorbidity and continuity between externalizing and internalizing syndromes (Caspi et al., 2014). This would imply that affect-driven impulsivity *is not*, as we claim, a

transdiagnostic externalizing dispositional vulnerability. Rather, a tendency to act impulsively in the context of intense emotional states would characterize both externalizing and internalizing problems. On such a view, *transdiagnostic differentiations* among *broader overarching* constructs (i.e., externalizing-internalizing spectra) look unattainable and our conclusions might serve, indeed, to indirectly consolidate such a perception. However, we argue that some *space for differentiation* is always available, also, at the broader level of externalizing-internalizing constructs. Especially, if one bears in mind that, as our findings preliminarily support, both broader and narrower influences operate together, and their effects can be simultaneously modeled. Through specific traits, the effects of broader ones *can*, therefore, always *be qualified*. As such, some of the major criticisms targeted at transdiagnostic factors would be somewhat attenuated.

Together, the **ideas and findings presented in this thesis** were intended to provide some insight into how to better classify and understand the etiology of early DB. Our starting point was that early DB is heterogeneous regarding its presentation, origins and outcomes, and traditional frameworks/methods have overall failed to capture and properly address this complexity. Accordingly, the hypotheses for this work were built upon alternative organizing models guiding contemporary structural and etiological research. In essence, our results pointed to the hierarchical structure of early DB and dispositional risk, as well as to some potential transdiagnostic trait-like mechanisms underlying an alleged broad externalizing vulnerability. Nonetheless, more research aimed at testing the replicability and generalizability of these findings is warranted. Large-scale longitudinal studies like the ELISA Project, are particularly promising for this task by allowing to test:

1) How the externalizing phenotypes evolve overtime and what is the robustness of certain psychopathology configurations.
2) To which extent the association between temperament and externalizing phenotypes remain or not invariant across development and which potential mediators and/or moderators are involved in these variations (e.g., environmental factors).
3) The far-reaching effects of affect-driven impulsivity.

6.2. Implications of our Findings

Our findings yielded several conceptual and practical implications.

At a conceptual level, some relevant considerations arise. First, as recurrently noted throughout this manuscript, the externalizing construct has a long history and a large body of research has documented its external validity and utility (Achenbach, 1966; Achenbach, 2020; Achenbach & Edelbrock, 1978). Thus, although this is not a conceptually or empirically controversial construct, it remains an empirical question whether classical characterizations previously discussed might be further refined. This is not a trivial issue. For instance, including CU traits as a part of the externalizing spectrum in bottom-up oriented studies, while ensuring a proper construct measurement, seems crucial for a better understanding of the specific and less specific expressions of a potential early externalizing liability. Considering the developmental and clinical relevance of these behaviors, the scarce presence of CU traits in prior structural psychopathology research is somewhat surprising. A possible explanation for

this is that when Achenbach, a pioneer in bottom-up approaches to psychopathology, proposed his model, research on CU traits was, in overall terms, still nascent. Over recent decades, however, CU traits research, models and measures have proliferated (Frick et al., 2014; Salekin, 2016; Waller & Wagner, 2019). Second, the externalizing construct has recently been included in the HiTOP system, which more than a radical revolution, seems an attempt to re-describe psychopathology in a synthetic way (Zachar, 2018). Nevertheless, at present, the HiTOP is largely adevelopmental, regardless of the widespread recognition that efforts to overcome this limitation are urgently needed. Paradoxically, it could be said that the HiTOP is "developmentally-*derived*" in as much as it is clearly rooted in Achenbach's crucial contributions but has failed to become "developmentally-*informed*" and "developmentally-*appropriate*", because the current model is mostly based on the review of research findings from adult populations (Kotov et al., 2021; Ringwald et al., 2021). With this dissertation, we have tried to shed some light on these issues. On the one hand, we attempted to show how the characterization of CU traits within Achenbach's model could be improved, by tacitly signaling, the need for refinements to this classical model. On the other hand, we anticipated that such refined characterization could inform the HiTOP framework, which, at this point in time, remains a less precise and substantive system than it might appear to be at first sight (Zachar, 2018). In this regard, our findings have two major conceptual implications. As Kotov et al. (2021) have recently claimed: "the generalizability of HiTOP outside the age range of 15 to 65 years is uncertain" (p.93) and "expanding the coverage of the system to include more childhood-onset psychopathology is crucial" (p.93). Thus, with the present work we may be indirectly and preliminarily contributing to the wider HiTOP research agenda, since in its current form, the HiTOP system, offers little utility in understanding childhood psychopathology.

In this vein, the current dissertation could be also seen as a preliminary and very tentative effort to harmonize the HiTOP system premises with the essential principles of developmental psychopathology (Hinshaw & Beauchaine, 2016). There is no doubt that Achenbach's model embodies a developmental perspective, despite a certain degree of intrinsic rigidity characterizing data-driven structural approaches to psychopathology. At the most basic level, it reflects the notion that different assessment instruments need to be tailored to the developmental level of the people being assessed (Achenbach, 2020). Conversely, the HiTOP system appears less easily reconcilable with the principles of developmental psychopathology, contrary to Achenbach's approach and, interestingly, the RDoC initiative (Garber & Bradshaw, 2020; Ostlund et al., 2021). Some incompatibilities are particularly evident. Expressions of psychopathology, including externalizing behaviors, vary with age. In its current form, the HiTOP fails to capture the developmental progression within disorders and the potential interplay between them overtime (Kotov et al., 2021). Expressions of psychopathology are the results of reciprocal transactions between individuals and their contexts (Hinshaw & Beauchaine, 2016). Yet, the HiTOP framework currently fails to account for environmental influences (Haeffel et al., 2021).

Because of the apparent superiority of Achenbach's model, at least with respect to childhood and youth psychopathology, our enthusiasm for the sometimes heavily criticized HiTOP system (Haeffel et al., 2021; Haeffel et al., 2022) may seem surprising. However, there are reasons for this. Although further work and clarification are pending, the HiTOP framework

is, given its integrative and comprehensive nature, an alluring and promising model, which conveniently resurrects old but transcendent ideas. First, it constitutes an exaltation of empirical approaches to psychopathology, not only when the structure of psychopathology is directly derived from a particular set of data (Achenbach, 1966), but also if it is indirectly inferred from a thorough revision and integration of prior findings (Kotov et al., 2017; Ringwald et al., 2021). Second, it emphasizes the hierarchical organization of empirically-derived psychopathological constructs. Hierarchical dimensional models, abundant in various subfields of psychological inquiry (e.g., personality, cognition or intelligence theory and research) allow for the accommodation of specific and non-specific problems and risk factors within the same working-model (Beaujean, 2015; Markon, 2019). At least, conceptually, this is an achievement, and it paves the way, at an empirical level, for the exploration of issues with crucial clinical implications (e.g., the effects transdiagnostic risk).

The topics and issues addressed so far transcend the interest of academics and psychiatrics. Clinicians are also very much in need of better descriptions of psychopathology. It is likely that many practitioners on the frontlines would "welcome a more integrated and comprehensive approach to conceptualizing patients, grounded in structural data, and accompanied by well-articulated corresponding intervention strategies" (Krueger et al., 2020, p. 3). Thus, two fundamental questions need to be addressed, namely: a) whether or not the HiTOP framework is translatable into clinical settings and b) whether our own findings have any clinical applicability and utility.

As regards the possibility of integrating the HiTOP into clinical practice, much remains to be probed. Some preliminary insights have been offered in terms of how to approach this challenge (Ruggero et al., 2019). Yet, in parallel to this, criticisms of the clinical utility of HiTOP are on the rise (see the Haeffel et al., 2021- DeYoung et al., 2022 debate). In general, several problematic issues remain unresolved and much clearer guidelines for practitioners are expected in the future. As an example, performing HiTOP-based assessments certainly appears to be a complex task and, at this point and despite all efforts, no psychopathology inventory to operationalize the entire HiTOP working model exists (Simms et al., 2021). However, as Lahey et al. (2021) have argued, this is critical inasmuch as "we cannot define the dimensions of psychopathology until we can study *all of the symptoms* that define the universe of psychopathology *at the same time* and *in the same way*" (p. 57). In addition, there are other HiTOP features that make it difficult for clinicians to use the system in their daily practice (see Kotov et al., 2021 for a review of HiTOP limitations). At the same time, there are also some encouraging reasons to believe that dimensional and hierarchical models such as this can be applied in clinical practice and help clinical decision-making. First, although at present the HiTOP remains agnostic regarding the causes of disorders, it can provide valuable information towards guiding assessment and intervention processes (Forbes et al., 2019; Ruggero et al., 2019). Second, practitioners' day-to-day clinical decisions seem to be naturally well aligned with the philosophy underlying the HiTOP. The idea that psychopathology is dimensional rather categorical in nature, appears already to have crystallized among mental health professionals over recent decades (Tyrer, 2018). Also, recent proposals for a developmentally-informed and transdiagnostic *stepped care* approach to prevent early psychopathology (Forbes et al., 2019), may represent a theoretically and empirically-based systematization of principles that clinicians may have naturally been applying routinely in their clinical practice. Third, since

the HiTOP model has preserved, thus far, most DSM rubrics, no radical change in terminology is expected and, therefore, a major adjustment or renaming would not be required. Consequently, the translation looks as overall feasible. At the same time, plenty of room still exists for the framework to become more clinically friendly in terms of applicability and interpretability.

As regards the applied or clinical value of our findings, there are at least three ways in which the conclusions derived from this work have the potential to provide some guidance and orient clinical decisions related to early DB. First, by capitalizing on a dimensional approach, findings from the first and second study, may have contributed to advance the understanding of the phenotypic heterogeneity of early DB, shedding more light on the phenomenology of early externalizing behaviors and their variability. Critically, our results have served to corroborate that not only ODD but also ADHD, along with CU traits, are part of the externalizing spectrum in the preschool years. Moreover, the results of the second study can help to make a better case for a simultaneous examination of both broader and narrower traits in articulating tailored assessment and treatment plans for early externalizing problems. Finally, the third and fourth studies, afforded certain degree of visibility to emotional forms of impulsivity, a trait-like mechanism largely unexplored with preschool children. Of particularly importance is that in this dissertation, we have provided a reliable a valid parent-reported measure of impulsivity based on the UPPS-P model (Cyders & Smith, 2007; Whiteside & Lynam, 2001).

6.3. Limitations of this Dissertation

This research is not exempt from some methodological limitations. Also, some conflicting and inconclusive results were found. They have been discussed in detail in each of the chapters. Below, we reflect, instead, on more general reasons for why our findings should be interpreted with caution.

First, data for this dissertation is from a single sample, the large community sample of the ELISA Project, despite specific data waves of this longitudinal study were used in each of the empirical works (see **Supplementary Material for Chapter Two**). The external validity of our findings, and the extent to which they are applicable to other populations (e.g., more clinically or demographically diverse) is, therefore, unknown. Critically, the fact that we opted for a convenience sample (i.e., children at risk for psychopathology) in one of our studies (see **Chapter Three**) is problematic. Convenience samples are often biased for selective factors, compromising, again, the generalizability of the findings.

Second, a major limitation is that our analyses and inferences were based only in report-based psychometric data. No behavioral, psychophysiological, or neurobiological indicators of the constructs of interest were evaluated in this work. Regardless of having collected reports from multiple informants (i.e., parents and teachers), behavioral and observational assessments would have strengthened the quality of our data, ultimately enhancing the robustness and validity of our conclusions.

Third, the use of factor analysis for identifying meaningful dimensions of externalizing behaviors poses certain disadvantages. As noted, this statistical technique is dependent on the particular set of items used, the methods selected for factor analysis, or the sample size

considered optimal for estimation (Sellbom & Tellegen, 2019). Thus, generalizability of factor analytic findings is limited.

Fourth, we primarily focused in one of the mechanisms potentially giving rise to DB: child's temperament. However, it is unclear whether the findings presented above would remain unaltered after other relevant mechanisms were also considered (e.g., family, school and broader socialization factors). There is, thus, the possibility that these results were not replicated in such conditions. Relatedly, by focusing only on externalizing problems without considering their well-documented relations with internalizing psychopathology, an insufficient account of the externalizing phenomenology may have been provided in this work.

Finally, it has been claimed that dimensions of DB should not be combined because they follow separable developmental trajectories (Tremblay, 2010). Although our approach in this dissertation is grounded in prior theoretic and empirical evidence, it seems contrary to this premise and could be, thus, questioned on this basis.

Regardless of these methodological limitations, our findings and conclusions may still be worthwhile. In what follows, we provide a set of broader reflections and recommendations on how future research could build upon this work, and more importantly, overcome some of its limitations.

6.4. Future Research

6.4.1. Some Thoughts regarding the Structural Organization of DB during the Preschool Years

First, future research should better clarify what is exactly the universe of externalizing psychopathology in the preschool years. Accordingly, a dimensional measure including all symptoms and indicators of DB in this period is needed, beyond the current CBCL /1.5-5 (Achenbach & Rescorla, 2000). This measure should incorporate a developmental view of psychopathology and a consideration of age specific symptoms as well as normative disruptive behaviors in the preschool years (Wakschlag et al., 2010; Wakschlag, Henry et al., 2012). In adult literature, there have been attempts trying to identify and assess comprehensively all externalizing indicators potentially encountered in clinical settings. The Externalizing Spectrum Inventory (ESI) in its extended (i.e., 415 items) and abbreviated forms (i.e.,160 items) is an example (Krueger et al., 2007; Patrick et al., 2013).

Second, beyond improving its operational definition, a validation of the externalizing construct through its behavioral, genetic, environmental, neurophysiological, and neurocognitive correlates should be pursued. Relatedly, its nomological network should be strengthened in order to obtain further evidence on construct validity. A promising venue could be to parse its relations with well-documented correlates of externalizing/antisocial behaviors in other developmental periods (e.g., interpersonal, and social difficulties). In addition, the externalizing factor should not be only statistically derived but also clinically assessed, via direct observational procedures, purpose-developed measures just as mentioned, or both.

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Third, future works should compare the predictive power of empirically-derived dimensions and clinical diagnosis (e.g., DSM-based) in relation to relevant outcomes. By so doing, a stringent test of the predictive utility of the externalizing construct would be ensured.

Finally, a pending issue is to test the applicability of the disinhibited-antagonistic subdivision, specified in the current version of HiTOP model for the externalizing superspectra, to externalizing behaviors in early childhood. While the externalizing factor is well-established in both youth and adult research, this differentiation, on the contrary, has been mostly examined with adult samples (Krueger et al., 2021). Since findings from the first and second study of this thesis indicate that CU traits are a meaningful component of an early externalizing vulnerability, it would be of particular interest to examine to which subfactor, disinhibited or antagonistic, are they structurally linked in early developmental periods if the feasibility of such a differentiation can be demonstrated.

6.4.2. Some Thoughts regarding the Dispositional Risk linked to DB in Preschool Years

First, there is an overall scarcity of theories and models delineating both common and unique mechanisms leading to psychopathology in childhood. Despite some exceptions (e.g., the recently proposed REAL model, Dadds & Frick, 2019), there is still a need to advance in the study of processes underlying multiple problematic behaviors (i.e., within and across the externalizing spectrum), as well as identifying specific and distinguishable causal mechanisms involved in particular problems. Therefore, future research empirically testing the validity, utility and applicability of theoretical proposals such as the REAL model (Dadds & Frick, 2019) is warranted.

Second, future studies should complement traditional assessments of affect-driven impulsivity (i.e., parent-reported questionnaires) with observational and lab measures or a combination of both. For one thing, it has been shown that observational paradigms are particularly suitable for assessing preschool children (Wakschlag et al., 2005). For another, laboratory tasks seem optimal to probe how emotion and behavior interact. For instance, by using valenced stimuli or mood inductions, and simultaneously collecting psychophysiological data accounting for this emotional experience. However, the extent to which trait and behavioral assessments of affect-driven impulsivity would converge is uncertain. Meta-analytic findings with adult populations have revealed consistently low to very low relations between self-reported measures and laboratory tasks assessing impulsivity more broadly conceptualized (Sharma et al., 2014).

Third, in future investigations willing to adopt a lab-based paradigm to assess affect-driven impulsivity in childhood, the RDoC framework should be considered. RDoC constructs clearly facilitate a more nuanced operationalization of the constructs of interest in neurobehavioral terms (Cuthbert et al., 2013; Garber et al., 2020), including affect-driven impulsivity. Hypothetically emotional forms of impulsivity could be associated with *Negative Valence systems* and *Positive Valence systems* related to responses to aversive and appetitive contexts, respectively, as well as mechanisms of *Cognitive Control*, related to the regulation of behavior. Thus, Negative and Positive Urgency, as defined in the UPPS-P model of impulsivity

(Whiteside & Lynam, 2001), may be translatable into RDoC terms (i.e., biobehavioral vulnerabilities). Specifically, *Negative Valence systems* and *Cognitive systems* could be implicated in impulsive behaviors elicited by negative emotions (i.e., fear, anger, loss, Negative Urgency). *Positive Valence Systems* and *Cognitive systems* could be implicated in impulsive behaviors elicited by positive emotions (i.e., joy, Positive Urgency). Also, there is the possibility of *Arousal/Regulatory Systems* taking part in these processes. Interestingly, in relating these pathways with externalizing behaviors, the connections just described appear to dovetail particularly well with the disinhibited subfactor of the externalizing spectra (Krueger et al., 2021; Michelini et al., 2021). However, evaluating whether these same biobehavioral vulnerabilities would be also applicable to the antagonistic subfactor is necessary. Prior literature has suggested that the systems for *Social Processes* are primarily implicated in the major deficits on this latter domain (i.e., attachment/affiliation, social communication and perception and understanding of others; Michelini et al., 2021). Yet, the potential shared vulnerabilities between disinhibited and antagonistic phenotypes need to be uncovered.

Finally, future investigations should bear in mind the possibility that affect-driven impulsivity does not relate specifically to externalizing psychopathology. Since Urgency has been recently posited to be associated to the p-factor of psychopathology (Johnson et al., 2020), the specificity of affect-driven impulsivity in relation to externalizing problems needs to be further probed.

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7 CONCLUSIONS

In this dissertation, we reviewed and examined the phenotypic and etiological heterogeneity of early DB. Based on the findings from the studies presented above, it is possible to derive the following conclusions.

First, the structure of DB in the preschool years can be represented through a hierarchical configuration in which the affinities and distinctiveness among ODD, ADHD and CU traits are both accommodated.

- Second-order factor models, rather than bifactor models, appear to be a sounder statistical alternative to parse these structural relations.
- A valid account for the patterns of covariation among ODD, ADHD and CU traits can be obtained by means of a higher-order externalizing factor, capturing the shared variance among these specific problems.
- CU traits emerge, also in hierarchical dimensional conceptualizations of psychopathology, as a core component of early externalizing difficulties.

Second, there is a partial correspondence between the structure of DB in the preschool years and the dispositional risk for DB during this period.

- Temperament traits and early expressions of DB map into each other at different levels of specificity.
- A general dispositional vulnerability which is related to approach tendencies and child exuberant behavior seems to operate conferring risk for ODD, ADHD and CU traits.
- Both broad-band and narrow-band temperament traits are apparently implicated in the intricate net of etiological influences underpinning early externalizing problems.

Third, the construct of affect-driven impulsivity can be applied to early childhood.

- Both affect and non-affect-driven impulsive behaviors can be reliably assessed in preschoolers through an abbreviated parent-reported form of the UPPS-P Impulsive Behaviors Scale.
- Emotional forms of trait impulsivity operationalized through the construct of Urgency, seem to be implicated in multiple externalizing problems, beyond disinhibitory dispositions defined in a more general sense.

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8 REFERENCES

Abdi, H., & Williams, L.J. (2010). Principal component analysis. *Wiley Interdisciplinary Reviews: Computational Statistics*, 2(4), 433-459. 10.1002/wics.101

Achenbach, T. M. (1966). The classification of children's psychiatric symptoms: A factor-analytic study. *Psychological Monographs: General and Applied*, *80*(7), 1–37. 10.1037/h0093906

Achenbach, T. M. (2020). Bottom-Up and Top-Down Paradigms for Psychopathology: A Half-Century Odyssey. *Annual Review of Clinical Psychology*. 16: 1-24.10.1146/annurev-clinpsy-071119-115831

Achenbach T. M. (2021). Hierarchical dimensional models of psychopathology: yes, but…. *World Psychiatry : official Journal of the World Psychiatric Association (WPA)*, *20*(1), 64–65. 10.1002/wps.20810

Achenbach, T. M., & Edelbrock, C. S. (1978). The classification of child psychopathology: A review and analysis of empirical efforts. *Psychological Bulletin, 85*(6), 1275–1301. 10.1037/0033-2909.85.6.1275

Achenbach, T.M.., & Rescorla, L.A.(2000). *Manual for the ASEBA Preschool Forms and Profiles: An Integrated System of Multi-informant Assessment.* Burlington, VT: University of Vermont, Department of Psychiatry

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, and Families.

Achenbach, T. M., & Rescorla, L. A. (2016). Developmental issues in assessment, taxonomy, and diagnosis of psychopathology: Life span and multicultural perspectives. In D. Cicchetti (Ed.), *Developmental Psychopathology: Theory and Method* (pp. 46–93). John Wiley & Sons, Inc.. 10.1002/9781119125556.devpsy102

Aebi, M., Plattner, B., Metzke, C. W., Bessler, C., & Steinhausen, H. (2013). Parent- and self-reported dimensions of oppositionality in youth: Construct validity, concurrent validity, and the prediction of criminal outcomes in adulthood. *Journal of Child Psychology and Psychiatry, 54*(9), 941-949. 10.1111/jcpp.12039

Ahmad, S. I., & Hinshaw, S. P. (2017). Attention-Deficit/Hyperactivity Disorder, Trait Impulsivity, and Externalizing Behavior in a Longitudinal Sample. *Journal of Abnormal Child Psychology, 45*(6), 1077–1089. 10.1007/s10802-016-0226-9

Ainslie, G. (1975). Specious reward: A behavioral theory of impulsiveness and impulse control. *Psychological Bulletin*, *82*(4), 463–496. 10.1037/h0076860

Aitken, M., Henry, S., & Andrade, B. F. (2018). Distilling Heterogeneity among Children with Disruptive Behavior: Associations between Symptom Patterns and Social Functioning. *Journal of Abnormal Child Psychology*, *46*(6), 1241–1252. 10.1007/s10802-017-0350-1

USC
UNIVERSIDADE
DE SANTIAGO
DE COMPOSTELA

Aksan, N., Goldsmith, H. H., Smider, N. A., Essex, M. J., Clark, R., Hyde, J. S., Klein, M. H., & Vandell, D. L. (1999). Derivation and prediction of temperamental types among preschoolers. *Developmental Psychology, 35*(4), 958-971. 10.1037/0012-1649.35.4.958

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Washington, DC: Author.

Andrade, B. F., Sorge, G. B., Na, J. J., & Wharton-Shukster, E. (2015). Clinical Profiles of Children with Disruptive Behaviors Based on the Severity of Their Conduct Problems, Callous-Unemotional Traits and Emotional Difficulties. *Child Psychiatry and Human Development*, *46*(4), 567–576. 0.1007/s10578-014-0497-8

Andrade, B. F., & Wade, M. (2016). Latent Profiles of Externalizing Psychopathology and Their Relation to Children's Aggression and Social Behavior. *Journal of Developmental and Behavioral Pediatrics, 37*(6), 442–450. 10.1097/DBP.0000000000000304

Anestis, M. D., Selby, E. A., & Joiner, T. E. (2007). The role of urgency in maladaptive behaviors. *Behaviour Research and Therapy, 45*(12), 3018–3029. 10.1016/j.brat.2007.08.012

Asendorpf, J., Borkenau, P., Ostendorf, F., & Aken, M.V. (2001). Carving personality description at its joints: Confirmation of three replicable personality prototypes for both children and adults. *European Journal of Personality, 15,* 169 - 198. 10.1002/per.408

Asendorpf, J. B., & van Aken, Marcel A. G. (1999). Resilient, overcontrolled, and undercontrolled personality prototypes in childhood. *Journal of Personality and Social Psychology, 77*(4), 815-832. 10.1037/0022-3514.77.4.815

Asparouhov, T., & Muthén, B. (2009). Exploratory structural equation modeling. *Structural Equation Modeling, 16*(3), 397–438. 10.1080/10705510903008204

Assari S. (2021). Association Between Parental Educational Attainment and Children's Negative Urgency: Sex Differences. *International Journal of Epidemiologic Research, 8*(1), 14–22. 10.34172/IJER.2021.04

Avila, C., Cuenca, I., Felix, V., Parcet, M. A., & Miranda, A. (2004). Measuring impulsivity in school-aged boys and examining its relationship with ADHD and ODD ratings. *Journal of Abnormal Child Psychology, 32,* 295–304. 10.1023/b:jacp.0000026143.70832.4b

Bai, S., & Lee, S. S. (2017). Early-onset Conduct Problems: Predictions from daring temperament and risk-taking behavior. *Journal of Psychopathology and Behavioral Assessment, 39*(4), 575–584. 10.1007/s10862-017-9612-z

Baker-Henningham, H., Scott, S., Jones, K., & Walker, S. (2012). Reducing child conduct problems and promoting social skills in a middle-income country: cluster randomised controlled trial. *The British Journal of Psychiatry : The Journal of Mental Science*, *201*(2), 101–108. 10.1192/bjp.bp.111.096834

Bakker, M. J., Greven, C. U., Buitelaar, J. K., & Glennon, J. C. (2017). Practitioner Review: Psychological treatments for children and adolescents with conduct disorder problems - a systematic review and meta-analysis. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 58*(1), 4–18. 10.1111/jcpp.12590

Barkley, R. A., & Fischer, M. (2010). The unique contribution of emotional impulsiveness to impairment in major life activities in hyperactive children as adults. *Journal of the American Academy of Child and Adolescent Psychiatry*, *49*(5), 503–513.1097/00004583-201005000-00011

Barratt, E. S. (1965). Factor analysis of some psychometric measures of impulsiveness and anxiety. *Psychological Reports, 16*(2), 547–554. 10.2466/pr0.1965.16.2.547

Basten, M., Tiemeier, H., Althoff, R. R., van de Schoot, R., Jaddoe, V. W., Hofman, A., Hudziak, J. J., Verhulst, F. C., & van der Ende, J. (2016). The Stability of Problem Behavior Across the Preschool Years: An Empirical Approach in the General Population. *Journal of Abnormal Child Psychology*, *44*(2), 393–404. 10.1007/s10802-015-9993-y

Bayer, J. K., Ukoumunne, O. C., Mathers, M., Wake, M., Abdi, N., & Hiscock, H. (2012). Development of children's internalising and externalising problems from infancy to five years of age. *The Australian and New Zealand Journal of Psychiatry*, *46*(7), 659–668. 10.1177/0004867412450076

Beauchaine, T. P., Hinshaw, S. P., & Pang, K. L. (2010). Comorbidity of Attention-Deficit/hyperactivity disorder and Early-Onset conduct disorder: Biological, environmental, and developmental mechanisms. *Clinical Psychology (New York, N.Y.), 17*(4), 327-336. 10.1111/j.1468-2850.2010.01224.x

Beauchaine, T. P., & Klein, D. N. (2017). *Classifying Psychopathology, the DSM, empirically based taxonomies, and the Research Domain Criteria.* In T. Beauchaine and S. Hinshaw (Ed.), Child and Adolescent Psychopathology, (pp.33-67). John Wiley & Sons Inc.

Beauchaine, T. P., & McNulty, T. (2013). Comorbidities and continuities as ontogenic processes: toward a developmental spectrum model of externalizing psychopathology. *Development and psychopathology*, *25*(4 Pt 2), 1505–1528. 10.1017/S0954579413000746

Beauchaine, T. P., & Neuhaus, E. (2008). Impulsivity and vulnerability to psychopathology. In T. P. Beauchaine & S. P. Hinshaw (Eds.), *Child and adolescent psychopathology* (pp. 129–156). John Wiley & Sons Inc.

Beauchaine, T. P., & Tackett, J. L. (2020). Irritability as a transdiagnostic vulnerability trait: Current issues and future directions. *Behavior Therapy, 51*(2), 350-364. 10.1016/j.beth.2019.10.009

Beauchaine, T. P., & Zisner, A. (2017). Motivation, emotion regulation, and the latent structure of psychopathology: An integrative and convergent historical perspective. *International Journal of Psychophysiology, 119*, 108-118. 10.1016/j.ijpsycho.2016.12.014

Beauchaine, T. P., Zisner, A. R., & Sauder, C. L. (2017). Trait Impulsivity and the Externalizing Spectrum. *Annual Review of Clinical Psychology*, *13*, 343–368. 10.1146/annurev-clinpsy-021815-093253

Beaujean, A.A. (2015). John Carroll's Views on Intelligence: Bi-Factor vs. Higher-Order Models. *Journal of Intelligence, 3*, 121-136. 10.3390/jintelligence3040121

Beecham J. (2014). Annual research review: Child and adolescent mental health interventions: a review of progress in economic studies across different disorders. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *55*(6), 714–732. 10.1111/jcpp.12216

Bendiksen, B., Svensson, E., Aase, H., Reichborn-Kjennerud, T., Friis, S., Myhre, A. M., & Zeiner, P. (2017). Co-Occurrence of ODD and CD in Preschool Children With Symptoms of ADHD. *Journal of Attention Disorders*, *21*(9), 741–752. 10.1177/1087054714538655

Berg, J. M., Latzman, R. D., Bliwise, N. G., & Lilienfeld, S. O. (2015). Parsing the heterogeneity of impulsivity: A meta-analytic review of the behavioral implications of the UPPS for psychopathology. *Psychological Assessment, 27*(4), 1129–1146. 10.1037/pas0000111

Bevilacqua, L., & Goldman, D. (2013). Genetics of impulsive behaviour. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *368*(1615), 20120380. 10.1098/rstb.2012.0380

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Bevilacqua, L., Hale, D., Barker, E. D., & Viner, R. (2018). Conduct problems trajectories and psychosocial outcomes: a systematic review and meta-analysis. *European Child & Adolescent Psychiatry, 27*(10), 1239–1260. 10.1007/s00787-017-1053-4

Bezdjian, S., Baker, L. A., & Tuvblad, C. (2011). Genetic and environmental influences on impulsivity: a meta-analysis of twin, family and adoption studies. *Clinical Psychology Review, 31*(7), 1209–1223. 10.1016/j.cpr.2011.07.005

Bezdjian, S., Krueger, R. F., Derringer, J., Malone, S., McGue, M., & Iacono, W. G. (2011). The structure of DSM-IV ADHD, ODD, and CD criteria in adolescent boys: a hierarchical approach. *Psychiatry Research, 188*(3), 411–421. 10.1016/j.psychres.2011.02.027

Bijttebier, P., & Roeyers, H. (2009). Temperament and vulnerability to psychopathology: introduction to the special section. *Journal of Abnormal Child Psychology, 37*(3), 305–308. 0.1007/s10802-009-9308-2

Billieux, J. (2017). *Urgency*. In V. Zeigler- Hill & T. K. Shackelford (Eds.), Encyclopedia of personality and individual differences (pp. 1– 3). Springer. 10.1007/978- 3- 319- 28099 - 8_2132- 1

Billieux, J., Heeren, A., Rochat, L., Maurage, P., Bayard, S., Bet, R., Besche-Richard, C., Challet-Bouju, G., Carré, A., Devos, G., Flayelle, M., Gierski, F., Grall-Bronnec, M., Kern, L., Khazaal, Y., Lançon, C., Lannoy, S., Michael, G. A., Raffard, S., Romo, L., … Baggio, S. (2021). Positive and negative urgency as a single coherent construct: Evidence from a large-scale network analysis in clinical and non-clinical samples. *Journal of Personality, 89*(6), 1252–1262. 10.1111/jopy.12655

Blair, R. J., White, S. F., Meffert, H., & Hwang, S. (2014). Disruptive behavior disorders: taking an RDoC(ish) approach. *Current Topics in Behavioral Neurosciences, 16*, 319–336. 10.1007/7854_2013_247

Block J. (1995). A contrarian view of the five-factor approach to personality description. *Psychological Bulletin, 117*(2), 187–215. 10.1037/0033-2909.117.2.187

Bolhuis, K., Lubke, G. H., van der Ende, J., Bartels, M., van Beijsterveldt, C., Lichtenstein, P., Larsson, H., Jaddoe, V., Kushner, S. A., Verhulst, F. C., Boomsma, D. I., & Tiemeier, H. (2017). Disentangling Heterogeneity of Childhood Disruptive Behavior Problems Into Dimensions and Subgroups. *Journal of the American Academy of Child and Adolescent Psychiatry, 56*(8), 678–686. 10.1016/j.jaac.2017.05.019

Booth, C., Spronk, D., Grol, M., & Fox, E. (2018). Uncontrolled eating in adolescents: The role of impulsivity and automatic approach bias for food. *Appetite, 120*, 636–643. 10.1016/j.appet.2017.10.024

Bornovalova, M. A., Choate, A. M., Fatimah, H., Petersen, K. J., & Wiernik, B. M. (2020). Appropriate use of bifactor analysis in psychopathology research: Appreciating benefits and limitations. *Biological Psychiatry (1969), 88*(1), 18-27. 10.1016/j.biopsych.2020.01.013

Brammer, W. A., & Lee, S. S. (2012). Impairment in children with and without ADHD: contributions from oppositional defiant disorder and callous-unemotional traits. *Journal of Attention Disorders, 16*(7), 535–543. 10.1177/1087054711403709

Brammer, W. A., & Lee, S. S. (2013). Prosociality and negative emotionality mediate the association of serotonin transporter genotype with childhood ADHD and ODD. *Journal of Clinical Child and Adolescent Psychology, 42*(6), 809–819. 10.1080/15374416.2013.840638

Brault, M. C., & Lacourse, É. (2012). Prevalence of prescribed attention-deficit hyperactivity disorder medications and diagnosis among Canadian preschoolers and school-age children: 1994-2007.

Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie, *57*(2), 93–101. 10.1177/070674371205700206

Brennan, L. M., Shaw, D. S., Dishion, T. J., & Wilson, M. N. (2015). The Predictive Utility of Early Childhood Disruptive Behaviors for School-Age Social Functioning. *Journal of Abnormal Child Psychology*, *43*(6), 1187–1199. 10.1007/s10802-014-9967-5

Briggs-Gowan, M. J., Carter, A. S., Skuban, E. M., & Horwitz, S. M. (2001). Prevalence of social-emotional and behavioral problems in a community sample of 1- and 2-year-old children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*(7), 811–819. 10.1097/00004583-200107000-00016

Bongers, I. L., Koot, H. M., van der Ende, J., & Verhulst, F. C. (2004). Developmental trajectories of externalizing behaviors in childhood and adolescence. *Child Development*, *75*(5), 1523–1537. 10.1111/j.1467-8624.2004.00755.x

Brunner, M., Nagy, G., & Wilhelm, O. (2012). A tutorial on hierarchically structured constructs. *Journal of Personality*, *80*(4), 796-846. 10.1111/j.1467-6494.2011.00749.x

Burns, G. L., de Moura, M. A., Beauchaine, T. P., & McBurnett, K. (2014). Bifactor latent structure of ADHD/ODD symptoms: predictions of dual-pathway/trait-impulsivity etiological models of ADHD. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *55*(4), 393–401. 10.1111/jcpp.12165

Burns, G. L., Geiser, C., Servera, M., Becker, S. P., & Beauchaine, T. P. (2020). Application of the Bifactor S - 1 Model to Multisource Ratings of ADHD/ODD Symptoms: an Appropriate Bifactor Model for Symptom Ratings. *Journal of Abnormal Child Psychology*, *48*(7), 881–894. 10.1007/s10802-019-00608-4

Burt, S. A., Hyde, L. W., Frick, P. J., Jaffee, S. R., Shaw, D. S., & Tremblay, R. (2018). Commentary: Childhood conduct problems are a public health crisis and require resources: a commentary on Rivenbark et al. (). *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *59*(6), 711–713. 10.1111/jcpp.12930

Burt, S. A., Krueger, R. F., McGue, M., & Iacono, W. G. (2001). Sources of covariation among attention-deficit/hyperactivity disorder, oppositional defiant disorder, and conduct disorder. *Journal of Abnormal Psychology (1965)*, *110*(4), 516-525. 10.1037/0021-843X.110.4.516

Buss, A. H., & Plomin, R. (1975). *A Temperament Theory of Personality Development*. New York: Wiley-Interscience.

Buss, A., & Plomin, R. (1984). *Temperament: Early Developing Personality Traits.*

Candido, A., Orduna, E., Perales, J. C., Verdejo-Garcia, A. J., & Billieux, J. (2012). Validation of a short Spanish version of the UPPS-P impulsive behaviour scale [Validacion de una version breve de la escala de comportamiento impulsivo UPPS-P]. *Trastornos Adictivos*, *14*(3), 73 - 78. 10.1016/S1575-0973(12)70048-X

Caneto, F., Pilatti, A., Cupani, M., & Pautassi, R. M. (2020). Validación de la versión breve en español de la Escala UPPS-P de impulsividad para niños y adolescentes (BUPPS-P NA). *Revista De Psicopatología Y Psicología Clínica*, *25*(3), 175–185. 10.5944/rppc.26249

Carbonneau, R., Boivin, M., Brendgen, M., Nagin, D., & Tremblay, R. E. (2016). Comorbid Development of Disruptive Behaviors from age 1½ to 5 Years in a Population Birth-Cohort and Association with School Adjustment in First Grade. *Journal of Abnormal Child Psychology*, *44*(4), 677–690. 10.1007/s10802-015-0072-1

Carey, W.B. (2017). Editorial Perspective: Whatever happened to temperament? *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 58* 12, 1381-1382. 10.1111/jcpp.12816

Carragher, N., Krueger, R. F., Eaton, N. R., Markon, K. E., Keyes, K. M., Blanco, C., Saha, T. D., & Hasin, D. S. (2014). ADHD and the externalizing spectrum: Direct comparison of categorical, continuous, and hybrid models of liability in a nationally representative sample. *Social Psychiatry and Psychiatric Epidemiology*, *49*(8), 1307–1317. 10.1007/s00127-013-0770-3

Carver, C. S., & Johnson, S. L. (2018). Impulsive reactivity to emotion and vulnerability to psychopathology. *The American psychologist*, *73*(9), 1067–1078. 10.1037/amp0000387

Carver, C. S., Johnson, S. L., & Joormann, J. (2008). Serotonergic function, two-mode models of self-regulation, and vulnerability to depression: What depression has in common with impulsive aggression. *Psychological Bulletin, 134*(6), 912–943. 10.1037/a0013740

Carver, C. S., Johnson, S. L., Joormann, J., Kim, Y., & Nam, J. Y. (2011). Serotonin transporter polymorphism interacts with childhood adversity to predict aspects of impulsivity. *Psychological Science*, *22*(5), 589–595. 10.1177/0956797611404085

Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, *67*(2), 319–333. 10.1037/0022-3514.67.2.319

Caspi, A. (2000). The child is father of the man: personality continuities from childhood to adulthood. *Journal of Personality and Social Psychology*, *78*(1), 158–172. 10.1037/0022-3514.78.1.158

Caspi, A., Houts, R. M., Belsky, D. W., Goldman-Mellor, S. J., Harrington, H., Israel, S., Meier, M. H., Ramrakha, S., Shalev, I., Poulton, R., & Moffitt, T. E. (2014). The p Factor: One General Psychopathology Factor in the Structure of Psychiatric Disorders?. *Clinical Psychological Science*, *2*(2), 119–137. 10.1177/2167702613497473

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: stability and change. *Annual Review of Psychology*, *56*, 453–484. 10.1146/annurev.psych.55.090902.141913

Castellanos-Ryan, N., Brière, F. N., O'Leary-Barrett, M., Banaschewski, T., Bokde, A., Bromberg, U., Büchel, C., Flor, H., Frouin, V., Gallinat, J., Garavan, H., Martinot, J. L., Nees, F., Paus, T., Pausova, Z., Rietschel, M., Smolka, M. N., Robbins, T. W., Whelan, R., Schumann, G., … IMAGEN Consortium (2016). The structure of psychopathology in adolescence and its common personality and cognitive correlates. *Journal of Abnormal Psychology*, *125(*8), 1039–1052. 10.1037/abn0000193

Castellanos-Ryan, N., & Séguin, J. R. (2016). Prefrontal and anterior cingulate cortex mechanisms of impulsivity. In T. P. Beauchaine & S. P. Hinshaw (Eds.), *The Oxford Handbook of Externalizing Spectrum Disorders* (pp. 201–219). Oxford University Press.

Cecil, C. A., Barker, E. D., Jaffee, S. R., & Viding, E. (2012). Association between maladaptive parenting and child self-control over time: cross-lagged study using a monozygotic twin difference design. *The British Journal of Psychiatry : the Journal of Mental Science*, *201*(4), 291–297. 10.1192/bjp.bp.111.107581

Clark, L. A. (2005). Temperament as a unifying basis for personality and psychopathology. *Journal of Abnormal Psychology (1965), 114*(4), 505-521. 10.1037/0021-843X.114.4.505

Clark, L. A., Cuthbert, B., Lewis-Fernández, R., Narrow, W. E., & Reed, G. M. (2017). Three Approaches to Understanding and Classifying Mental Disorder: ICD-11, DSM-5, and the National Institute of Mental Health's Research Domain Criteria (RDoC). *Psychological Science in the Public interest : a Journal of the American Psychological Society*, *18*(2), 72–145. 0.1177/1529100617727266

Clark, L. A., & Watson, D. (1999). Temperament. In L. Pervin & O. John (Eds.). Handbook of personality (2nd ed., pp. 399–423). New York: Guilford Press.

Class, Q. A., Van Hulle, C. A., Rathouz, P. J., Applegate, B., Zald, D. H., & Lahey, B. B. (2019). Socioemotional dispositions of children and adolescents predict general and specific second-order factors of psychopathology in early adulthood: A 12-year prospective study. *Journal of Abnormal Psychology*, *128*(6), 574–584. 10.1037/abn0000433

Cloninger, C. R., & Zwir, I. (2018). What is the natural measurement unit of temperament: Single traits or profiles? *Philosophical Transactions. Biological Sciences*, *373*(1744), 20170163. 10.1098/rstb.2017.0163

Cohen, P., Cohen, J., Kasen, S., Velez, C. N., Hartmark, C., Johnson, J., Rojas, M., Brook, J., & Streuning, E. L. (1993). An epidemiological study of disorders in late childhood and adolescence--I. Age- and gender-specific prevalence. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *34*(6), 851–867. 10.1111/j.1469-7610.1993.tb01094.x

Congdon, E., & Canli, T. (2008). A neurogenetic approach to impulsivity. *Journal of Personality*, *76*(6), 1447–1484. 10.1111/j.1467-6494.2008.00528.x

Colder, C. R., & Chassin, L. (1997). Affectivity and impulsivity: Temperament risk for adolescent alcohol involvement. *Psychology of Addictive Behaviors*, *11*(2), 83–97. 10.1037/0893-164X.11.2.83

Colins, O. F., Andershed, H., Frogner, L., Lopez-Romero, L., Veen, V., & Andershed, A. K. (2014). A New Measure to Assess Psychopathic Personality in Children: The Child Problematic Traits Inventory. *Journal of Psychopathology and Behavioral Assessment*, 36, 4–21. 10.1007/s10862-013-9385-y

Colins, O. F., Fanti, K. A., & Andershed, H. (2021). The DSM-5 Limited Prosocial Emotions Specifier for Conduct Disorder: Comorbid Problems, Prognosis, and Antecedents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *60*(8), 1020–1029. 10.1016/j.jaac.2020.09.022

Comer, J. S., Chow, C., Chan, P. T., Cooper-Vince, C., & Wilson, L. A. (2013). Psychosocial treatment efficacy for disruptive behavior problems in very young children: a meta-analytic examination. *Journal of the American Academy of Child and Adolescent Psychiatry*, *52*(1), 26–36. 10.1016/j.jaac.2012.10.001

Conduct Problems Prevention Research Group (1995). *Social Competence Scale* (Parent Version). University Park, PA: Pennsylvania State University

Connor, D. F., Newcorn, J. H., Saylor, K. E., Amann, B. H., Scahill, L., Robb, A. S., Jensen, P. S., Vitiello, B., Findling, R. L., & Buitelaar, J. K. (2019). Maladaptive Aggression: With a Focus on Impulsive Aggression in Children and Adolescents. *Journal of Child and Adolescent Psychopharmacology*, *29*(8), 576–591. 10.1089/cap.2019.0039

Conners, C. K., Sitarenios, G., Parker, J. D., & Epstein, J. N. (1998). The revised Conners' Parent Rating Scale (CPRS-R): factor structure, reliability, and criterion validity. *Journal of Abnormal Child Psychology*, *26*(4), 257–268. 10.1023/a:1022602400621

Conway, C. C., Forbes, M. K., South, S. C., & HiTOP Consortium Executive Board (2021). A Hierarchical Taxonomy of Psychopathology (HiTOP) primer for mental health researchers. *Clinical Psychological Science*. 10.1177/21677026211017834

Conway, C. C., & Simms, L. J. (2020). Maximizing the applied value of structural models of psychopathology: Introduction to a Special Issue of Personality and Mental Health. *Personality and Mental Health*, *14*, 3-8. 10.1002/pmh.1474

USC
DE SANTIAGO
DE COMPOSTELA

Cosi, S., Hernández-Martínez, C., Canals, J., & Vigil-Colet, A. (2011). Impulsivity and internalizing disorders in childhood. *Psychiatry Research*, *190*(2-3), 342–347. 10.1016/j.psychres.2011.05.036

Cosi, S., Vigil-Colet, A., Canals, J., & Lorenzo-Seva, U. (2008). Psychometric properties of the Spanish adaptation of the Barratt Impulsiveness Scale-11-A for children. *Psychological Reports*, *103*(2), 336–346. 10.2466/pr0.103.2.336-346

Côté, S. M., Vaillancourt, T., LeBlanc, J. C., Nagin, D. S., & Tremblay, R. E. (2006). The development of physical aggression from toddlerhood to pre-adolescence: a nationwide longitudinal study of Canadian children. *Journal of Abnormal Child Psychology*, *34*(1), 71–85. 10.1007/s10802-005-9001-z

Curry, I., Luk, J. W., Trim, R. S., Hopfer, C. J., Hewitt, J. K., Stallings, M. C., Brown, S. A., & Wall, T. L. (2018). Impulsivity Dimensions and Risky Sex Behaviors in an At-Risk Young Adult Sample. *Archives of Sexual Behavior*, *47*(2), 529–536. 10.1007/s10508-017-1054-x

Cuthbert, B. N., & Kozak, M. J. (2013). Constructing constructs for psychopathology: the NIMH research domain criteria. *Journal of Abnormal Psychology*, *122*(3), 928–937. 10.1037/a0034028

Cyders, M.A., & Smith, G.T. (2007). Mood-based rash action and its components: Positive and negative urgency. *Personality and Individual Differences*, *43*, 839-850. 10.1016/j.paid.2007.02.008

Cyders, M. A., Smith, G. T., Spillane, N. S., Fischer, S., Annus, A. M., & Peterson, C. (2007). Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. *Psychological Assessment*, *19*(1), 107-118. 10.1037/1040-3590.19.1.107

Cyders, M. A. & Smith, G. A. (2008). Emotion-based dispositions to rash action: Positive and Negative Urgency. *Psychological Bulletin*, *134*, 807–828. 10.1037/a0013341

Dadds, M. R., & Frick, P. J. (2019). Toward a transdiagnostic model of common and unique processes leading to the major disorders of childhood: The REAL model of attention, responsiveness and learning. *Behaviour Research and Therapy*, *119*, 103410. 10.1016/j.brat.2019.103410

Dalley, J. W., & Robbins, T. W. (2017). Fractionating impulsivity: neuropsychiatric implications. *Nature Reviews. Neuroscience*, *18*(3), 158–171. 10.1038/nrn.2017.8

de la Osa, N., Granero, R., Penelo, E., Domènech, J. M., & Ezpeleta, L. (2014). Psychometric properties of the Alabama Parenting Questionnaire-Preschool Revision (APQ-Pr) in 3 year-old Spanish preschoolers. *Journal of Child and Family Studies*, *23*(5), 776–784. 10.1007/s10826-013-9730-5

Dalgleish, T., Black, M., Johnston, D., & Bevan, A. (2020). Transdiagnostic approaches to mental health problems: Current status and future directions. *Journal of Consulting and Clinical Psychology*, *88*(3), 179–195. 10.1037/ccp0000482

Derryberry, D., & Rothbart, M. K. (1997). Reactive and effortful processes in the organization of temperament. *Development and Psychopathology*, *9*(4), 633–652. 10.1017/s0954579497001375

DeYoung, C. G., Kotov, R., Krueger, R. F., Cicero, D. C., Conway, C. C., Eaton, N. R., Forbes, M. K., Hallquist, M. N., Jonas, K., Latzman, R. D., Rodriguez-Seijas, C., Ruggero, C. J., Simms, L. J., Waldman, I. D., Waszczuk, M. A., Widiger, T., & Wright, A. (2022). Answering questions about the Hierarchical Taxonomy of Psychopathology (HiTOP): Analogies to whales and sharks miss the boat. *Clinical Psychological Science*, *10*(2), 279–284. 10.1177/21677026211049390

DeYoung, C. G. & Rueter, A. R. (2016). Impulsivity as a personality trait. In K. D. Vohs & R. F. Baumeister (Eds.). *Handbook of Self-Regulation: Research, Theory, and Applications*, (pp. 345–363). New York: Guilford Press.

Dir, A. L., Banks, D. E., Zapolski, T. C., McIntyre, E., & Hulvershorn, L. A. (2016). Negative urgency and emotion regulation predict positive smoking expectancies in non-smoking youth. *Addictive Behaviors*, *58*, 47–52. 10.1016/j.addbeh.2016.02.014

Drabick, D., Steinberg, E.,& Hampton, A. (2016). Overview of DSM Disruptive Behavior Disorders. In T. Beauchaine and S. Hinshaw (Ed.), *The Oxford Handbook of Externalizing Spectrum Disorders*, (pp. 3-19). Oxford University Press

Dick, D. M., Smith, G., Olausson, P., Mitchell, S. H., Leeman, R. F., O'Malley, S. S., & Sher, K. (2010). Understanding the construct of impulsivity and its relationship to alcohol use disorders. *Addiction Biology*, *15*(2), 217–226. 10.1111/j.1369-1600.2009.00190.x

Dick, D. M., Viken, R. J., Kaprio, J., Pulkkinen, L., & Rose, R. J. (2005). Understanding the covariation among childhood externalizing symptoms: Genetic and environmental influences on conduct disorder, attention deficit hyperactivity disorder, and oppositional defiant disorder symptoms. *Journal of Abnormal Child Psychology*, *33*(2), 219–229. 10.1007/s10802-005-1829-8

Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, *53*(6), 1146–1158. 10.1037//0022-3514.53.6.1146

Donati, M. A., Beccari, C., Bacherini, A., Capitanucci, D., & Primi, C. (2021). Psychometric properties of the short UPPS-P scale in adolescents: Gender, age invariance, and validity among italian youth. *Addictive Behaviors*, *120*, 106987. 10.1016/j.addbeh.2021.106987

Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The mini-IPIP scales: tiny-yet-effective measures of the Big Five factors of personality. *Psychological Assessment*, *18*(2), 192–203. 10.1037/1040-3590.18.2.192

Doyle, M., Murphy, J., & Shevlin, M. (2016). Competing factor models of child and adolescent psychopathology. *Journal of Abnormal Child Psychology*, *44*(8), 1559-1571. 10.1007/s10802-016-0129-9

Earls, F. (1980). Prevalence of behavior problems in 3-year-old children: A cross-national replication. *Archives of General Psychiatry*, *37*(10), 1153–1157. 10.1001/archpsyc.1980.01780230071010

Eaton, N. R. (2017). Advances in transdiagnostic psychopathology research: Introduction to the special issue. *Comprehensive Psychiatry*, *79*, 1–3. 10.1016/j.comppsych.2017.09.006

Egger, H. L., & Angold, A. (2006). Common emotional and behavioral disorders in preschool children: presentation, nosology, and epidemiology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *47*(3-4), 313–337. 10.1111/j.1469-7610.2006.01618.x

Eid, M., Geiser, C., Koch, T., & Heene, M. (2017). Anomalous results in G-factor models: Explanations and alternatives. *Psychological Methods*, *22*(3), 541-562. 10.1037/met0000083

Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*, *6*, 495–525. 10.1146/annurev.clinpsy.121208.131208

Español-Martín, G., Pagerols, M., Prat, R., Rivas, C., Sixto, L., Valero, S., Artigas, M. S., Ribasés, M., Ramos-Quiroga, J. A., Casas, M., & Bosch, R. (2021). Strengths and Difficulties Questionnaire: Psychometric Properties and Normative Data for Spanish 5- to 17-Year-Olds. *Assessment*, *28*(5), 1445–1458. 10.1177/1073191120918929

Espeleta, H. C., Brett, E. I., Ridings, L. E., Leavens, E., & Mullins, L. L. (2018). Childhood adversity and adult health-risk behaviors: Examining the roles of emotion dysregulation and urgency. *Child Abuse & Neglect*, *82*, 92–101. 10.1016/j.chiabu.2018.05.027

Ezpeleta, L., de la Osa, N., & Doménech, J. M. (2014). Prevalence of DSM-IV disorders, comorbidity and impairment in 3-year-old Spanish preschoolers. *Social Psychiatry and Psychiatric Epidemiology*, *49*(1), 145–155. 10.1007/s00127-013-0683-1

Evans, B. C., Felton, J. W., Lagacey, M. A., Manasse, S. M., Lejuez, C. W., & Juarascio, A. S. (2019). Impulsivity and affect reactivity prospectively predict disordered eating attitudes in adolescents: a 6-year longitudinal study. *European Child & Adolescent Psychiatry*, *28*(9), 1193–1202. 10.1007/s00787-018-01267-4

Evenden J. L. (1999). Varieties of impulsivity. *Psychopharmacology*, *146*(4), 348–361. 10.1007/pl00005481

Evenden J. L. (1999). Impulsivity: a discussion of clinical and experimental findings. *Journal of Psychopharmacology (Oxford, England)*, *13*(2), 180–192. 10.1177/026988119901300211

Fairchild, G., van Goozen, S. H., Calder, A. J., & Goodyer, I. M. (2013). Research review: evaluating and reformulating the developmental taxonomic theory of antisocial behaviour. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *54*(9), 924–940. 10.1111/jcpp.12102

Fanti K. A. (2018). Understanding heterogeneity in conduct disorder: A review of psychophysiological studies. *Neuroscience and Biobehavioral Reviews*, *91*, 4–20. 10.1016/j.neubiorev.2016.09.022

Farmer, R. F., Seeley, J. R., Kosty, D. B., & Lewinsohn, P. M. (2009). Refinements in the hierarchical structure of externalizing psychiatric disorders. *Journal of Abnormal Psychology (1965)*, *118*(4), 699-710. 10.1037/a0017205

Feil, E. G., Small, J. W., Seeley, J. R., Walker, H. M., Golly, A., Frey, A., & Forness, S. R. (2016). Early Intervention for Preschoolers at Risk for Attention-Deficit/Hyperactivity Disorder: Preschool First Step to Success. *Behavioral Disorders*, *41*(2), 95–106. 10.17988/0198-7429-41.2.95

Forbes, M. K., Greene, A. L., Levin-Aspenson, H. F., Watts, A. L., Hallquist, M., Lahey, B. B., Markon, K. E., Patrick, C. J., Tackett, J. L., Waldman, I. D., Wright, A., Caspi, A., Ivanova, M., Kotov, R., Samuel, D. B., Eaton, N. R., & Krueger, R. F. (2021). Three recommendations based on a comparison of the reliability and validity of the predominant models used in research on the empirical structure of psychopathology. *Journal of Abnormal Psychology*, *130*(3), 297–317. 10.1037/abn0000533

Forbes, M. K., Rapee, R. M., & Krueger, R. F. (2019). Opportunities for the prevention of mental disorders by reducing general psychopathology in early childhood. *Behaviour Research and Therapy*, *119*, 103411. 10.1016/j.brat.2019.103411

Forbes, M. K., Tackett, J. L., Markon, K. E., & Krueger, R. F. (2016). Beyond comorbidity: Toward a dimensional and hierarchical approach to understanding psychopathology across the life span. *Development and Psychopathology*, *28*(4pt1), 971–986. 10.1017/S0954579416000651

Forslund, T., Brocki, K. C., Bohlin, G., Granqvist, P., & Eninger, L. (2016). The heterogeneity of attention-deficit/hyperactivity disorder symptoms and conduct problems: Cognitive inhibition, emotion regulation, emotionality, and disorganized attachment. *The British Journal of Developmental Psychology*, *34*(3), 371–387. 10.1111/bjdp.12136

Fountoulakis, K. N., & Gonda, X. (2019). Modeling human temperament and character on the basis of combined theoretical approaches. *Annals of General Psychiatry*, *18*, 21. 10.1186/s12991-019-0247-1

Frick, M. A., Forslund, T., & Brocki, K. C. (2019). Can reactivity and regulation in infancy predict inattentive and hyperactive/impulsive behavior in 3-year-olds?. *Development and Psychopathology, 31*(2), 619–629. 10.1017/S0954579418000160

Frick, P. J. (2004). Integrating research on temperament and childhood psychopathology: Its pitfalls and promise. *Journal of Clinical Child and Adolescent Psychology, 33*(1), 2-7. 10.1207/S15374424JCCP3301_1

Frick, P. J. (2012). Developmental pathways to conduct disorder: implications for future directions in research, assessment, and treatment. *Journal of Clinical Child and Adolescent Psychology, 41*(3), 378–389. 10.1080/15374416.2012.664815

Frick, P. J., & Morris, A. S. (2004). Temperament and developmental pathways to conduct problems. *Journal of Clinical Child and Adolescent Psychology, 33*(1), 54–68. 10.1207/S15374424JCCP3301_6

Frick, P. J., Ray, J. V., Thornton, L. C., & Kahn, R. E. (2014). Annual research review: A developmental psychopathology approach to understanding callous-unemotional traits in children and adolescents with serious conduct problems. *Journal of Child Psychology and Psychiatry, 55*(6), 532-548. 10.1111/jcpp.12152

Fuchs, S., Klein, A. M., Otto, Y., & von Klitzing, K. (2013). Prevalence of emotional and behavioral symptoms and their impact on daily life activities in a community sample of 3 to 5-year-old children. *Child Psychiatry and Human Development, 44*(4), 493–503. 10.1007/s10578-012-0343-9

Garber, J., & Bradshaw, C. P. (2020). Developmental Psychopathology and the Research Domain Criteria: Friend or Foe?. *Journal of Clinical Child and Adolescent Psychology 53, 49*(3), 341–352. 10.1080/15374416.2020.1753205

Gardner, F., Leijten, P., Melendez-Torres, G. J., Landau, S., Harris, V., Mann, J., Beecham, J., Hutchings, J., & Scott, S. (2019). The Earlier the Better? Individual Participant Data and Traditional Meta-analysis of Age Effects of Parenting Interventions. *Child Development, 90*(1), 7–19. 10.1111/cdev.13138

Gartstein, M. A., Putnam, S. P., & Rothbart, M. K. (2012). Etiology of preschool behavior problems: Contributions of temperament attributes in early childhood. *Infant Mental Health Journal, 33*(2), 197–211. 10.1002/imhj.21312

Geurten, M., Catale, C., Gay, P., Deplus, S., & Billieux, J. (2018). Measuring Impulsivity in Children: Adaptation and Validation of a Short Version of the UPPS-P Impulsive Behaviors Scale in Children and Investigation of its Links With ADHD. *Journal of Attention Disorders, 25*(1), 105–114. 10.1177/1087054718775831

Girard, L. C., Tremblay, R. E., Nagin, D., & Côté, S. M. (2019). Development of Aggression Subtypes from Childhood to Adolescence: a Group-Based Multi-Trajectory Modelling Perspective. *Journal of Abnormal Child Psychology, 47*(5), 825–838. 10.1007/s10802-018-0488-5

Gleason, M. M., Zamfirescu, A., Egger, H. L., Nelson, C. A., 3rd, Fox, N. A., & Zeanah, C. H. (2011). Epidemiology of psychiatric disorders in very young children in a Romanian pediatric setting. *European Child & Adolescent Psychiatry, 20*(10), 527–535. 10.1007/s00787-011-0214-0

Goh, P. K., Lee, C. A., Martel, M. M., Fillmore, M. T., Derefinko, K. J., & Lynam, D. R. (2020). Conceptualizing the UPPS-P model of impulsive personality through network analysis: Key dimensions and general robustness across young adulthood. *Journal of Personality, 88*(6), 1302–1314. 10.1111/jopy.12572

González-Iglesias, B., Gómez-Fraguela, J. A., Romero, E., & Sobral, J. (2012). The effects of impulsiveness and alcohol abuse on traffic code violations. *The European Journal of Psychology Applied to Legal Context, 4* (1) , 1-16.

Goodman R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*(11), 1337–1345. 10.1097/00004583-200111000-00015

Gordon, J. A., & Redish, A. D. (2016). On the cusp. Current challenges and promises in psychiatry. In A. D. Redish & J. A. Gordon (Eds.), *Computational Psychiatry: New Perspectives on Mental Illness* (pp. 3–14). MIT Press

Gorenstein, E. E., & Newman, J. P. (1980). Disinhibitory psychopathology: A new perspective and a model for research. *Psychological Review*, *87*(3), 301–315. 10.1037/0033-295X.87.3.301

Gray, J. A. (1991). The neuropsychology of temperament. In J. Strelau & A. Angleitner (Eds.), *Explorations in temperament: International perspectives on theory and measurement* (pp. 105–128). Plenum Press. 10.1007/978-1-4899-0643-4_8

Graziano, P. A., & Garcia, A. (2016). Attention-deficit hyperactivity disorder and children's emotion dysregulation: A meta-analysis. *Clinical Psychology Review, 46,* 106–123. 0.1016/j.cpr.2016.04.011

Greene, A. L., Eaton, N. R., Li, K., Forbes, M. K., Krueger, R. F., Markon, K. E., Waldman, I. D., Cicero, D. C., Conway, C. C., Docherty, A. R., Fried, E. I., Ivanova, M. Y., Jonas, K. G., Latzman, R. D., Patrick, C. J., Reininghaus, U., Tackett, J. L., Wright, A., & Kotov, R. (2019). Are fit indices used to test psychopathology structure biased? A simulation study. *Journal of Abnormal Psychology*, *128*(7), 740–764. 10.1037/abn0000434

Grice J. W. (2001). Computing and evaluating factor scores. *Psychological Methods*, *6*(4), 430–450. 10.1037/1082-989X.6.4.430

Griffin, S. A., Lynam, D. R., & Samuel, D. B. (2018). Dimensional conceptualizations of impulsivity. *Personality Disorders: Theory, Research, and Treatment, 9*(4), 333–345. doi.org/10.1037/per0000253

Gunn, R. L., & Smith, G. T. (2010). Risk factors for elementary school drinking: pubertal status, personality, and alcohol expectancies concurrently predict fifth grade alcohol consumption. *Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors*, *24*(4), 617–627. 10.1037/a0020334

Gustafsson, B. M., Proczkowska-Björklund, M., & Gustafsson, P. A. (2017). Emotional and behavioural problems in Swedish preschool children rated by preschool teachers with the Strengths and Difficulties Questionnaire (SDQ). *BMC Pediatrics*, *17*(1), 110. 10.1186/s12887-017-0864-2

Haas, S. M., Derefinko, K. J., & Waschbusch, D. A. (2017). The use of multimethod impulsivity assessment in the prediction of ADHD, conduct problems, and callous-unemotional symptoms. *Personality and Individual Differences*, *116*, 289-295. 10.1016/j.paid.2017.04.028

Haas, S.M., Waschbusch, D.A. (2012). Callous-unemotional traits and their relevance to ADHD. *The ADHD*
Report. 20 (3), 5-9. 10.1521/adhd.2012.20.3.5

Haeffel, G. J., Jeronimus, B. F., Fisher, A. J., Kaiser, B. N., Weaver, L. J., Vargas, I., Goodson, J. T., Soyster, P. D., & Lu, W. (2022). The Hierarchical Taxonomy of Psychopathology (HiTOP) is not an improvement over the DSM. *Clinical Psychological Science, 10*(2), 285–290. 10.1177/21677026211068873

Haeffel, G.J., Jeronimus, B.F., Kaiser, B.N., Weaver, L.J., Soyster, P.D., Fisher, A.J., Vargas, I., Goodson, J.T., & Lu, W. (2021). Folk Classification and Factor Rotations: Whales, Sharks, and the Problems With the Hierarchical Taxonomy of Psychopathology (HiTOP). *Clinical Psychological Science, 10,* 259 - 278. 10.1177/21677026211002500

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate Data Analysis* (5th ed.). Upper Saddle River, NJ. Prentice Hall.

Halperin, J. M., Newcorn, J. H., Matier, K., Bedi, G., Hall, S., & Sharma, V. (1995). Impulsivity and the initiation of fights in children with disruptive behavior disorders. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 36*(7), 1199–1211. 10.1111/j.1469-7610.1995.tb01365.x

Harmon-Jones, E., Barratt, E. S., & Wigg, C. (1997). Impulsiveness, aggression, reading, and the P300 of the event-related potential. *Personality and Individual Differences, 22*(4), 439–445. 10.1016/S0191-8869(96)00235-8

Harvey, E. A., Breaux, R. P., & Lugo-Candelas, C. I. (2016). Early development of comorbidity between symptoms of attention-deficit/hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD). *Journal of Abnormal Psychology, 125*(2), 154–167. 10.1037/abn0000090

Hay, D. F. (2017). The early development of human aggression. Child Development Perspectives, 11(2), 102-106. 10.1111/cdep.12220

Helzer, J. E., Kraemer, H. C., & Krueger, R. F. (2006). The feasibility and need for dimensional psychiatric diagnoses. *Psychological Medicine*, *36*(12), 1671–1680. 10.1017/S003329170600821X

Heron, J., Barker, E. D., Joinson, C., Lewis, G., Hickman, M., Munafò, M., & Macleod, J. (2013). Childhood conduct disorder trajectories, prior risk factors and cannabis use at age 16: birth cohort study. *Addiction (Abingdon, England)*, *108*(12), 2129–2138. 10.1111/add.12268

Heterogeneous. 2022. In *Merriam-Webster.com*. Retrieved January 11, 2022, from https://www.merriam-webster.com/dictionary/ heterogeneous

Hinshaw S. P. (2003). Impulsivity, emotion regulation, and developmental psychopathology: specificity versus generality of linkages. *Annals of the New York Academy of Sciences, 1008,* 149–159. 10.1196/annals.1301.016

Hinshaw, S. P., & Beauchaine, T. P. (2016). The developmental psychopathology perspective on externalizing behavior dimensions and externalizing disorders. In T. P. Beauchaine & S. P. Hinshaw (Eds.), *The Oxford Handbook of Externalizing Spectrum Disorders* (pp. 90–102). Oxford University Press.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. 10.1080/10705519909540118

Hubbard, J. A., McAuliffe, M. D., Morrow, M. T., & Romano, L. J. (2010). Reactive and proactive aggression in childhood and adolescence: precursors, outcomes, processes, experiences, and measurement. *Journal of Personality, 78*(1), 95–118. 10.1111/j.1467-6494.2009.00610.x

Hukkelberg, S.S., Tømmerås, T., & Ogden, T. (2019). Parent training: Effects beyond conduct problems. *Children and Youth Services Review.* 100, 405-414. 10.1016/j.childyouth.2019.03.009

Hyman, S. E. (2010). The diagnosis of mental disorders: The problem of reification. *Annual Review of Clinical Psychology, 6*(1), 155-179. 10.1146/annurev.clinpsy.3.022806.091532

IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.

Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., Sanislow, C., & Wang, P. (2010). Research domain criteria (RDoC): toward a new classification framework for research on mental disorders. *The American Journal of Psychiatry*, 167(7), 748–751. 10.1176/appi.ajp.2010.09091379

International Society for Research on Impulsivity. (2021). What is impulsivity. Retrieved from http://www.impulsivity.org/index.htm

James, L. M., & Taylor, J. (2007). Impulsivity and negative emotionality associated with substance use problems and Cluster B personality in college students. *Addictive Behaviors, 32*(4), 714–727. 10.1016/j.addbeh.2006.06.012

Johnson, S. L., Carver, C. S., & Joormann, J. (2013). Impulsive responses to emotion as a transdiagnostic vulnerability to internalizing and externalizing symptoms. *Journal of Affective Disorders*, *150*(3), 872–878. 10.1016/j.jad.2013.05.004

Johnson, S. L., Elliott, M. V., & Carver, C. S. (2020). Impulsive Responses to Positive and Negative Emotions: Parallel Neurocognitive Correlates and Their Implications. *Biological Psychiatry*, *87*(4), 338–349. 10.1016/j.biopsych.2019.08.018

Johnson, S. L., Pearlstein, J., Swerdlow, B., & Carver, C. S. (2018). Emotion-related impulsivity and the mood disorders. In S. Sangha & D. Foti (Eds.), *Neurobiology of abnormal emotion and motivated behaviors: Integrating animal and human research* (pp. 23–40). Elsevier Academic Press. 10.1016/B978-0-12-813693-5.00002-2

Johnson, S. L., Tharp, J. A., Peckham, A. D., Sanchez, A. H., & Carver, C. S. (2016). Positive urgency is related to difficulty inhibiting prepotent responses. *Emotion*, *16*(5), 750–759. 10.1037/emo0000182

Joyner, K. J., Daurio, A. M., Perkins, E. R., Patrick, C. J., & Latzman, R. D. (2021). The difference between trait disinhibition and impulsivity—and why it matters for clinical psychological science. *Psychological Assessment, 33*(1), 29–44. 10.1037/pas0000964

Kagan, J. (1966). Reflection-impulsivity: The generality and dynamics of conceptual tempo. *Journal of Abnormal Psychology*, *71*(1), 17–24. 10.1037/h0022886

Kassing, F., Godwin, J., Lochman, J. E., Coie, J. D., & Conduct Problems Prevention Research Group (2019). Using Early Childhood Behavior Problems to Predict Adult Convictions. *Journal of Abnormal Child Psychology*, *47*(5), 765–778. 10.1007/s10802-018-0478-7

Keenan, K., & Wakschlag, L. S. (2000). More than the terrible twos: the nature and severity of behavior problems in clinic-referred preschool children. *Journal of Abnormal Child Psychology*, *28*(1), 33–46. 10.1023/a:1005118000977

Keenan, K., & Wakschlag, L. S. (2002). Can a valid diagnosis of disruptive behavior disorder be made in preschool children?. *The American Journal of Psychiatry, 159*(3), 351–358. 10.1176/appi.ajp.159.3.351

Kiff, C. J., Lengua, L. J., & Zalewski, M. (2011). Nature and nurturing: parenting in the context of child temperament. *Clinical Child and Family Psychology Review*, *14*(3), 251–301. 10.1007/s10567-011-0093-4

Kimonis, E. R., Fleming, G., Briggs, N., Brouwer-French, L., Frick, P. J., Hawes, D. J., Bagner, D. M., Thomas, R., & Dadds, M. (2019). Parent-Child Interaction Therapy Adapted for Preschoolers with Callous-Unemotional Traits: An Open Trial Pilot Study. *Journal of Clinical Child and Adolescent Psychology 3, 48(*sup1), S347–S361. 10.1080/15374416.2018.1479966

King, K. M., Lengua, L. J., & Monahan, K. C. (2013). Individual differences in the development of self-regulation during pre-adolescence: connections to context and adjustment. *Journal of Abnormal Child Psychology*, *41*(1), 57–69. 10.1007/s10802-012-9665-0

King, K. M., Feil, M. C., & Halvorson, M. A. (2018). Negative urgency is correlated with the use of reflexive and disengagement emotion regulation strategies. *Clinical Psychological Science, 6*(6), 822–834. 10.1177/2167702618785619

Kim, H., & Eaton, N. R. (2015). The hierarchical structure of common mental disorders: Connecting multiple levels of comorbidity, bifactor models, and predictive validity. *Journal of Abnormal Psychology (1965), 124*(4), 1064-1078. 10.1037/abn0000113

Klahr, A. M., & Burt, S. A. (2014). Evaluation of the known behavioral heterogeneity in conduct disorder to improve its assessment and treatment. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *55*(12), 1300–1310. 10.1111/jcpp.12268

Kleberg, J. L., Frick, M. A., & Brocki, K. C. (2021). Increased pupil dilation to happy faces in children with hyperactive/impulsive symptoms of ADHD. *Development and Psychopathology*, *33*(3), 767–777. 10.1017/S0954579420000036

Kolko, D. J., & Pardini, D. A. (2010). ODD dimensions, ADHD, and callous-unemotional traits as predictors of treatment response in children with disruptive behavior disorders. *Journal of Abnormal Psychology (1965), 119*(4), 713-725. 10.1037/a0020910

Koot, H. M., & Verhulst, F. C. (1991). Prevalence of problem behavior in Dutch children aged 2-3. *Acta Psychiatrica Scandinavica. Supplementum*, *367*, 1–37. 10.1111/j.1600-0447.1991.tb10574.x

Kotov, R., Krueger, R. F., & Watson, D. (2018). A paradigm shift in psychiatric classification: The hierarchical taxonomy of psychopathology (HiTOP). *World Psychiatry, 17*(1), 24-25. 10.1002/wps.20478

Kotov, R., Krueger, R. F., Watson, D., Achenbach, T. M., Althoff, R. R., Bagby, R. M., Brown, T. A., Carpenter, W. T., Caspi, A., Clark, L. A., Eaton, N. R., Forbes, M. K., Forbush, K. T., Goldberg, D., Hasin, D., Hyman, S. E., Ivanova, M. Y., Lynam, D. R., Markon, K., Miller, J. D., … Zimmerman, M. (2017). The Hierarchical Taxonomy of Psychopathology (HiTOP): A dimensional alternative to traditional nosologies. *Journal of Abnormal Psychology*, *126*(4), 454–477. 10.1037/abn0000258

Kotov, R., Krueger, R. F., Watson, D., Cicero, D. C., Conway, C. C., DeYoung, C. G., Eaton, N. R., Forbes, M. K., Hallquist, M. N., Latzman, R. D., Mullins-Sweatt, S. N., Ruggero, C. J., Simms, L. J., Waldman, I. D., Waszczuk, M. A., & Wright, A. (2021). The Hierarchical Taxonomy of Psychopathology (HiTOP): A Quantitative Nosology Based on Consensus of Evidence. *Annual Review of Clinical Psychology*, *17*, 83–108. 10.1146/annurev-clinpsy-081219-093304

Kozak, M. J., & Cuthbert, B. N. (2016). The NIMH research domain criteria initiative: background, issues, and pragmatics. *Psychophysiology, 53,* 286-297. 10.1111/psyp.12518

Krueger, R. F., & Eaton, N. R. (2015). Transdiagnostic factors of mental disorders. *World Psychiatry : Official Journal of the World Psychiatric Association (WPA)*, *14*(1), 27–29. 10.1002/wps.20175

Krueger, R. F., Kotov, R., Watson, D., Forbes, M. K., Eaton, N. R., Ruggero, C. J., Simms, L. J., Widiger, T. A., Achenbach, T. M., Bach, B., Bagby, R. M., Bornovalova, M. A., Carpenter, W. T., Chmielewski, M., Cicero, D. C., Clark, L. A., Conway, C., DeClercq, B., DeYoung, C. G., Docherty, A. R., … Zimmermann, J. (2018). Progress in achieving quantitative classification of psychopathology. *World psychiatry : official journal of the World Psychiatric Association (WPA)*, *17*(3), 282–293. 10.1002/wps.20566

Krueger, R. F., Hicks, B. M., Patrick, C. J., Carlson, S. R., Iacono, W. G., & McGue, M. (2002). Etiologic connections among substance dependence, antisocial behavior, and personality. *Journal of Abnormal Psychology (1965), 111*(3), 411-424. 10.1037/0021-843X.111.3.411

Krueger, R. F., Hobbs, K. A., Conway, C. C., Dick, D. M., Dretsch, M. N., Eaton, N. R., Forbes, M. K., Forbush, K. T., Keyes, K. M., Latzman, R. D., Michelini, G., Patrick, C. J., Sellbom, M., Slade, T., South, S. C., Sunderland, M., Tackett, J., Waldman, I., Waszczuk, M. A., Wright, A., … HiTOP Utility Workgroup (2021). Validity and utility of Hierarchical Taxonomy of Psychopathology (HiTOP): II. Externalizing superspectrum. *World Psychiatry, 20*(2), 171–193. 10.1002/wps.20844

Krueger, R. F., & Markon, K. E. (2006). Reinterpreting comorbidity: A model-based approach to understanding and classifying psychopathology. *Annual Review of Clinical Psychology, 2*(1), 111-133. 10.1146/annurev.clinpsy.2.022305.095213

Krueger, R. F., Markon, K. E., Patrick, C. J., Benning, S. D., & Kramer, M. D. (2007). Linking antisocial behavior, substance use, and personality. *Journal of Abnormal Psychology (1965), 116*(4), 645-666. 10.1037/0021-843X.116.4.645

Krueger, R. F., Markon, K. E., Patrick, C. J., & Iacono, W. G. (2005). Externalizing psychopathology in adulthood: a dimensional-spectrum conceptualization and its implications for DSM-V. *Journal of Abnormal Psychology, 114*(4), 537–550. 10.1037/0021-843X.114.4.537

Krueger, R. F., Watson, D., & Widiger, T. (2020). The vibrant intersection of personality and psychopathology research: A special issue of the *Journal of Research in Personality. Journal of Research in Personality, 84,*1-3. 10.1016/j.jrp.2019.103890

Kuja-Halkola, R., Lichtenstein, P., D'Onofrio, B. M., & Larsson, H. (2015). Codevelopment of ADHD and externalizing behavior from childhood to adulthood. *Journal of Child Psychology and Psychiatry, 56*(6), 640-647. 10.1111/jcpp.12340

Lahey, B. B. (2004). Commentary: Role of temperament in developmental models of psychopathology. *Journal of Clinical Child and Adolescent Psychology, 33*(1), 88-93. 10.1207/S15374424JCCP3301_9

Lahey, B. B., Applegate, B., Chronis, A. M., Jones, H. A., Williams, S. H., Loney, J., & Waldman, I. D. (2008). Psychometric characteristics of a measure of emotional dispositions developed to test a developmental propensity model of conduct disorder. *Journal of Clinical Child and Adolescent Psychology, 37*(4), 794-807. 10.1080/15374410802359635

Lahey, B. B., Class, Q. A., Zald, D. H., Rathouz, P. J., Applegate, B., & Waldman, I. D. (2018). Prospective test of the developmental propensity model of antisocial behavior: from childhood and adolescence into early adulthood. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 59*(6), 676–683. 10.1111/jcpp.12852

Lahey, B. B., Hinton, K. E., Meyer, F. C., Villalta-Gil, V., Van Hulle, C. A., Applegate, B., Yang, X., & Zald, D. H. (2020). Sex differences in associations of socioemotional dispositions measured in childhood and adolescence with brain white matter microstructure 12 years later. *Personality Neuroscience, 3,* e5. 10.1017/pen.2020.3

Lahey, B. B., Krueger, R. F., Rathouz, P. J., Waldman, I. D., & Zald, D. H. (2017). A hierarchical causal taxonomy of psychopathology across the life span. *Psychological Bulletin, 143*(2), 142-186. 10.1037/bul0000069

Lahey, B.B., Moore, T.M., Kaczkurkin, A.N., & Zald, D.H. (2021). Hierarchical models of psychopathology: empirical support, implications, and remaining issues. *World Psychiatry,* 20 (1), 57-63. 10.1002/wps.20824

Lahey, B. B., Rathouz, P. J., Van Hulle, C., Urbano, R. C., Krueger, R. F., Applegate, B., Garriock, H. A., Chapman, D. A., & Waldman, I. D. (2008). Testing structural models of DSM-IV symptoms of common forms of child and adolescent psychopathology. *Journal of Abnormal Child Psychology*, *36*(2), 187–206. 10.1007/s10802-007-9169-5

Lahey, B. B., Van Hulle, C. A., Singh, A. L., Waldman, I. D., & Rathouz, P. J. (2011). Higher-order genetic and environmental structure of prevalent forms of child and adolescent psychopathology. *Archives of General Psychiatry*, *68*(2), 181-189. 10.1001/archgenpsychiatry.2010.192

Lahey, B. B., & Waldman, I. D. (2003). A developmental propensity model of the origins of conduct problems during childhood and adolescence. In B. B. Lahey, T. E. Moffitt, & A. Caspi (Eds.), *Causes of conduct disorder and juvenile delinquency* (pp. 76-117). New York, NY: Guilford Press.

Lahey, B,B., & Waldman, I.D. (2005). A developmental model of the propensity to offend during childhood and adolescence. In D. P.Farrington (Ed.), *Advances in criminological theory. Vol. 13*. (pp. 15-50). Piscataway, NJ: Transaction Publishers.

Lahey, B. B., & Waldman, I. D. (2012). Annual research review: phenotypic and causal structure of conduct disorder in the broader context of prevalent forms of psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *53*(5), 536–557. 10.1111/j.1469-7610.2011.02509.x

Latzman, R. D., DeYoung, C. G., & HITOP NEUROBIOLOGICAL FOUNDATIONS WORKGROUP (2020). Using empirically-derived dimensional phenotypes to accelerate clinical neuroscience: the Hierarchical Taxonomy of Psychopathology (HiTOP) framework. *Neuropsychopharmacology*, *45*(7), 1083–1085. 10.1038/s41386-020-0639-6

Latzman, R. D., Krueger, R. F., DeYoung, C. G., & Michelini, G. (2021). Connecting quantitatively derived personality-psychopathology models and neuroscience. *Personality Neuroscience*, *4*, e4. 10.1017/pen.2021.3

Laurent, J., Catanzaro, S. J., Joiner, T. E., Jr., Rudolph, K. D., Potter, K. I., Lambert, S., Osborne, L., & Gathright, T. (1999). A measure of positive and negative affect for children: Scale development and preliminary validation. *Psychological Assessment*, *11*(3), 326–338. 10.1037/1040-3590.11.3.326

Lavigne, J. V., Gibbons, R. D., Christoffel, K. K., Arend, R., Rosenbaum, D., Binns, H., Dawson, N., Sobel, H., & Isaacs, C. (1996). Prevalence rates and correlates of psychiatric disorders among preschool children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *35*(2), 204–214. 10.1097/00004583-199602000-00014

Lavigne, J. V., Gouze, K. R., Hopkins, J., Bryant, F. B., & LeBailly, S. A. (2012). A multi-domain model of risk factors for ODD symptoms in a community sample of 4-year-olds. *Journal of Abnormal Child Psychology*, *40*(5), 741–757. 10.1007/s10802-011-9603-6

Lawson, K. M., & Robins, R. W. (2021). Sibling Constructs: What Are They, Why Do They Matter, and How Should You Handle Them?. *Personality and social psychology review : an official journal of the Society for Personality and Social Psychology, Inc*, *25*(4), 344–366. 10.1177/10888683211047101

Leibenluft, E., & Stoddard, J. (2013). The developmental psychopathology of irritability. *Development and Psychopathology*, *25*(4 Pt 2), 1473–1487. 10.1017/S0954579413000722

USC
UNIVERSIDADE
DE SANTIAGO
DE COMPOSTELA

Lengua, L. J., West, S. G., & Sandler, I. N. (1998). Temperament as a predictor of symptomatology in children: Addressing contamination of measures. *Child Development, 69*(1), 164–181. 10.2307/1132078

Lilienfeld, S. O. (2003). Comorbidity between and within childhood externalizing and internalizing disorders: Reflections and directions. *Journal of Abnormal Child Psychology, 31*(3), 285-291. 10.1023/A:1023229529866

Lilienfeld S. O. (2014). The Research Domain Criteria (RDoC): an analysis of methodological and conceptual challenges. *Behaviour Research and Therapy, 62*, 129–139. 10.1016/j.brat.2014.07.019

Littlefield, A. K., Stevens, A. K., Ellingson, J. M., King, K. M., & Jackson, K. M. (2016). Changes in negative urgency, positive urgency, and sensation seeking across adolescence. *Personality and Individual Differences, 90*, 332–337. 0.1016/j.paid.2015.11.024

Liu R. T. (2019). Childhood Maltreatment and Impulsivity: A Meta-Analysis and Recommendations for Future Study. *Journal of Abnormal Child Psychology*, *47*(2), 221–243. 10.1007/s10802-018-0445-3

Longman, T., Hawes, D. J., & Kohlhoff, J. (2016). Callous–unemotional traits as markers for conduct problem severity in early childhood: A meta-analysis. *Child Psychiatry and Human Development*, 47, 326–334. 10.1007/s10578-015-0564-9

López-Romero, L., Romero, E., Colins, O. F., Andershed, H., Hare, R. D., & Salekin, R. T. (2019). Proposed Specifiers for Conduct Disorder (PSCD): Preliminary validation of the parent version in a Spanish sample of preschoolers. *Psychological Assessment*, *31*(11), 1357–1367. 10.1037/pas0000759

Lorber, M. F., Del Vecchio, T., & Slep, A. M. S. (2015). The emergence and evolution of infant externalizing behavior. *Development and Psychopathology, 27*(3), 663-680. 10.1017/S0954579414000923

Luengo, M. A., Carrillo-de-la-Peña, M. T., Otero, J. M., & Romero, E. (1994). A short-term longitudinal study of impulsivity and antisocial behavior. *Journal of Personality and Social Psychology*, *66*(3), 542–548. 10.1037//0022-3514.66.3.542

Luk, J. W., Trim, R. S., Karyadi, K. A., Curry, I., Hopfer, C. J., Hewitt, J. K., Stallings, M. C., Brown, S. A., & Wall, T. L. (2017). Unique and interactive effects of impulsivity facets on reckless driving and driving under the influence in a high-risk young adult sample. *Personality and Individual Differences*, *114*, 42–47. 10.1016/j.paid.2017.03.048

Luk, S. L., Leung, P. W., Bacon-Shone, J., & Lieh-Mak, F. (1991). The structure and prevalence of behavioral problems in Hong Kong preschool children. *Journal of Abnormal Child Psychology*, *19*(2), 219–232. 10.1007/BF00909979

Lynam, D. R. (1996). Early identification of chronic offenders: Who is the fledgling psychopath? *Psychological Bulletin, 120*(2), 209–234. 10.1037/0033-2909.120.2.209

Lynam, D. R., & Miller, J. D. (2004). Personality Pathways to Impulsive Behavior and Their Relations to Deviance: Results from Three Samples. *Journal of Quantitative Criminology, 20*(4), 319–341. 23366826

Lynam, D. R., Whiteside, S. P., Smith, G. T., & Cyders, M. A. (2006). *The UPPS-P: Assessing five personality pathways to impulsive behavior.* West Lafayette, IN: Purdue University. Unpublished report.

Mann, F. D., Engelhardt, L., Briley, D. A., Grotzinger, A. D., Patterson, M. W., Tackett, J. L., Strathan, D. B., Heath, A., Lynskey, M., Slutske, W., Martin, N. G., Tucker-Drob, E. M., & Harden, K.

P. (2017). Sensation seeking and impulsive traits as personality endophenotypes for antisocial behavior: Evidence from two independent samples. *Personality and Individual Differences, 105*, 30–39. 10.1016/j.paid.2016.09.018

Markon K. E. (2019). Bifactor and Hierarchical Models: Specification, Inference, and Interpretation. *Annual Review of Clinical Psychology, 15*, 51–69. 10.1146/annurev-clinpsy-050718-095522

Marković, J., Rescorla, L., Okanović, P., Maraš, J. S., Bukurov, K. G., & Sekulić, S. (2016). Assessment of preschool psychopathology in Serbia. *Research in Developmental Disabilities, 49-50*, 216–225. 10.1016/j.ridd.2015.11.027

Marmorstein N. R. (2013). Associations between dispositions to rash action and internalizing and externalizing symptoms in children. *Journal of clinical child and adolescent psychology : the official journal for the Society of Clinical Child and Adolescent Psychology, American Psychological Association, Division 53*, *42*(1), 131–138. 10.1080/15374416.2012.734021

Martel, M. M., Gremillion, M. L., & Roberts, B. (2012). Temperament and common disruptive behavior problems in preschool. *Personality and Individual Differences, 53*(7), 874-879. 10.1016/j.paid.2012.07.011

Martel, M. M., Gremillion, M., Roberts, B., von Eye, A., & Nigg, J. T. (2010). The structure of childhood disruptive behaviors. *Psychological Assessment, 22*(4), 816-826. 10.1037/a0020975

Martel, M., Levinson, C., Lee, C., & Smith, T. (2017). Impulsivity symptoms as core to the developmental externalizing spectrum. *Journal of Abnormal Child Psychology, 45*(1), 83-90. 10.1007/s10802-016-0148-6

Martel, M. M., & Nigg, J. T. (2006). Child ADHD and personality/temperament traits of reactive and effortful control, resiliency, and emotionality. *Journal of child psychology and psychiatry, and allied disciplines*, *47*(11), 1175–1183. 10.1111/j.1469-7610.2006.01629.x

Marsh, H., Morin, A., Parker, P.D., & Kaur, G. (2014). Exploratory structural equation modeling: an integration of the best features of exploratory and confirmatory factor analysis. *Annual Review of Clinical Psychology, 10*, 85-110 . 10.1146/annurev-clinpsy-032813-153700

Mathesius, J., Lussier, P., & Corrado, R. (2017). Child and adolescent disposition model: An examination of the temperament factor structure within early childhood. *International Journal of Offender Therapy and Comparative Criminology, 61*(13), 1500-1526. 10.1177/0306624X16672931

Mathias, C. W., Stanford, M. S., Liang, Y., Goros, M., Charles, N. E., Sheftall, A. H., Mullen, J., Hill-Kapturczak, N., Acheson, A., Olvera, R. L., & Dougherty, D. M. (2018). A test of the psychometric characteristics of the BIS-Brief among three groups of youth. *Psychological assessment*, *30*(7), 847–856. 10.1037/pas0000531

Mervielde, I., & De Pauw, S. (2012). Models of Child Temperament. In M. Zentner & R. L. Shiner (Eds.), *Handbook of Temperament* (p. 21–41). The Guilford Press.

Mezquita, L., Ibáñez, M.I., Villa, H., Fañanás, L., Moya-Higueras, J., & Ortet, G. (2015). Five-factor model and internalizing and externalizing syndromes: A 5-year prospective study. *Personality and Individual Differences, 79*, 98-103. 10.1016/j.paid.2015.02.002

McElroy, E., Belsky, J., Carragher, N., Fearon, P., & Patalay, P. (2018). Developmental stability of general and specific factors of psychopathology from early childhood to adolescence: dynamic mutualism or p-differentiation? *Journal of Child Psychology and Psychiatry, 59*(6), 667-675. 10.1111/jcpp.12849

McLuckie, A., Landers, A.L., Curran, J.A., Cann, R., Carrese, D.H., Nolan, A., Corrigan, K., & Carrey, N. (2019). A scoping review of mental health prevention and intervention initiatives for infants

and preschoolers at risk for socio-emotional difficulties. *Systematic Reviews,* 8, 183. 10.1186/s13643-019-1043-3

Merikangas, K. R., Nakamura, E. F., & Kessler, R. C. (2009). Epidemiology of mental disorders in children and adolescents. *Dialogues in Clinical Neuroscience*, *11*(1), 7–20. 10.31887/DCNS.2009.11.1/krmerikangas

Michelini, G., Palumbo, I. M., DeYoung, C. G., Latzman, R. D., & Kotov, R. (2021). Linking RDoC and HiTOP: A new interface for advancing psychiatric nosology and neuroscience. *Clinical Psychology Review*, *86*, 102025. 10.1016/j.cpr.2021.102025

Miller, J.D., Flory, K., Lynam, D., & Leukefeld, C. (2003). A test of the four-factor model of impulsivity-related traits. *Personality and Individual Differences, 34,* 1403-1418. 10.1016/S0191-8869(02)00122-8

Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M., & Swann, A. C. (2001). Psychiatric aspects of impulsivity. *The American Journal of Psychiatry*, *158*(11), 1783–1793. 10.1176/appi.ajp.158.11.1783

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*(4), 674–701. 10.1037/0033-295X.100.4.674

Moore, T. M., Kaczkurkin, A. N., Durham, E. L., Jeong, H. J., McDowell, M. G., Dupont, R. M., Applegate, B., Tackett, J. L., Cardenas-Iniguez, C., Kardan, O., Akcelik, G. N., Stier, A. J., Rosenberg, M. D., Hedeker, D., Berman, M. G., & Lahey, B. B. (2020). Criterion validity and relationships between alternative hierarchical dimensional models of general and specific psychopathology. *Journal of Abnormal Psychology*, *129*(7), 677–688. 10.1037/abn0000601

Morris, S., Musser, E. D., Tenenbaum, R. B., Ward, A. R., Martinez, J., Raiker, J. S., Coles, E. K., & Riopelle, C. (2020). Emotion Regulation via the Autonomic Nervous System in Children with Attention-Deficit/Hyperactivity Disorder (ADHD): Replication and Extension. *Journal of Abnormal Child Psychology*, *48*(3), 361–373. 10.1007/s10802-019-00593-8

Muris, P., Meesters, C., de Kanter, E., & Timmerman, P. E. (2005). Behavioural inhibition and behavioural activation system scales for children: Relationships with Eysenck's personality traits and psychopathological symptoms. *Personality and Individual Differences, 38*(4), 831-841. 10.1016/j.paid.2004.06.007

Musci, R. J., Bradshaw, C. P., Maher, B., Uhl, G. R., Kellam, S. G., & Ialongo, N. S. (2014). Reducing aggression and impulsivity through school-based prevention programs: a gene by intervention interaction. *Prevention science*, 15(6), 831–840. 10.1007/s11121-013-0441-3

Muthén, L., & Muthén, B. (2019). *Mplus. The Comprehensive Modelling Program for Applied Researchers: User's Guide, 5.*

Nigg J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *47*(3-4), 395–422. 10.1111/j.1469-7610.2006.01612.x

Nigg, J. T. (2016). Attention and impulsivity. In D. Cicchetti (Ed.), *Developmental psychopathology: Maladaptation and psychopathology* (pp. 591–646). John Wiley & Sons, Inc.

Nigg J. T. (2017). Annual Research Review: On the relations among self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-taking, and inhibition for developmental psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *58*(4), 361–383. 10.1111/jcpp.12675

USC
UNIVERSIDADE DE COMPOSTELA

Nigg, J. T., Goldsmith, H. H., & Sachek, J. (2004). Temperament and attention deficit hyperactivity disorder: the development of a multiple pathway model. *Journal of Clinical Child and Adolescent Psychology*, 33(1), 42–53. 10.1207/S15374424JCCP3301_5

Nigg, J. T., & Nagel, B. J. (2016). Commentary: Risk taking, impulsivity, and externalizing problems in adolescent development--commentary on Crone et al. 2016. *Journal of Child Psychology and Psychiatry, and Allied Dsciplines*, *57*(3), 369–370. 10.1111/jcpp.12539

Nikolas, M. A. (2016). Comorbidity Among Externalizing Disorders. In T. Beauchaine and S. Hinshaw (Ed.), *The Oxford Handbook of Externalizing Spectrum Disorders*, (pp. 461-481). Oxford University Press

Obsuth, I., Murray, A. L., Di Folco, S., Ribeaud, D., & Eisner, M. (2020). Patterns of Homotypic and Heterotypic Continuity Between ADHD Symptoms, Externalizing and Internalizing Problems from Age 7 to 15. *Journal of Abnormal Child Psychology*, *48*(2), 223–236. 10.1007/s10802-019-00592-9

Olino, T. M., Dougherty, L. R., Bufferd, S. J., Carlson, G. A., & Klein, D. N. (2014). Testing models of psychopathology in preschool-aged children using a structured interview-based assessment. *Journal of Abnormal Child Psychology*, *42*(7), 1201–1211. 10.1007/s10802-014-9865-x

Olson, S. L., Bates, J. E., & Bayles, K. (1990). Early antecedents of childhood impulsivity: the role of parent-child interaction, cognitive competence, and temperament. *Journal of Abnormal Child Psychology*, *18*(3), 317–334. 10.1007/BF00916568

Olson, S. L., Bates, J. E., Sandy, J. M., & Schilling, E. M. (2002). Early developmental precursors of impulsive and inattentive behavior: from infancy to middle childhood. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *43*(4), 435–447. 10.1111/1469-7610.00035

Olson, S. L., Sameroff, A. J., Lansford, J. E., Sexton, H., Davis-Kean, P., Bates, J. E., Pettit, G. S., & Dodge, K. A. (2013). Deconstructing the externalizing spectrum: growth patterns of overt aggression, covert aggression, oppositional behavior, impulsivity/inattention, and emotion dysregulation between school entry and early adolescence. *Development and Psychopathology*, *25*(3), 817–842. 10.1017/S0954579413000199

Olson, S. L., Schilling, E. M., & Bates, J. E. (1999). Measurement of impulsivity: construct coherence, longitudinal stability, and relationship with externalizing problems in middle childhood and adolescence. *Journal of Abnormal Child Psychology*, *27(*2), 151–165. 10.1023/a:1021915615677

Ostlund, B., Myruski, S., Buss, K., & Pérez-Edgar, K. E. (2021). The centrality of temperament to the research domain criteria (RDoC): The earliest building blocks of psychopathology. *Development and Psychopathology*, 1–15. Advance online publication. 10.1017/S0954579421000511

Owens, M. M., Hyatt, C. S., Gray, J. C., Miller, J. D., Lynam, D. R., Hahn, S., Allgaier, N., Potter, A., & Garavan, H. (2020). Neuroanatomical correlates of impulsive traits in children aged 9 to 10. *Journal of Abnormal Psychology*, *129*(8), 831–844. 10.1037/abn0000627

Pardini, D. A., Byrd, A. L., Hawes, S. W., & Docherty, M. (2018). Unique Dispositional Precursors to Early-Onset Conduct Problems and Criminal Offending in Adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry*, *57*(8), 583–592.e3. 10.1016/j.jaac.2018.04.013

Pardini, D., & Frick, P. J. (2013). Multiple developmental pathways to conduct disorder: Current conceptualizations and clinical implications. *Journal of the Canadian Academy of Child and Adolescent Psychiatry / Journal de l'Académie canadienne de psychiatrie de l'enfant et de l'adolescent*, *22*(1), 20–25.

Patrick, C. J., Kramer, M. D., Krueger, R. F., & Markon, K. E. (2013). Optimizing efficiency of psychopathology assessment through quantitative modeling: development of a brief form of the Externalizing Spectrum Inventory. *Psychological Assessment*, *25*(4), 1332–1348. 10.1037/a0034864

Paunonen, S. V. (1998). Hierarchical organization of personality and prediction of behavior. *Journal of Personality and Social Psychology*, *74*(2), 538–556. 10.1037/0022-3514.74.2.538

Pearlstein, J. G., Johnson, S. L., Modavi, K., Peckham, A. D., & Carver, C. S. (2019). Neurocognitive mechanisms of emotion-related impulsivity: The role of arousal. *Psychophysiology*, *56*(2), e13293. 10.1111/psyp.13293

Pechorro, P., Revilla, R., Palma, V. H., Nunes, C., Martins, C., & Cyders, M. A. (2021). Examination of the SUPPS-P Impulsive Behavior Scale among Male and Female Youth: Psychometrics and Invariance. *Children (Basel, Switzerland)*, *8*(4), 283. 10.3390/children8040283

Pedersen, S. L., King, K. M., Louie, K. A., Fournier, J. C., & Molina, B. (2019). Momentary fluctuations in impulsivity domains: Associations with a history of childhood ADHD, heavy alcohol use, and alcohol problems. *Drug and Alcohol Dependence*, *205*, 107683. 10.1016/j.drugalcdep.2019.107683

Peterson, S. J., & Smith, G. T. (2017). Association between elementary school personality and high school smoking and drinking. *Addiction*, *112*(11), 2043–2052. 10.1111/add.13905

Peterson, S. J., & Smith, G. T. (2019). Impulsigenic personality: Is urgency an example of the jangle fallacy? *Psychological Assessment*, *31*(9), 1135–1144. 10.1037/pas0000740

Petitclerc, A., & Tremblay, R. E. (2009). Childhood disruptive behaviour disorders: review of their origin, development, and prevention. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, *54*(4), 222–231. 10.1177/070674370905400403

Petresco, S., Anselmi, L., Santos, I. S., Barros, A. J., Fleitlich-Bilyk, B., Barros, F. C., & Matijasevich, A. (2014). Prevalence and comorbidity of psychiatric disorders among 6-year-old children: 2004 Pelotas Birth Cohort. *Social Psychiatry and Psychiatric Epidemiology*, *49*(6), 975–983. 10.1007/s00127-014-0826-z

Pillow, D., Pelham Jr, W., Hoza, B., Molina, B., & Stultz, C. (1998). Confirmatory factor analyses examining attention deficit hyperactivity disorder symptoms and other childhood disruptive behaviors. *Journal of Abnormal Child Psychology*, *26*(4), 293-309. 10.1023/A:1022658618368

Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A., & Rohde, L. A. (2015). Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *56*(3), 345–365. doi.org/10.1111/jcpp.12381

Poulin, F., & Boivin, M. (2000). Reactive and proactive aggression: evidence of a two-factor model. *Psychological Assessment*, *12*(2), 115–122. 10.1037//1040-3590.12.2.115

Pringsheim, T., Hirsch, L., Gardner, D., & Gorman, D. A. (2015). The pharmacological management of oppositional behaviour, conduct problems, and aggression in children and adolescents with attention-deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder: a systematic review and meta-analysis. Part 1: psychostimulants, alpha-2 agonists, and atomoxetine. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, *60*(2), 42–51. 10.1177/070674371506000202

Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the Children's Behavior Questionnaire. *Journal of Personality Assessment*, *87*(1), 102–112. 10.1207/s15327752jpa8701_09

Rapee R. M. (2013). The preventative effects of a brief, early intervention for preschool-aged children at risk for internalising: follow-up into middle adolescence. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *54*(7), 780–788. 10.1111/jcpp.12048

Reinke, W. M., Herman, K. C., Petras, H., & Ialongo, N. S. (2008). Empirically derived subtypes of child academic and behavior problems: co-occurrence and distal outcomes. *Journal of Abnormal Child Psychology*, *36*(5), 759–770. 10.1007/s10802-007-9208-2

Rettew, D. C., & McKee, L. (2005). Temperament and its role in developmental psychopathology. *Harvard Review of Psychiatry*, *13*(1), 14-27. 10.1080/10673220590923146

Revill, A. S., Patton, K. A., Connor, J. P., Sheffield, J., Wood, A. P., Castellanos-Ryan, N., & Gullo, M. J. (2020). From Impulse to Action? Cognitive Mechanisms of Impulsivity-Related Risk for Externalizing Behavior. *Journal of Abnormal Child Psychology*, *48*(8), 1023–1034. 10.1007/s10802-020-00642-7

Rhee, S. H., Friedman, N. P., Corley, R. P., Hewitt, J. K., Hink, L. K., Johnson, D. P., Smith Watts, A. K., Young, S. E., Robinson, J., Waldman, I. D., & Zahn-Waxler, C. (2016). An examination of the developmental propensity model of conduct problems. *Journal of Abnormal Psychology (1965)*, *125*(4), 550-564. 10.1037/abn0000128

Rijlaarsdam, J., Stevens, G. W., van der Ende, J., Hofman, A., Jaddoe, V. W., Mackenbach, J. P., Verhulst, F. C., & Tiemeier, H. (2013). Economic disadvantage and young children's emotional and behavioral problems: mechanisms of risk. *Journal of Abnormal Child Psychology*, *41*(1), 125–137. 10.1007/s10802-012-9655-2

Ringwald, W. R., Forbes, M. K., & Wright, A. (2021). Meta-analysis of structural evidence for the Hierarchical Taxonomy of Psychopathology (HiTOP) model. *Psychological Medicine*, 1–14. Advance online publication. /10.1017/S0033291721001902

Rioux, C., Murray, J., Castellanos-Ryan, N., Séguin, J. R., Tremblay, R. E., & Parent, S. (2020). Moderation of parenting by inhibitory control in the prediction of the common and unique variance of hyperactivity-impulsivity and inattention. *Development and Psychopathology*, *32*(3), 909–921. 10.1017/S0954579419000774

Rivenbark, J. G., Odgers, C. L., Caspi, A., Harrington, H., Hogan, S., Houts, R. M., Poulton, R., & Moffitt, T. E. (2018). The high societal costs of childhood conduct problems: evidence from administrative records up to age 38 in a longitudinal birth cohort. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *59*(6), 703–710. 10.1111/jcpp.12850

Rodenacker, K., Hautmann, C., Görtz-Dorten, A., & Döpfner, M. (2018). Evidence for the trait-impulsivity etiological model in a clinical sample: Bifactor structure and its relation to impairment and environmental risk. *Journal of Abnormal Child Psychology*, *46*(4), 659-669. 10.1007/s10802-017-0329-y

Rosellini, A. J., & Brown, T. A. (2021). Developing and Validating Clinical Questionnaires. *Annual Review of Clinical Psychology*, 10.1146/annurev-clinpsy-081219-115343. Advance online publication. 10.1146/annurev-clinpsy-081219-115343

Rosen, P. J., & Factor, P. I. (2015). Emotional Impulsivity and Emotional and Behavioral Difficulties Among Children With ADHD: An Ecological Momentary Assessment Study. *Journal of Attention Disorders*, *19*(9), 779–793. 0.1177/1087054712463064

Rothbart, M. K. (1989). Temperament in childhood: A framework. In G. A. Kohnstamm, J. E. Bates, & M. K. Rothbart (Eds.), *Temperament in childhood* (pp. 59–73). John Wiley & Sons.

Rothbart, M. K. (2007). Temperament, development, and personality. *Current Directions in Psychological Science*, *16*(4), 207–212. 10.1111/j.1467-8721.2007.00505.x

Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: the Children's Behavior Questionnaire. *Child Development*, *72*(5), 1394–1408. 10.1111/1467-8624.00355

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of Child Psychology: Social, Emotional, and Personality Development* (pp. 99–166). John Wiley & Sons, Inc..

RStudio Team (2019). *RStudio: Integrated Development for R*. RStudio, Inc., Boston, MA URL http://www.rstudio.com/.

Ruggero, C. J., Kotov, R., Hopwood, C. J., First, M., Clark, L. A., Skodol, A. E., Mullins-Sweatt, S. N., Patrick, C. J., Bach, B., Cicero, D. C., Docherty, A., Simms, L. J., Bagby, R. M., Krueger, R. F., Callahan, J. L., Chmielewski, M., Conway, C. C., De Clercq, B., Dornbach-Bender, A., Eaton, N. R., … Zimmermann, J. (2019). Integrating the Hierarchical Taxonomy of Psychopathology (HiTOP) into clinical practice. *Journal of Consulting and Clinical Psychology*, *87*(12), 1069–1084. 10.1037/ccp0000452

Rutter M. (2009). Understanding and testing risk mechanisms for mental disorders. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *50*(1-2), 44–52. 10.1111/j.1469-7610.2008.01976.x

Rutter, M., & Pickles, A. (2016). Annual research review: Threats to the validity of child psychiatry and psychology. *Journal of Child Psychology and Psychiatry*, *57*(3), 398-416. 10.1111/jcpp.12461

Rutter, M., & Pine, D. S. (2015). Diagnosis, diagnostic formulations, and classification. *Rutter's Child and Adolescent Psychiatry* (pp. 17-30). John Wiley & Sons, Ltd. 10.1002/9781118381953.ch2

Salekin, R. T. (2016). Psychopathy in childhood: Toward better informing the DSM–5 and ICD-11 conduct disorder specifiers. *Personality Disorders: Theory, Research, and Treatment*, *7*(2), 180–191. 10.1037/per0000150

Sanchez-Roige, S., Fontanillas, P., Elson, S. L., Gray, J. C., de Wit, H., MacKillop, J., & Palmer, A. A. (2019). Genome-Wide Association Studies of Impulsive Personality Traits (BIS-11 and UPPS-P) and Drug Experimentation in up to 22,861 Adult Research Participants Identify Loci in the *CACNA1I* and *CADM2* genes. *The Journal of Neuroscience*, *39*(13), 2562–2572. 10.1523/JNEUROSCI.2662-18.2019

Sandler, I., Wolchik, S. A., Cruden, G., Mahrer, N. E., Ahn, S., Brincks, A., & Brown, C. H. (2014). Overview of meta-analyses of the prevention of mental health, substance use, and conduct problems. *Annual Review of Clinical Psychology*, *10*, 243–273. 10.1146/annurev-clinpsy-050212-185524

Sanislow, C. A., Pine, D. S., Quinn, K. J., Kozak, M. J., Garvey, M. A., Heinssen, R. K., Wang, P. S., & Cuthbert, B. N. (2010). Developing constructs for psychopathology research: Research Domain Criteria. *Journal of Abnormal Psychology*, *119*(4), 631–639. 10.1037/a0020909

Sanson, A., Prior, M., & Kyrios, M. (1990). Contamination of measures in temperament research. *Merrill-Palmer Quarterly*, *36*(2), 179–192

Schmid, J., & Leiman, J.M. (1957). The development of hierarchical factor solutions. *Psychometrika*, *22*, 53-61. 10.1007/BF02289209

Scheper, F. Y., Majdandžić, M., van de Ven, P. M., Jansen, L., Doreleijers, T., Schuengel, C., & de Vries, A. (2017). Temperament Traits and Psychopathology in Young Clinically Referred Children Compared to a General Population Sample. *Child Psychiatry and Human Development*, *48*(6), 841–850. 10.1007/s10578-016-0708-6

Sellbom, M., & Tellegen, A. (2019). Factor analysis in psychological assessment research: Common pitfalls and recommendations. *Psychological Assessment, 31*(12), 1428–1441. 10.1037/pas0000623

Settles, R. E., Fischer, S., Cyders, M. A., Combs, J. L., Gunn, R. L., & Smith, G. T. (2012). Negative urgency: A personality predictor of externalizing behavior characterized by neuroticism, low conscientiousness, and disagreeableness. *Journal of Abnormal Psychology, 121*(1), 160-172. 10.1037/a0024948

Sharma, L., Markon, K. E., & Clark, L. A. (2014). Toward a theory of distinct types of "impulsive" behaviors: A meta-analysis of self-report and behavioral measures. *Psychological Bulletin, 140*(2), 374–408. 10.1037/a0034418

Sharpe, B. M., Simms, L. J., & Wright, A. (2021). Impulsivity, Affect, and Stress in Daily Life: Examining a Cascade Model of Urgency. *Journal of Personality Disorders, 35*(4), 494–512. 10.1521/pedi_2020_34_465

Shaw, D. S., Gilliom, M., Ingoldsby, E. M., & Nagin, D. S. (2003). Trajectories leading to school-age conduct problems. *Developmental Psychology*, *39*(2), 189–200. 10.1037//0012-1649.39.2.189

Shaw, D. S., Bell, R. Q., & Gilliom, M. (2000). A truly early starter model of antisocial behavior revisited. *Clinical Child and Family Psychology Review*, *3*(3), 155–172. 10.1023/a:1009599208790

Shaw, D., Owens, E., Vondra, J., Keenan, K., & Winslow, E. (1996). Early risk factors and pathways in the development of early disruptive behavior problems. *Development and Psychopathology, 8*(4), 679-699. 10.1017/S0954579400007367

Shaw, D. S., Owens, E. B., Giovannelli, J., & Winslow, E. B. (2001). Infant and toddler pathways leading to early externalizing disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*(1), 36–43. 10.1097/00004583-200101000-00014

Shaw, D. S., & Shelleby, E. C. (2014). Early-starting conduct problems: intersection of conduct problems and poverty. *Annual Review of Clinical Psychology, 10*, 503 528. 10.1146/annurev-clinpsy-032813-153650

Shevlin, M., McElroy, E., & Murphy, J. (2017). Homotypic and heterotypic psychopathological continuity: a child cohort study. *Social Psychiatry and Psychiatric Epidemiology*, *52*(9), 1135–1145. 10.1007/s00127-017-1396-7

Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: the development and validation of a new criterion Q-sort scale. *Developmental psychology*, *33*(6), 906–916. 10.1037//0012-1649.33.6.906

Shields, A. N., Giljen, M., España, R. A., & Tackett, J. L. (2021). The p factor and dimensional structural models of youth personality pathology and psychopathology. *Current Opinion in Psychology, 37*, 21–25. 10.1016/j.copsyc.2020.06.005

Shiner, R. L., Buss, K. A., McClowry, S. G., Putnam, S. P., Saudino, K. J., & Zentner, M. (2012). What is temperament now? assessing progress in temperament research on the Twenty-Fifth anniversary of Goldsmith et al. (). *Child Development Perspectives, 6*(4), 436-444. 10.1111/j.1750-8606.2012.00254.x

Skovgaard, A. M., Houmann, T., Christiansen, E., Landorph, S., Jørgensen, T., CCC 2000 Study Team, Olsen, E. M., Heering, K., Kaas-Nielsen, S., Samberg, V., & Lichtenberg, A. (2007). The prevalence of mental health problems in children 1(1/2) years of age - the Copenhagen Child Cohort 2000. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *48*(1), 62–70. 10.1111/j.1469-7610.2006.01659.x

Simms, L. J., Wright, A., Cicero, D., Kotov, R., Mullins-Sweatt, S. N., Sellbom, M., Watson, D., Widiger, T. A., & Zimmermann, J. (2021). Development of Measures for the Hierarchical Taxonomy of Psychopathology (HiTOP): A Collaborative Scale Development Project. *Assessment*, 10731911211015309. Advance online publication. 10.1177/10731911211015309

Singh, A. L., & Waldman, I. D. (2010). The etiology of associations between negative emotionality and childhood externalizing disorders. *Journal of Abnormal Psychology (1965), 119*(2), 376-388. 10.1037/a0019342

Smith, G. T., & Cyders, M. A. (2016). Integrating affect and impulsivity: The role of positive and negative urgency in substance use risk. *Drug and Alcohol Dependence, 163 Suppl 1*(Suppl 1), S3–S12. 10.1016/j.drugalcdep.2015.08.038

Smith, G. T., Fischer, S., Cyders, M. A., Annus, A. M., Spillane, N. S., & McCarthy, D. M. (2007). On the validity and utility of discriminating among impulsivity-like traits. *Assessment, 14*(2), 155–170. 10.1177/1073191106295527

Smith, G. T., Guller, L., & Zapolski, T. C. (2013). A comparison of two models of Urgency: Urgency predicts both rash action and depression in youth. *Clinical Psychological Science, 1*(3), 266–275. 10.1177/2167702612470647

Smith, G. T., McCarthy, D. M., & Anderson, K. G. (2000). On the sins of short-form development. *Psychological Assessment, 12*(1), 102–111.10.1037/1040-3590.12.1.102

Sourander, A. (2001). Emotional and behavioural problems in a sample of Finnish three-year-olds. *European Child & Adolescent Psychiatry, 10*(2), 98–104. 10.1007/s007870170032

Sperry, S. H., Lynam, D. R., & Kwapil, T. R. (2018). The convergence and divergence of impulsivity facets in daily life. *Journal of Personality, 86*(5), 841–852. 10.1111/jopy.12359

Stallard, P. (1993). The behaviour of 3-year-old children: Prevalence and parental perception of problem behaviour: A research note. *Child Psychology & Psychiatry & Allied Disciplines, 34*(3), 413–421. 10.1111/j.1469-7610.1993.tb01001.x

Sterba, S., Egger, H. L., & Angold, A. (2007). Diagnostic specificity and nonspecificity in the dimensions of preschool psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 48*(10), 1005–1013. 10.1111/j.1469-7610.2007.01770.x

Stifter, C. A., Putnam, S., & Jahromi, L. (2008). Exuberant and inhibited toddlers: Stability of temperament and risk for problem behavior. Development and *Psychopathology, 20*(2), 401-421. 10.1017/S0954579408000199

Strickland, J. C., & Johnson, M. W. (2021). Rejecting impulsivity as a psychological construct: A theoretical, empirical, and sociocultural argument. *Psychological Review, 128*(2), 336–361. 10.1037/rev0000263

Strickland, J., Keller, J., Lavigne, J. V., Gouze, K., Hopkins, J., & LeBailly, S. (2011). The structure of psychopathology in a community sample of preschoolers. *Journal of Abnormal Child Psychology, 39*(4), 601–610. 10.1007/s10802-011-9487-5

Stringaris, A.K., & Goodman, R. (2009). Longitudinal outcome of youth oppositionality: irritable, headstrong, and hurtful behaviors have distinctive predictions. *Journal of the American Academy of Child and Adolescent Psychiatry, 48* 4, 404-12 . 10.1097/CHI.0b013e3181984f30

Stringaris, A., & Goodman, R. (2009). Three dimensions of oppositionality in youth. *Journal of Child Psychology and Psychiatry, 50*(3), 216-223. 10.1111/j.1469-7610.2008.01989.x

Stringaris, A., Goodman, R., Ferdinando, S., Razdan, V., Muhrer, E., Leibenluft, E., & Brotman, M. A. (2012). The Affective Reactivity Index: a concise irritability scale for clinical and research

settings. *Journal of child psychology and psychiatry, and allied disciplines*, *53*(11), 1109–1117. 10.1111/j.1469-7610.2012.02561.x

Stülb, K., Messerli-Bürgy, N., Kakebeeke, T. H., Arhab, A., Zysset, A. E., Leeger-Aschmann, C. S., Schmutz, E. A., Meyer, A. H., Kriemler, S., Jenni, O. G., Puder, J. J., & Munsch, S. (2019). Prevalence and Predictors of Behavioral Problems in Healthy Swiss Preschool Children Over a One Year Period. *Child Psychiatry and Human Development*, *50*(3), 439–448. 10.1007/s10578-018-0849-x

Tackett, J. L. (2006). Evaluating models of the personality–psychopathology relationship in children and adolescents. *Clinical Psychology Review*, *26*(5), 584-599. 10.1016/j.cpr.2006.04.003

Tackett, J. L., Lahey, B. B., van Hulle, C., Waldman, I., Krueger, R. F., & Rathouz, P. J. (2013). Common genetic influences on negative emotionality and a general psychopathology factor in childhood and adolescence. *Journal of Abnormal Psychology, 122*(4), 1142–1153. 10.1037/a0034151

Tamm, L., Epstein, J.N., Loren, R.E., Becker, S.P., Brenner, S.B., Bamberger, M.E., Peugh, J., & Halperin, J.M. (2019). Generating Attention, Inhibition, and Memory: A Pilot Randomized Trial for Preschoolers With Executive Functioning Deficits. *Journal of Clinical Child & Adolescent Psychology*, *48*, S131 - S145. S131–S145. 10.1080/15374416.2016.1266645

Taylor, J., Allan, N., Mikolajewski, A. J., & Hart, S. A. (2013). Common genetic and nonshared environmental factors contribute to the association between socioemotional dispositions and the externalizing factor in children. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *54*(1), 67–76. 10.1111/j.1469-7610.2012.02621.x

Tomko, R.L., Prisciandaro, J.J., Falls, S.K., & Magid, V. (2016). The structure of the UPPS-R-Child impulsivity scale and its relations with substance use outcomes among treatment-seeking adolescents. *Drug and Alcohol Dependence, 161*, 276-83. 10.1016/j.drugalcdep.2016.02.010

Tremblay R. E. (2010). Developmental origins of disruptive behaviour problems: the 'original sin' hypothesis, epigenetics and their consequences for prevention. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *51*(4), 341–367. 10.1111/j.1469-7610.2010.02211.x

Trentacosta, C. J., Hyde, L. W., Shaw, D. S., & Cheong, J. (2009). Adolescent dispositions for antisocial behavior in context: The roles of neighborhood dangerousness and parental knowledge. *Journal of Abnormal Psychology*, *118*(3), 564–575. 10.1037/a0016394

Tsukayama, E., Duckworth, A. L., & Kim, B. (2013). Domain-specific impulsivity in school-age children. *Developmental Science, 16*(6), 879–893. 10.1111/desc.12067

Turner, H. A., Finkelhor, D., & Ormrod, R. (2010). Child mental health problems as risk factors for victimization. *Child Maltreatment*, *15*(2), 132–143. 10.1177/1077559509349450

Tuvblad, C. , Zheng, M., Raine, A., & Baker, L. (2009). A common genetic factor explains the covariation among ADHD ODD and CD symptoms in 9–10 year old boys and girls. *Journal of Abnormal Child Psychology*, *37*(2), 153-167. 10.1007/s10802-008-9278-9

Tyrer P. (2018). Dimensions fit the data, but can clinicians fit the dimensions?. *World Psychiatry*, *17*(3), 295–296. 10.1002/wps.20559

Uher, R., & Rutter, M. (2012). Basing psychiatric classification on scientific foundation: problems and prospects. *International Review of Psychiatry, 24*(6), 591–605. 10.3109/09540261.2012.721346

Valiente, C., Eisenberg, N., Spinrad, T. L., Haugen, R., Thompson, M. S., & Kupfer, A. (2013). Effortful control and impulsivity as concurrent and longitudinal predictors of academic achievement. *The Journal of Early Adolescence*, *33*(7), 946–972. 10.1177/0272431613477239

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Valle-Krieger, F., & Stringaris, A. (2016). Temperament and Vulnerability to Externalizing Behavior. In T. Beauchaine and S. Hinshaw (Ed.), *The Oxford Handbook of Externalizing Spectrum Disorders*, (pp. 170-183). Oxford University Press

Van den Akker, A. L, Deković, M., Prinzie, P., & Asscher, J. J. (2010). Toddlers' temperament profiles: Stability and relations to negative and positive parenting. *Journal of Abnormal Child Psychology, 38*(4), 485-495. 10.1007/s10802-009-9379-0

Van Lier, P. A., Verhulst, F. C., van der Ende, J., & Crijnen, A. A. (2003). Classes of disruptive behaviour in a sample of young elementary school children. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 44*(3), 377–387. 10.1111/1469-7610.00128

Verona, E., Javdani, S., & Sprague, J. (2011). Comparing factor structures of adolescent psychopathology. *Psychological Assessment, 23*(2), 545–551. 10.1037/a0022055

Viding, E., & McCrory, E.J. (2020). Disruptive Behavior Disorders: The Challenge of Delineating Mechanisms in the Face of Heterogeneity. *The American Journal of Psychiatry*, 177 9, 811-817 . 10.1176/appi.ajp.2020.20070998

Waddell, J. T., Sternberg, A., Bui, L., Ruof, A. R., Blake, A. J., Grimm, K. J., Elam, K. K., Eisenberg, N., & Chassin, L. (2021). Relations Between Child Temperament and Adolescent Negative Urgency in a High-Risk Sample. *Journal of Research in Personality*, *90*, 104056. 10.1016/j.jrp.2020.104056

Wahlbeck K. (2015). Public mental health: the time is ripe for translation of evidence into practice. *World Psychiatry, 14*(1), 36–42. 10.1002/wps.20178

Wakschlag, L. S., Choi, S. W., Carter, A. S., Hullsiek, H., Burns, J., McCarthy, K., Leibenluft, E., & Briggs-Gowan, M. J. (2012). Defining the developmental parameters of temper loss in early childhood: implications for developmental psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *53*(11), 1099–1108. 10.1111/j.1469-7610.2012.02595.x

Wakschlag, L. S., Henry, D. B., Tolan, P. H., Carter, A. S., Burns, J. L., & Briggs-Gowan, M. J. (2012). Putting theory to the test: modeling a multidimensional, developmentally-based approach to preschool disruptive behavior. *Journal of the American Academy of Child and Adolescent Psychiatry, 51*(6), 593–604.e4. 10.1016/j.jaac.2012.03.005

Wakschlag, L. S., Leventhal, B. L., Briggs-Gowan, M. J., Danis, B., Keenan, K., Hill, C., Egger, H. L., Cicchetti, D., & Carter, A. S. (2005). Defining the "disruptive" in preschool behavior: what diagnostic observation can teach us. *Clinical Child and Family Psychology Review, 8*(3), 183–201. 10.1007/s10567-005-6664-5

Wakschlag, L. S., Tolan, P. H., & Leventhal, B. L. (2010). Research Review: 'Ain't misbehavin': Towards a developmentally-specified nosology for preschool disruptive behavior. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *51*(1), 3–22. 10.1111/j.1469-7610.2009.02184.x

Wakschlag, L. S., Roberts, M. Y., Flynn, R. M., Smith, J. D., Krogh-Jespersen, S., Kaat, A. J., Gray, L., Walkup, J., Marino, B. S., Norton, E. S., & Davis, M. M. (2019). Future directions for early childhood prevention of mental disorders: A road map to mental health, earlier. *Journal of Clinical Child and Adolescent Psychology, 48*(3), 539-554. 10.1080/15374416.2018.1561296

Waldman, I. D., Poore, H. E., van Hulle, C., Rathouz, P. J., & Lahey, B. B. (2016). External validity of a hierarchical dimensional model of child and adolescent psychopathology: Tests using confirmatory factor analyses and multivariate behavior genetic analyses. *Journal of Abnormal Psychology, 125*(8), 1053–1066. 10.1037/abn0000183

Waldman, I.D., Singh, A., Lahey, B. B (2006). Dispositional dimensions and the causal structure of child and adolescent conduct problems. In R.F. Krueger and J.L. Tackett (Ed.). *Personality and Psychopathology*, (pp. 112-153). The Guildford Press

Walerius, D. M., Reyes, R. A., Rosen, P. J., & Factor, P. I. (2018). Functional Impairment Variability in Children With ADHD Due to Emotional Impulsivity. *Journal of Attention Disorders*, *22*(8), 724–737. 10.1177/1087054714561859

Waller, R., & Hyde, L. (2017). Callous-Unemotional Behaviors in Early Childhood: Measurement, Meaning, and the Influence of Parenting. *Child Development Perspectives*, *11*(2), 120–126. 10.1111/cdep.12222

Waller, R., Hyde, L. W., Grabell, A. S., Alves, M. L., & Olson, S. L. (2015). Differential associations of early callous-unemotional, oppositional, and ADHD behaviors: multiple domains within early-starting conduct problems? *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *56*(6), 657–666. 10.1111/jcpp.12326

Waller, R., & Wagner, N. (2019). The Sensitivity to Threat and Affiliative Reward (STAR) model and the development of callous-unemotional traits. *Neuroscience and Biobehavioral Reviews*, *107*, 656–671. 10.1016/j.neubiorev.2019.10.005

Wang, Y., Long, J., Liu, Y., Liu, T., & Billieux, J. (2020). Psychometric Properties of the Chinese SUPPS-P Impulsive Behavior Scale: Factor Structure and Measurement Invariance Across Gender and Age. *Frontiers in Psychiatry*, *11*, 529949. 10.3389/fpsyt.2020.529949

Waschbusch D. A. (2002). A meta-analytic examination of comorbid hyperactive-impulsive-attention problems and conduct problems. *Psychological Bulletin*, *128*(1), 118–150. 10.1037/0033-2909.128.1.118

Waschbusch, D. A., Porter, S., Carrey, N., Kazmi, S. O., Roach, K. A., & D'Amico, D. A. (2004). Investigation of the heterogeneity of disruptive behaviour in elementary-age children. *Canadian Journal of Behavioural Science*, *36*(2), 97-112. 10.1037/h0087221

Waszczuk, M. A., Eaton, N. R., Krueger, R. F., Shackman, A. J., Waldman, I. D., Zald, D. H., Lahey, B. B., Patrick, C. J., Conway, C. C., Ormel, J., Hyman, S. E., Fried, E. I., Forbes, M. K., Docherty, A. R., Althoff, R. R., Bach, B., Chmielewski, M., DeYoung, C. G., Forbush, K. T., . . . Kotov, R. (2020). Redefining phenotypes to advance psychiatric genetics: Implications from hierarchical taxonomy of psychopathology. *Journal of Abnormal Psychology (1965)*, *129*(2), 143-161. 10.1037/abn0000486

Watts, A. L., Lane, S. P., Bonifay, W., Steinley, D., & Meyer, F. A. C. (2020). Building theories on top of, and not independent of, statistical models: The case of the p-factor. *Psychological Inquiry*, *31*(4), 310-320. 10.1080/1047840X.2020.1853476

Watts, A. L., Poore, H., Lilienfeld, S. O., & Waldman, I. (2019). Clarifying the Associations between Big Five Personality Domains and Higher-Order Psychopathology Dimensions in Youth. *Journal of Research in Personality*, *82*. 10.17605/OSF.IO/CSKFE

Watts, A. L., Poore, H. E., & Waldman, I. D. (2019). Riskier tests of the validity of the bifactor model of psychopathology. *Clinical Psychological Science*, *7*(6), 1285–1303. 10.1177/2167702619855035

Watts, A. L., Smith, G. T., Barch, D. M., & Sher, K. J. (2020). Factor structure, measurement and structural invariance, and external validity of an abbreviated youth version of the UPPS-P Impulsive Behavior Scale. *Psychological Assessment*, *32*(4), 336–347. 10.1037/pas0000791

Wertz, J., Agnew-Blais, J., Caspi, A., Danese, A., Fisher, H. L., Goldman-Mellor, S., Moffitt, T. E., & Arseneault, L. (2018). From Childhood Conduct Problems to Poor Functioning at Age 18 Years:

Examining Explanations in a Longitudinal Cohort Study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *57*(1), 54–60.e4. 10.1016/j.jaac.2017.09.437

Wertz, J., Zavos, H. M., Matthews, T., Gray, R., Best-Lane, J., Pariante, C. M., Moffitt, T. E., & Arseneault, L. (2016). Etiology of Pervasive Versus Situational Antisocial Behaviors: A Multi-Informant Longitudinal Cohort Study. *Child Development*, *87*(1), 312–325. 10.1111/cdev.12456

Whelan, Y. M., Stringaris, A., Maughan, B., & Barker, E. D. (2013). Developmental continuity of oppositional defiant disorder subdimensions at ages 8, 10, and 13 years and their distinct psychiatric outcomes at age 16 years. J*ournal of the American Academy of Child and Adolescent Psychiatry*, *52*(9), 961–969. 10.1016/j.jaac.2013.06.013

Wichstrøm, L., Berg-Nielsen, T. S., Angold, A., Egger, H. L., Solheim, E., & Sveen, T. H. (2012). Prevalence of psychiatric disorders in preschoolers. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *53*(6), 695–705. 10.1111/j.1469-7610.2011.02514.x

Whiteside, S. P., & Lynam, D. R. (2001). The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences*, *30*(4), 669–689. 10.1016/S0191-8869(00)00064-7

Whiteside, S. P., Lynam, D. R., Miller, J. D., & Reynolds, S. K. (2005). Validation of the UPPS impulsive behaviour scale: A four-factor model of impulsivity. *European Journal of Personality*, *19*(7), 559–574. 10.1002/per.556

Widaman, K. F. (2018). On common factor and principal component representations of data: Implications for theory and for confirmatory replications. *Structural Equation Modeling*, *25*(6), 829–847. 10.1080/10705511.2018.1478730

Widiger, T. A., & Samuel, D. B. (2005). Diagnostic categories or dimensions? A question for the Diagnostic And Statistical Manual Of Mental Disorders--fifth edition. *Journal of Abnormal Psychology*, *114*(4), 494–504. 10.1037/0021-843X.114.4.494

Willner, C. J., Gatzke-Kopp, L. M., & Bray, B. C. (2016). The dynamics of internalizing and externalizing comorbidity across the early school years. *Development and Psychopathology*, *28*(4pt1), 1033–1052. 10.1017/S0954579416000687

Willoughby, M., Mills-Koonce, W., Gottfredson, N., & Wagner, N. (2014). Measuring callous unemotional behaviors in early childhood: Factor structure and the prediction of stable aggression in middle childhood. *Journal of Psychopathology and Behavioral Assessment*, *36*(1), 30-42. 10.1007/s10862-013-9379-9

Willoughby, M., Waschbusch, D., Moore, G., & Propper, C. (2011). Using the ASEBA to screen for callous unemotional traits in early childhood: Factor structure, temporal stability, and utility. *Journal of Psychopathology and Behavioral Assessment*, *33*(1), 19-30. 10.1007/s10862-010-9195-4

Witkiewitz, K., King, K., , McMahon, R., Wu, J., Luk, J., Bierman, K., Coie, J., Dodge, K., Greenberg, M., Lochman, J., . . . Pinderhughes, E. (2013). Evidence for a multi-dimensional latent structural model of externalizing disorders. *Journal of Abnormal Child Psychology*, *41*(2), 223-237. 10.1007/s10802-012-9674-z

Wood, A. C., Rijsdijk, F., Asherson, P., & Kuntsi, J. (2009). Hyperactive-impulsive symptom scores and oppositional behaviours reflect alternate manifestations of a single liability. *Behavior Genetics*, *39*(5), 447-460. 10.1007/s10519-009-9290-z

World Health Organization. (2019). *ICD-11: International classification of diseases* (11th revision). Retrieved from https://icd.who.int/

Wright, A.G., & Hopwood, C.J. (2021). Integrating and Distinguishing Personality and Psychopathology. *Journal of Personality.* 10.1111/jopy.12671

Wright, A. G., Krueger, R. F., Hobbs, M. J., Markon, K. E., Eaton, N. R., & Slade, T. (2013). The structure of psychopathology: toward an expanded quantitative empirical model. *Journal of Abnormal Psychology, 122*(1), 281–294. 0.1037/a0030133

Zachar, P. (2018). Quantitative classification as (re-)descriptive psychopathology. *World Psychiatry, 17*(3), 294–295. 10.1002/wps.20558

Zachar, P. (2020). Descriptive Psychopathology: A Manifest Level of Analysis, or Not? In K. Kendler, J. Parnas, & P. Zachar (Eds.), *Levels of Analysis in Psychopathology: Cross-Disciplinary Perspectives* (pp. 280-296). Cambridge: Cambridge University Press. 10.1017/9781108750349.025

Zaparniuk, J., & Taylor, S. (1997). Impulsivity in children and adolescents. In C. D. Webster & M. A. Jackson (Eds.), *Impulsivity: Theory, assessment, and treatment* (pp. 158–179). New York: The Guilford Press.

Zapolski, T. C., & Smith, G. T. (2013). Comparison of Parent versus Child-Report of Child Impulsivity Traits and Prediction of Outcome Variables. *Journal of Psychopathology and Behavioral Assessment, 35*(3), 301–313. 10.1007/s10862-013-9349-2

Zapolski, T. C. B., Stairs, A. M., Settles, R. F., Combs, J. L., & Smith, G. T. (2010). The measurement of dispositions to rash action in children. *Assessment, 17*(1), 116–125. 10.1177/1073191109351372

Zastrow, B. L., Martel, M. M., & Widiger, T. A. (2018). Preschool oppositional defiant disorder: A disorder of negative affect, surgency, and disagreeableness. *Journal of Clinical Child and Adolescent Psychology, 47*(6), 967-977. 10.1080/15374416.2016.1225504

Zentner, M. (2020). Identifying child temperament risk factors from 2 to 8 years of age: Validation of a brief temperament screening tool in the US, Europe, and China. *European Child & Adolescent Psychiatry*, *29*(5), 665-678. 10.1007/s00787-019-01379-5

Zentner, M., & Bates, J. (2008). Child Temperament: An Integrative Review of Concepts, Research Programs, and Measures. *European Journal of Developmental Science, 2*, 7-37. 10.3233/DEV-2008-21203

Zentner, M., & Shiner, R. L. (2012). Fifty years of progress in temperament research: A synthesis of major themes, findings, and challenges and a look forward. In M. Zentner & R. L. Shiner (Eds.), *Handbook of Temperament* (p. 673–700). The Guilford Press.

Zuckerman, M., Kuhlman, D. M., Joireman, J., Teta, P., & Kraft, M. (1993). A comparison of three structural models for personality: The Big Three, the Big Five, and the Alternative Five. *Journal of Personality and Social Psychology, 65*(4), 757–768. 10.1037/0022-3514.65.4.757

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SUPPLEMENTARY MATERIAL

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SUPPLEMENTARY MATERIAL FOR CHAPTER TWO (I): THE ELISA SAMPLE

➢ Brief sketch of the ELISA Project



PSI2015-65766-R
PID2019-107897RB-I00

The ELISA Project is an ongoing longitudinal study aiming to examine children's development and the factors involved in the emergence of early behavioral, emotional, and psychosocial difficulties. This longitudinal study is being conducted by the UNDERISK research group from the University of Santiago de Compostela (https://underisk.gal/underisk/?lang=en) in Galicia, the NW of Spain. It was approved by the Bioethics Committee of this institution (see the document attached in the following section), and the Spanish Ministry of Economy and Competitiveness, which provides funding for it. The project started in 2016 and its currently on its fifth data collection.

The recruitment process occurred in the 2016/2017 academic year. The heads of 126 public, charter and private schools were contacted in order to obtain school collaboration for the study. Seventy-two schools agreed to participate. Subsequently, families were contacted and invited to participate in the study. Families were engaged through meetings that were organized at schools, where information about the objectives of the ELISA study was provided. An active consent form was filled out by families who agreed to participate in the study (rate 25-50% per school), and collected by preschool teachers, who were then authorized to complete the questionnaires concerning the participating children from their classroom.

The first data collection took place in the Spring of 2017. At baseline (T1), the sample included 2467 children (48.1% girls) aged 3-6 years old (M=4.25 years, SD=.91) recruited from 72 public (79.2%), charter (18.1%), and private (2.8%) schools. Data questionnaire has been yearly obtained via parent and teacher reports. In a typical data collection, families are given the opportunity to choose the questionnaire format (online vs. paper-classic). Teachers, on the contrary, have been filling it on a secure online platform only, from T2 onwards. Both parents and teachers have been allowed to choose language in which they prefer to fill the questionnaire.

ELISA Project families are from rural, urban, and semi-urban areas of Galicia, a region in the NW of Spain. That includes, cities, villages, and small towns of A Coruña, Lugo, Ourense and Pontevedra, which are the main geopolitical and administrative subdivisions of this region. At T1, most families were Spanish (93.9% with the remaining 6.1% from Latin-American, African, and other European countries). Across the years, families have not received direct compensation for participating in the study. Schools, on the contrary, received some forms of compensation depending on the year (e.g., a set of books in the first year).

A year after the first data collection, in 2018 (T2), total of 361 preschoolers (48.5 % girls, aged 3-6 years old [M=3.8 years, SD=.86]) were incorporated to the study from schools already participating in the project. Since then, no additional incorporations have occurred.

So far, four data collections of the ELISA Project have been completed: T1, T2, T3 and T4 in 2017, 2018, 2019 and 2021, respectively. The fifth data collection (T5, 2022) is currently in progress. Retention rates over the first set of data collections (T1, T2, T3) have been overall high. Specifically, 81.35% of parents (*n*= 2007) and 88.61% of teachers (*n*= 2186) of the initial sample participated in T2, and 73.2% of parents (*n*= 1806) and 82.57% of teachers (*n*=2.037) of the initial sample participated in T3.

More information about the study, and each of its data collections, can be found here: https://underisk.gal/elisa/?lang=en

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- Copy of the authorization of the Bioethics Committee of the University of Santiago de Compostela to conduct research within the project which provides data for this dissertation

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JOSÉ MANUEL CIFUENTES MARTÍNEZ, PRESIDENTE DEL COMITÉ DE BIOÉTICA DE LA UNIVERSIDAD DE SANTIAGO DE COMPOSTELA,

INFORMA:

Que el proyecto de investigación para: **"Patrones de desarrollo de los problemas de conducta en la niñez: hacia una intervención preventiva en un perfil de alto riesgo"**, del que son Investigadore principales los profesores Doña. **Estrella Romero Triñares** y Dña. **Paula Villar Torres,** ha sido examinado por el Comité de Bioética de esta Universidad, cumpliendo su protocolo experimental los requisitos exigidos.

Este documento no exime de la obtención de permisos o autorizaciones y el cumplimiento de otras normativas de aplicación.

Lugo, 17 de junio de 2016.



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Table 2.1S. Sociodemographic characteristics of the ELISA sample (N =2467) at T1

Children	
Mean age (years)	4.25 years, SD=0.91
Gender (girls)	48.1%
Number of siblings	
Only child	33.4 %
1	58.1 %
2 or more	7.5 %
Medical or psychological diagnosis	14.4 %
Frequent concerns from school about child development	1.6 %
Need for psychoeducational support at school	8%
Parents	
Mothers (87.1%)	
Mean age (years)	38 (SD= 4.6)
Education status	
High school degree	23 %
Vocational degree	30 %
Bachelor's degree	38.8 %
Employment status (currently employed)	76.2 %
Maternal mental health	
Depression (T2, mean)	0.61 (SD=.55); Range 0-3
Anxiety (T2, mean)	0.72 (SD=.60); Range 0-3
Parental stress (mean)	2.08 (SD=.54); Range1-5
Overall level of satisfaction with school	8.54 (SD=1.45); Range 2-10
Fathers (12.6%)	
Mean age (years)	39.82 (SD=5.1)
Education status	
High school degree	22.9 %
Vocational degree	23.9 %
Bachelor's degree	41.2 %
Employment status (currently employed)	87.6 %
Paternal mental health	
Depression (T2)	0.59 (SD= .52); Range 0-3
Anxiety (T2)	0.66 (SD=.64); Range 0-3
Parental stress	2.06 (SD=.54); Range1-5
Overall level of satisfaction with school	8.33 (SD= 1.40); Range 3-10
Other caregivers (0.3%)	
Family	
SES	.00 (SD=.71); Range, -2.50-1.32
Lone-parent status	3.7 %
Perceived support (family, friends) for child rearing	2.54 (SD=. 79); Range, 0-3
Perceived support (health, academic social institutions)	1.81 (SD=. 89); Range, 0-3
Partner agreement about parenting	3.43 (SD=.79); Range, 0-5

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Table 2.2S. ELISA Project data waves used in this dissertation

	T1 (Spring 2017)		**T2** (Spring 2018)		**T3** (Spring 2019)		**T4** (Spring 2021)	
	P	**T**	**P**	**T**	**P**	**T**	**P**	**T**
Study #1	X	X			X	X		
Study #2	X	-	X	-	X	-		
Study #3					X	X		
Study #4					X	-	X	-

Note: T1=; T2=; T3= T4
P= parent-reported data; T= teacher-reported data

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Table 2.3S. Descriptive statistics of the ELISA sample on the SDQ problematic subscales across data collection

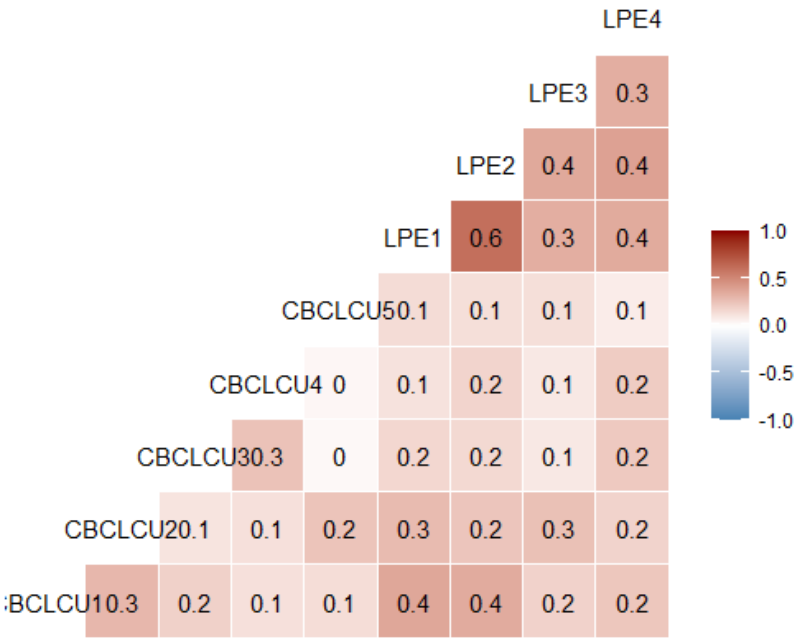
	T1			T2			T3			T4		
	N	***M (SD)***	***Range***	***N***	***M (SD)***	***Range***	***N***	***M (SD)***	***Range***	***N***	***M (SD)***	***Range***
Age	2467	4.26 (.91)	3-6	2343	5.12 (1.07)	3-7	2622	6.11 (1.06)	4-8	1254	8.21 (1.07)	6-10
Gender (% girls)	2467	48 %	-	-	-	-	2037	48.2%	-	1682	47.9%	-
SES	2252	.00 (.71)	-2.5-1.3	-	-	-	-	-	-	-	-	-
Parent-reported												
Conduct Problems	2231	.32 (.30)	0-2	-	-	-	-	-	-	1282	.26 (.28)	0-2
Hyperactivity-Inattention	2231	.78 (.49)	0-2	-	-	-	-	-	-	1282	.70 (.50)	0-2
Emotional Symptoms	2231	.25 (.30)	0-2	2306	.29 (.33)	0-2	2076	.27 (.32)	0-2	1282	.45 (.41)	0-2
Peer Problems	2231	.22 (.28)	0-2	2306	.25 (.30)	0-2	2075	.22 (.28)	0-2	1282	.24 (.30)	0-2
Teacher-reported												
Conduct Problems	2421	.26 (.32)	0-2	-	-	-	-	-	-	1426	.21 (.33)	0-2
Hyperactivity-Inattention	2421	.57 (.55)	0-2	-	-	-	-	-	-	1426	.55 (.54)	0-2
Emotional Symptoms	2421	.24 (.33)	0-2	2513	.28 (.36)	0-2	2346	.26 (.34)	0-2	1426	.31 (.37)	0-2
Peer Problems	2421	.23 (.31)	0-2	2513	.23 (.32)	0-2	-	-	-	1426	.21 (.30)	0-2

Note. T1=time 1; T2=time 2; T3= time 3; T4= time 4
SDQ= The Strengths and Difficulties Questionnaire (Goodman, 2001). SDQ data were not available for all time points

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SUPPLEMENTARY MATERIAL FOR CHAPTER TWO (II): ANALYSES

Figure 2.1S. Item-level correlations between the CBCL and the LPE CU traits subscales



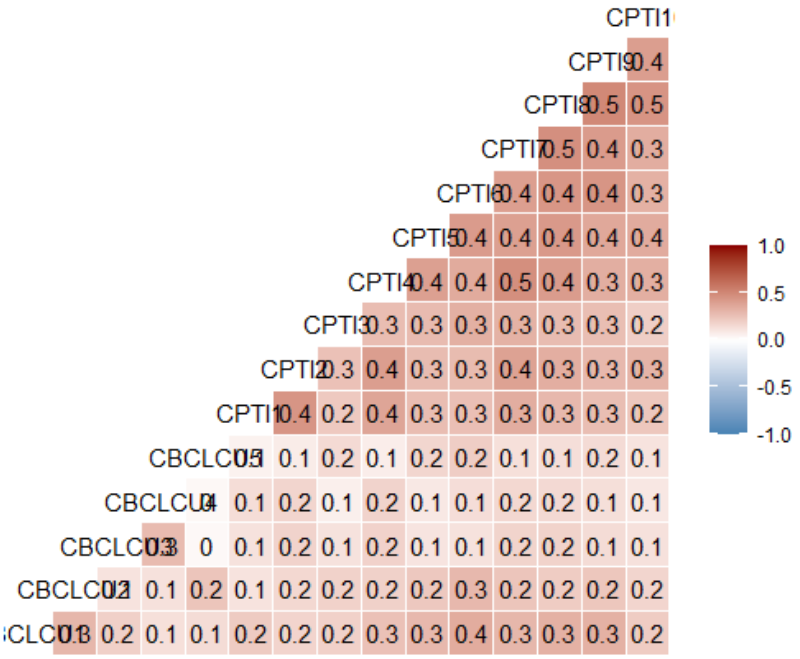
Method 1: Items selected from the CBCL

CBCL 1_Doesn't seem to feel guilty after misbehaving
CBCL 2_ Punishment doesn't change behavior
CBCL 3_ Seems unresponsive to affection
CBCL 4_ Shows little affection toward people
CBCL 5_ Shows too little fear of getting hurt

Method 3: CD Limited Prosocial Emotions Specifier of the DSM5

LPE 1_ Does not feel bad or guilty when he/she does something wrong
LPE 2_ Disregards and is unconcerned about the feelings of others
LPE 3_ Does not show concern about poor/problematic performance at school, work, or in other important activities
LPE 4_Does not express feelings or show emotions to others, except in ways that seem shallow or superficial

Figure 2.2S. Item-level correlations between the CBCL and the CPTI CU traits subscales



Method 1: Items selected from the CBCL

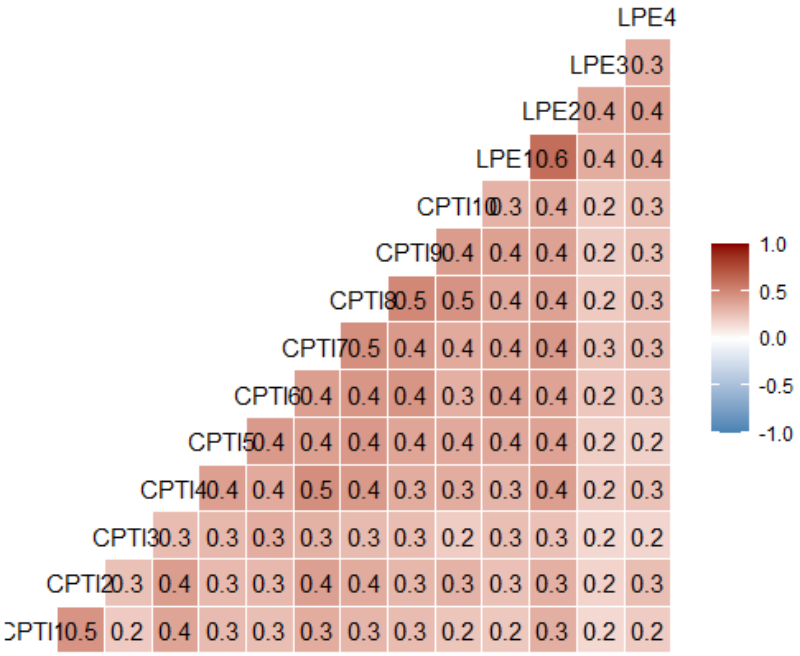
CBCL 1_Doesn't seem to feel guilty after misbehaving
CBCL 2_ Punishment doesn't change behavior
CBCL 3_ Seems unresponsive to affection
CBCL 4_ Shows little affection toward people
CBCL 5_ Shows too little fear of getting hurt

Method 2: CU traits subscale of the CPTI

CPTI 1_ Seldom expresses sympathy for others
CPTI 2_ Usually does not seem to share others' joy and sorrow
CPTI 3_ Never seems to have bad conscience for things that he/she has done
CPTI 4_ Often seems to be completely indifferent when other children are upset
CPTI 5_ Does not become upset when others are being hurt
CPTI 6_ Seldom remorseful when he/she has done something not allowed
CPTI 7_ Often does not seem to care about what other people feel and think
CPTI 8_ Sometimes seems to completely lack the capability to feel guilt and remorse
CPTI 9_ Never expresses feelings of guilt when he/she has done something not allowed
CPTI 10_ Does not express guilt and remorse to the same extent as other children of the same age

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Figure 2.3S. Item-level correlations between the CBCL and the LPE CU traits subscales



Method 3: CD Limited Prosocial Emotions Specifier of the DSM5

LPE 1_ Does not feel bad or guilty when he/she does something wrong
LPE 2_ Disregards and is unconcerned about the feelings of others
LPE 3_ Does not show concern about poor/problematic performance at school, work, or in other important activities
LPE 4_Does not express feelings or show emotions to others, except in ways that seem shallow or superficial

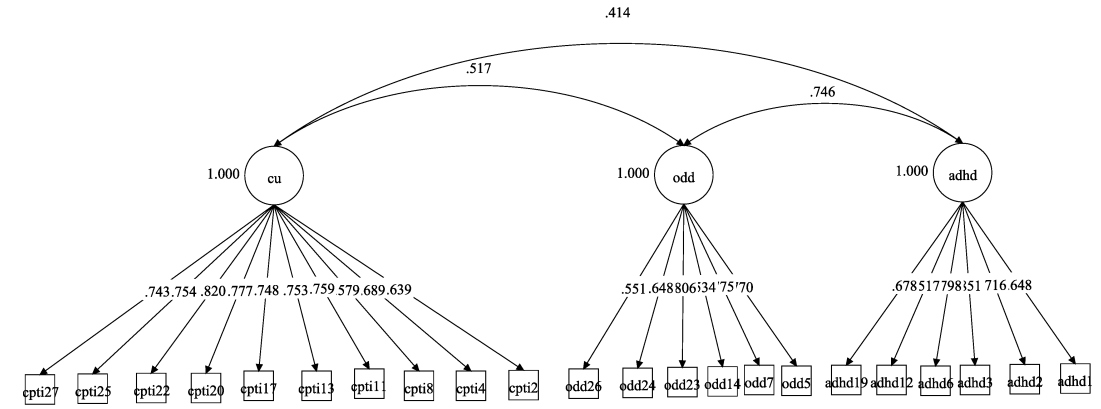
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CPTI 10_ Does not express guilt and remorse to the same extent as other children of the same age

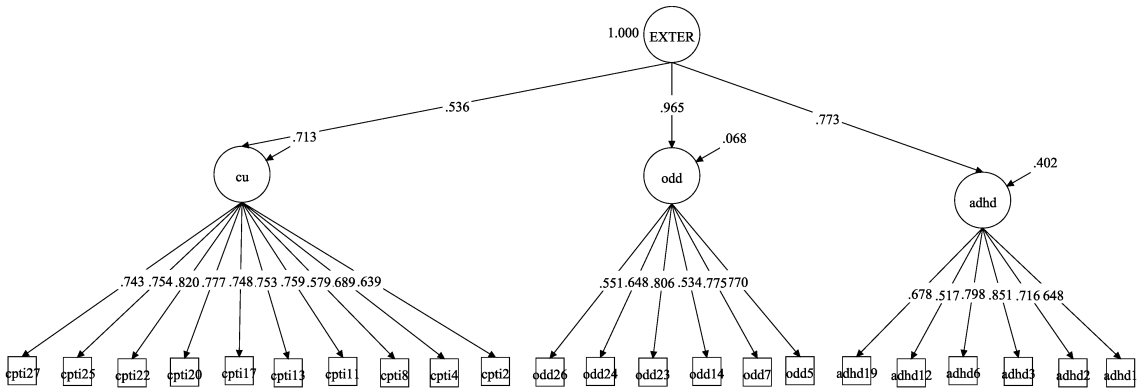
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Figure 2.4S. Competing structural models of DB examined in this study, in which CU traits are assessed by the CU traits subscale of the CPTI (Colins et al., 2014) at T1 *(Method 2)*

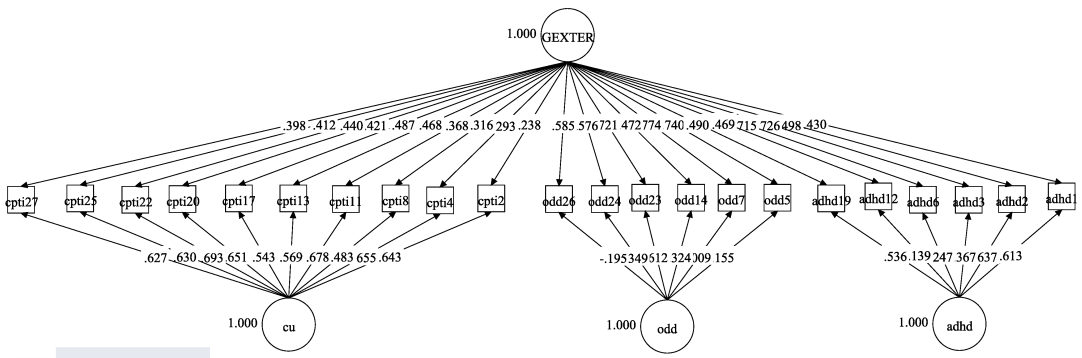
A



B



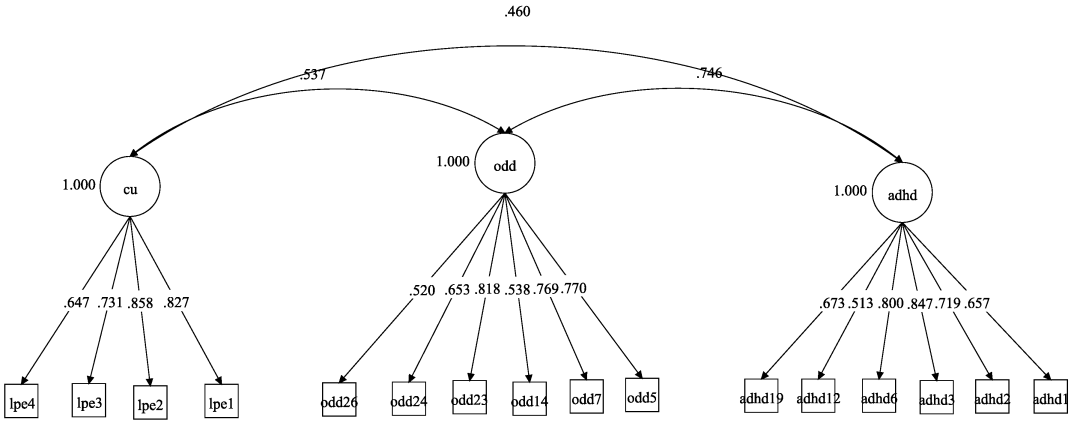
C



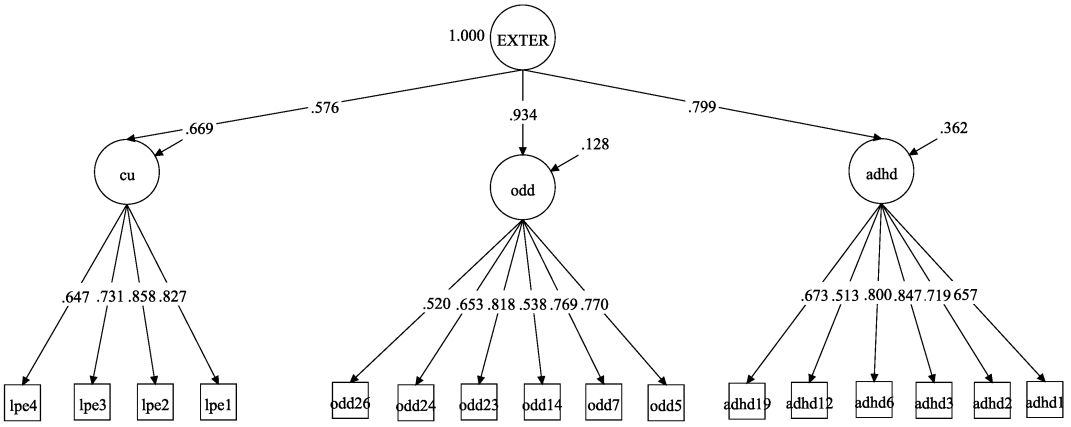
Depicted here are: **(A) the correlated-factor model, (B) the higher-order model**, **(C) the bifactor mode**l

Figure 2.5S. Competing structural models of DB examined in this study, in which CU traits are assessed by the Limited Prosocial Emotions Specifier of the DSM5 (APA., 2013) at T1 *(Method 3)*

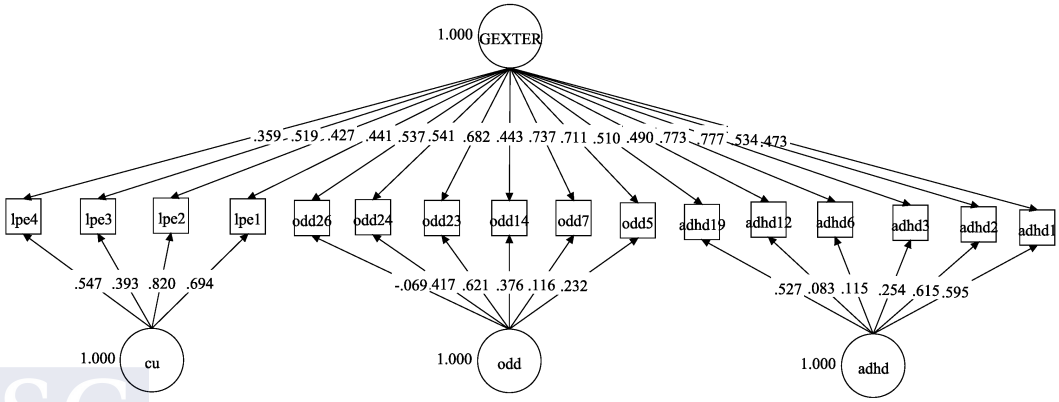
A



B



C



Depicted here are: **(A) the correlated-factor model, (B) the higher-order model**, **(C) the bifactor mode**l

Table 2.4S. Standardized item loadings in the subordinate and supraordinate factors of the higher-order model after applying the Schmid-Leiman transformation

	Higher-order model (*without SLT*)				***Higher-order model*** (*with SLT*)			
	ADHD	**ODD**	**CU**	**EXTER**	**ADHD**	**ODD**	**CU**	**EXTER**
Indicators	***β***	***β***	***β***	***β***	***β***	***β***	***β***	***β***
ADHD1	0.59				0.34			0.48
ADHD2	0.70				0.40			0.57
ADHD3	0.81				0.46			0.66
ADHD6	0.75				0.43			0.61
ADHD12	0.53				0.30			0.43
ADHD19	0.69				0.39			0.56
ODD5		0.78				0.26		0.73
ODD7		0.78				0.26		0.73
ODD14		0.54				0.18		0.51
ODD23		0.82				0.27		0.77
ODD24		0.65				0.21		0.61
ODD26		0.50				0.16		0.46
CU9			0.51				0.18	0.47
CU18			0.73				0.25	0.68
CU20			0.42				0.15	0.39
CU21			0.31				0.11	0.28
CU22			0.54				0.19	0.50
Subordinate factors								
ADHD	-	-	-	0.82	-	-	-	-
ODD	-	-	-	0.94	-	-	-	-
CU traits	-	-	-	0.93	-	-	-	-

Note: SLT (Schmid-Leiman transformation) the higher-order model after applying the Schmid-Leiman transformation (SLT, right) to the higher order factor model (left)

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Table 2.5S. Bivariate correlations for CU traits and the externalizing factor operationalized by different methods at different time points

	CU traits				EXTER			
	T1		T3		T1		T3	
Operationalization at T1	**(2)**	**(3)**	**(2)**	**(3)**	**(2)**	**(3)**	**(2)**	**(3)**
Method 1								
CU traits: CBCL	.56***	.62***	.45***	.51***	.94***	.94***	.65***	.64***
EXTER: CBCL	-	-	-	-	.97***	.97***	.66***	.65***
Method 2								
CU traits: CPTI		.66***	.55***	.45***	.62***	.57***	.45***	.43***
EXTER: CBCL+CPTI	-	-	-	-	-	.99***	.66***	.65***
Method 3								
CU traits: DSM5			.54***	.53***	.64***	.69***	.51***	.50***
EXTER:CBCL+DSM5	-	-	-	-	-	-	.67***	.66***

Note. *p<.05, **p<.01, ***p<.001; (2)= Method 2, CU traits via the CPTI (Colins et al., 2014); (3)= Method 3, CU traits via the Limited Prosocial Emotions Specifier of the DSM5 (APA, 2013) ; CBCL: The Child Behavior Checklist (Achenbach & Rescorla, 2001); CPTI: The Child Problematic Traits Inventory (Colins et al., 2014); DSM5: The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (APA, 2013)

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Table 2.6S. Results of regression analyses with the externalizing factor score from the second order CFA predicting levels of conduct problems informed by parents and teachers over a two-year period (*method 2* was used for extracting the externalizing factor)

	Dependent variable: Conduct Problems (T3)							
	Parent-reported				**Teacher-reported**			
	(a)		**(b)**		**(a)**		**(b)**	
Predictors (T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.15 (.02)	-.16***	-.13 (.02)	-.15***	-.26 (.03)	-.22***	-.24 (.02)	-.20***
Age	-.01 (.01)	-.01	-.01 (.01)	-.02	.00 (.01)	.01	.00 (.01)	.00
SES	.00 (.01)	.00	.01 (.01)	.01	-.05 (.02)	-.06*	-.03 (.02)	-.04
Temperament								
Reactivity	.05 (.02)	.08**	.04 (.01)	.07**	-.01 (.02)	-.02	-.02 (.02)	-.03
Regulation	-.12 (.02)	-.16***	-.08 (.02)	-.11***	-.01 (.03)	-.01	.04 (.03)	.04
DB (broad factor)								
EXTER	.22 (.02)	.40***	.11 (.02)	.22***	.21 (.02)	.30***	.06 (.03)	.09*
DB (specific behaviors)								
CP *(SDQ)*	-	-	.37 (.05)	.25***	-	-	.45 (.07)	.23***
HYP-INA *(SDQ)*	-	-	.03 (.03)	.03	-	-	.16 (.03)	.13***
CU traits *(PSCD)*	-	-	.37 (.06)	.18***	-	-	.17 (.08)	.06*
R^2		.23***		.21***		.15***		.15***

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; CU traits were operationalized via the CU traits subscale of the CPTI (Colins et al., 2014)
(a) = models in which the effects of the broader DB operationalization are considered alone or (b)= along with those of specific externalizing behaviors assessed at T1 via alternative measures of the specific domains; CP= Conduct Problems subscale of the SDQ (Goodman, 2001); HYP-INA= Hyperactivity-Inattention subscale of the SDQ (Goodman, 2001); CU traits= CU traits subscale of the PSCD (López-Romero et al., 2019)

Table 2.7S. Results of multi-collinearity tests for the most complex regression models

	Parents		**Teachers**	
	Tolerance	**VIF**	**Tolerance**	**VIF**
Externalizing factor	.31	3.25	.31	3.27
Conduct Problems	.46	2.16	.45	2.22
Hyperactivity-Inattention	.60	1.66	.59	1.69
CU traits	.86	1.15	.86	1.16

Table 2.8S. Results of regression analyses with the externalizing factor score from the second order CFA predicting levels of conduct problems informed by parents and teachers over a two-year period (*method 3* was used for extracting the externalizing factor)

	Dependent variable: Conduct Problems (T3)							
	Parent-reported				**Teacher-reported**			
	(a)		**(b)**		**(a)**		**(b)**	
Predictors (T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.15 (.02)	-.16***	-.13 (.02)	-.15***	-.26 (.03)	-.21***	-.24 (.02)	-.20***
Age	-.01 (.01)	-.01	-.01 (.01)	-.01	.00 (.01)	.01	.00 (.01)	.00
SES	.00 (.01)	.00	.01 (.01)	.01	-.05 (.02)	-.06*	-.03 (.02)	-.04
Temperament								
Reactivity	.05 (.02)	.08**	.04 (.01)	.07**	-.01 (.02)	-.02	-.02 (.02)	-.03
Regulation	-.12 (.02)	-.16***	-.08 (.02)	-.11***	-.01 (.03)	-.01	.04 (.03)	.04
DB (broad factor)								
EXTER	.22 (.02)	.39***	.12 (.02)	.22***	.21 (.03)	.29***	.05 (.03)	.08
DB (specific behaviors)								
CP *(SDQ)*	-	-	.38 (.05)	.26***	-	-	.46 (.07)	.24***
HYP-INA *(SDQ)*	-	-	.02 (.03)	.02	-	-	.16 (.04)	.13***
CU traits *(PSCD)*	-	-	.37 (.06)	.18***	-	-	.17 (.09)	.06*
R^2		.23***		.21***		.15***		.15 ***

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; CU were operationalized via the Limited Prosocial Emotions Specifier of the DSM5 (APA, 2013). (a) = models in which the effects of the broader DB dimension are considered alone or (b)= along with those of specific externalizing behaviors assessed at T1 via alternative measures of the specific domains; CP= Conduct Problems subscale of the SDQ (Goodman, 2001); HYP-INA= Hyperactivity-Inattention subscale of the SDQ (Goodman, 2001); CU traits= CU traits subscale of the PSCD (López-Romero et al., 2019)

Table 2.9S. Results of multi-collinearity tests for the most complex regression models

	Parents		**Teachers**	
	Tolerance	**VIF**	**Tolerance**	**VIF**
Externalizing factor	.30	3.33	.30	3.35
Conduct Problems	.47	2.13	.45	2.20
Hyperactivity-Inattention	.57	1.75	.56	1.78
CU traits	.87	1.15	.86	1.16

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Table 2.10S (A, B, C) . Results of regression analyses comparing the utility of the externalizing factor to predict specific externalizing problems, informed by parents and teachers, over and above the same specific problems previously reported by parents *(method 2)*

(A)

	Dependent variable: ODD (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**β**	**B (SE)**	**β**	**B (SE)**
Sex	-.05 (.02)	-.07***	-.05 (.01)	-.07**	-.09 (.01)	-.13***	-.09 (.02)	-.13***
Age	.01 (.01)	.02	.01 (.01)	.02	.02 (.01)	.05**	.02 (.01)	.06
SES	-.02 (.01)	-.04*	-.02 (.01)	-.05*	-.02 (.01)	-.04	-.02 (.01)	-.04
DB (broader)								
EXTER	.27 (.01)	.58***	.20 (.01)	.46***	.12 (.01)	.29***	.06 (.01)	.16***
DB (narrower)								
CP (*SDQ*)	-	-	.29 (.04)	.23***	-	-	.22 (.04)	.20***
R^2	.36***		.29***		.11***		.09***	

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; CP= Conduct Problems subscale of the SDQ (Goodman, 2001).
Multicollinearity tests. Parent model : EXTER, VIF=2.05 ; CP, VIF=2.01, Teacher model: EXTER, VIF=2.07; CP, VIF= 2.03

(B)

	Dependent variable: ADHD (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**β**	**B (SE)**	**β**	**B (SE)**
Sex	-.10 (.02)	-.12***	-.06 (.01)	-.08***	-.18 (.02)	-.22***	-.16 (.02)	-.20***
Age	.01 (.01)	.02	.01 (.01)	.03	.03 (.01)	.06**	.03 (.01)	.06**
SES	-. 08 (.01)	-.13***	-.05 (.01)	-.08***	-.04 (.01)	-.07**	-.02 (.01)	-.04*
DB (broader)								
EXTER	.26 (.01)	.51***	.12 (.01)	.27***	.14 (.01)	.29***	.07 (.01)	.14***
DB (narrower)								
HYP-INA (*SDQ*)	-	-	.40 (.02)	.49***	-	-	.22 (.02)	.27***
R^2	.33***		.37***		.16***		.17***	

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; HYP-INA= Hyperactivity-Inattention subscale of the SDQ
Multicollinearity tests. Parent model: EXTER, VIF=1.60; CP, VIF=1.64, Teacher model: EXTER, VIF=1.63 ; CP, VIF=1.67

(C)

	Dependent variable: CU traits (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**β**	**B (SE)**	**β**	**B (SE)**
Sex	-.07 (.02)	-.09***	-.05 (.02)	-.06**	-.13 (.02)	-.13***	-.13 (.02)	-.12***
Age	.01 (.01)	.02	.01 (.01)	.02	.04 (.01)	.08	.04 (.01)	.07***
SES	-.03 (.01)	-.05*	-.03 (.01)	-.05*	-.02 (.02)	-.02	-.02 (.02)	-.02
DB (broader)								
EXTER	.18 (.01)	.37***	.13 (.01)	.29***	.15 (.02)	.23***	.13 (.02)	.21***
DB (narrower)								
CU traits (*PSCD*)	-	-	.68 (.06)	.35***	-	-	.22 (.08)	.09**
R^2	.16***		.22***		.08***		.08***	

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; CU traits subscale of the PSCD (López-Romero et al., 2019)
Multicollinearity tests. Parent model: EXTER, VIF=1.14 ; CP, VIF=1.12 , Teacher model: EXTER, VIF=1.16; CP, VIF=1.13

Table 2.11S (A, B, C). Results of regression analyses comparing the utility of the externalizing factor to predict specific externalizing problems, informed by parents and teachers, over and above the same specific problems previously reported by parents *(method 3)*

(A)

	Dependent variable: ODD (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**β**	**B (SE)**	**β**	**B (SE)**
Sex	-.05 (.02)	-.06*	-.05 (.01)	-.06**	-.09 (.01)	-.12***	-.09 (.01)	-.12***
Age	.01 (.01)	.02	.01 (.01)	.02	.02 (.01)	.06**	.02 (.01)	.06**
SES	-.02 (.01)	-.04*	-.02 (.01)	-.05*	-.02 (.01)	-.04	-.02 (.01)	-.04
DB (broader)								
EXTER	.28 (.01)	.58***	.20 (.01)	.45***	.12 (.01)	.29***	.07 (.01)	.16***
DB (narrower)								
CP (*SDQ*)	-	-	.30 (.04)	.24***	-	-	.22 (.04)	.19***
R^2		.36***		.29***		.11***		.09***

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; CP= Conduct Problems subscale of the SDQ (Goodman, 2001).
Multicollinearity tests. Parent model : EXTER, VIF=2.01 ; CP, VIF=1.98 , Teacher model: EXTER, VIF=2.04; CP, VIF=2.00

(B)

	Dependent variable: ADHD (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**β**	**B (SE)**	**β**	**B (SE)**
Sex	-.09 (.02)	-.11***	-.06 (.01)	-.08***	-.18 (.02)	-.22***	-.16 (.02)	-.20***
Age	.01 (.01)	.03	.01 (.01)	.03	.03 (.01)	.06**	.03 (.01)	.06**
SES	-.08 (.01)	-.13***	-.05 (.01)	-.08***	-.04 (.01)	-.07**	-.02 (.01)	-.04*
DB (broader)								
EXTER	.27 (.01)	.54***	.13 (.01)	.29***	. 15 (.01)	.30***	.07 (.01)	.15***
DB (narrower)								
HYP-INA (*SDQ*)	-	-	.38 (.02)	.47***	-	-	.21 (.02)	.26***
R^2		.35***		.37***		.16***		.16***

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; HYP-INA= Hyperactivity-Inattention subscale of the SDQ
Multicollinearity tests. Parent model: EXTER, VIF=1.69 ; CP, VIF=1.73 , Teacher model: EXTER, VIF= 1.72; CP, VIF=1.75

(C)

	Dependent variable: CU traits (T3)							
	Parent-reported				**Teacher-reported**			
Predictors	**(a)**		**(b)**		**(a)**		**(b)**	
(T1, P)	**B (SE)**	**β**	**B (SE)**	**β**	**β**	**B (SE)**	**β**	**B (SE)**
Sex	-.07 (.02)	-.09***	-.05 (.02)	-.06**	-.13 (.02)	-.12***	-.12 (.02)	-.12***
Age	.01 (.01)	.02	.01 (.01)	.02	.04 (.01)	.08***	.04 (.01)	.08***
SES	-.03 (.01)	-.05*	-.03 (.01)	-.04	-.02 (.02)	-.02	-.02 (.02)	-.02
DB (broader)								
EXTER	.18 (.01)	.37***	.13 (.01)	.28***	.15 (.02)	.23***	.13 (.02)	.20***
DB (narrower)								
CU traits (*PSCD*)	-	-	.68 (.06)	.35***	-	-	.23 (.08)	.09**
R^2		.16***		.22***		.08***		.08***

Note. *p<.05, **p<.01, ***p<.001; P= parent-reported; CU traits subscale of the PSCD (López-Romero et al., 2019)
Multicollinearity tests. Parent model: EXTER, VIF=.14; CP, VIF=1.12., Teacher model: EXTER, VIF=1.15 ; CP, VIF=1.12

SUPPLEMENTARY MATERIAL FOR CHAPTER THREE

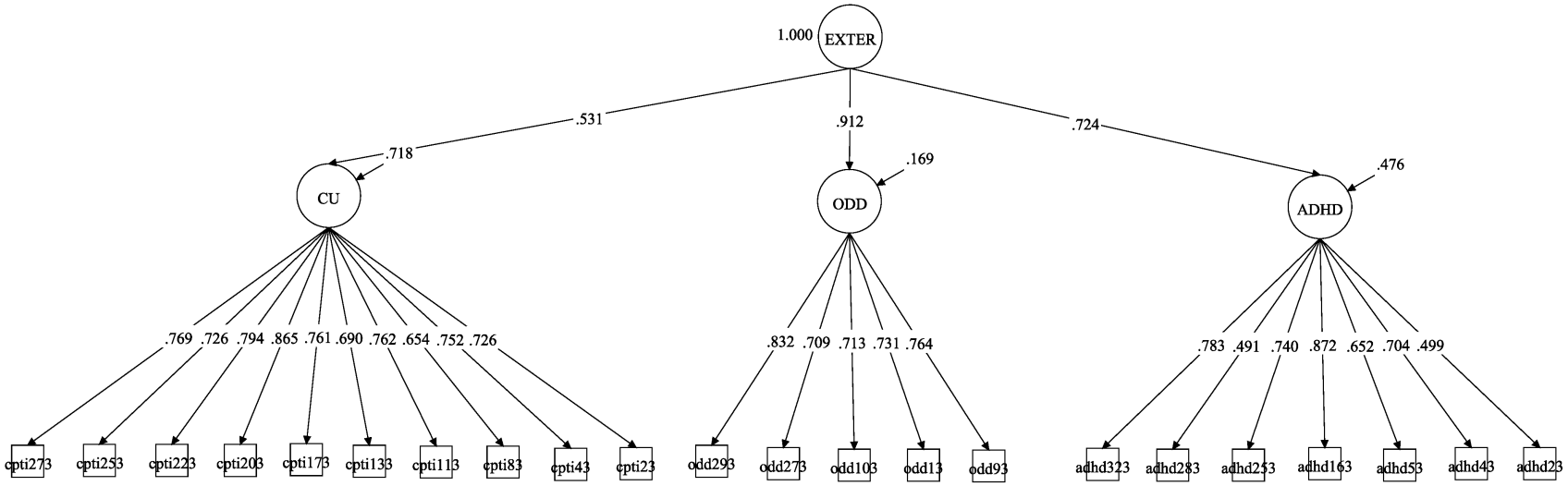
Table 3.1S. Descriptive statistics of relevant indicators of DB in the study sample and the original sample of the ELISA Project *(parent -reported)*

	Study sample				ELISA sample			
	N	*M*	*SD*	*Range*	*N*	*M*	*SD*	*Range*
Sex (T1, girls)	298 (55.5%)	-	-	-	1185 (48%)	-	-	-
Age (T1)	537	4.25	.92	3-6 (in years)	2467	4.25	.91	3-6
SES (T1)	534	-.22	.72	-2.47-1.32	2252	-.002	.71	-2.47−1.32
T1								
ODD	537	.93	.40	0-2	2235	.60	.39	0-2
ADHD	537	1.14	.41	0-2	2236	.72	.46	0-2
CU traits	537	1.66	.51	1-4	2248	1.42	.44	1-4
T3								
ODD	401	.69	.44	0-2	1785	.46	.40	0-2
ADHD	401	.84	.45	0-2	1785	.52	.42	0-2
CU traits	405	1.48	.47	1-3.2*	1794	1.32	.42	1-4

Note. T1=time 1; T3=time 3.
The study sample are 543 preschoolers at risk for psychopathology selected from the initial sample (N = 2467) based on children's scores on the "Total Difficulties" scale of the Strengths and Difficulties Questionnaire (SDQ, Goodman, 2001) at T1.
*Mean scores are shown

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Figure 3.1S. Second order factor model in which a single supraordinate factor (i.e. "EXTER") accounts for shared variance among subordinate factors (i.e., CU traits, CP, ADHD)



CPTI27. No muestra sentimientos de culpa ni remordimiento
CPTI25. Nunca expresa sentimientos de culpa
CPTI22. Parece que es totalmente incapaz de sentir culpa o remordimiento
CPTI20. Parece que no le preocupa lo que otros sienten o piensan
CPTI17. Rara vez se arrepiente de hacer algo no permitido
CPTI13. No se siente mal cuando se está haciendo daño a otros/as
CPTI11. Completamente indiferente ante el malestar de otros/as niños/as
CPTI8. Nunca parece tener mala conciencia por las cosas que hace
CPTI4. No parece compartir las alegrías y las penas de los demás
CPTI2. Rara vez muestra compasión por los demás

ODD29. Tiene rabietas o mal genio
ODD27. Es tozudo/a, malhumorado/a, irritable
ODD10. Desobedece en la escuela
ODD1. Discute mucho
ODD9. Desobedece en casa

ADHD32. Es más ruidoso/a de lo común
ADHD28. Habla demasiado
ADHD25. Es desatento/a, se distrae con facilidad
ADHD16. Es impulsivo/a, actúa sin pensar
ADHD5. No puede estar quieto/a sentado/a, es movido/a o hiperactivo/a
ADHD4. No puede concentrarse o prestar atención durante mucho tiempo
ADHD2. Deja sin concluir las cosas que empieza

Note. The model was estimated using WLSM (Weighted Least Square Mean), given the ordinal nature of the data. It was composed by indicators of ODD (CBCL, Achenbach, & Rescorla, 2001), ADHD (CBCL, Achenbach, & Rescorla, 2001) and CU traits (CPTI, Colins et al., 2014). The overall model fit of the initial estimated solution was acceptable ($\chi 2$ (231) = 6352.72, p < .000, CFI = .91, RMSEA = .072 (90% confidence interval [90% CI]: .066 - .077). The second-order factor (i.e., general externalizing factor) was well-defined, as indicated by the significant first-factor loadings on the first-order dimensions: CU traits (β=0.53, p < .000), CP (β=0.91, p < .000) and ADHD (β=0.72, p < .000)

Table 3.2S. Associations of broad temperament dimensions operationalized via Principal Component Analyses of general-purposes scales, and disruptive behavior at different levels of specificity

(A)

	Parent reported disruptive behavior, T3							
	Lower-order dimensions						**Higher-order factor**	
	ODD		**ADHD**		**CU traits**		**EXTER**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**	**β**
Sex	-.17 (.04)	-.19***	-.22 (.04)	-.24***	-.09 (.04)	-.10*	-.39 (.07)	-.23***
Age	-.02 (.02)	-.05	.00 (.02)	.00	.00 (.02)	.00	-.02 (.04)	-.03
SES	-.04 (.03)	-.07	-.12 (.03)	-.19***	-.03 (.03)	-.04	-.13 (.05)	-.11*
Parenting (T1)								
PUN	.21 (.05)	.21***	.03 (.05)	.03	.18 (.06)	.17**	.34 (.09)	.19***
POS	.03 (.06)	.02	.04 (.05)	.03	-.03 (.06)	-.03	.03 (.10)	.01
INC	.08 (.05)	.10	.06 (.04)	.07	.10 (.05)	.12*	.19 (.08)	.13*
Temperament								
PC1 (approach)	.08 (.02)	.17***	.18 (.02)	.39***	.05 (.02)	.10*	.21 (.04)	.26***
R^2		.15***		.30***		.07**		.22***

Note:*p*<.05; ***p*<.001; ****p*<.000. PUN: Punitive parenting practices; POS: Positive parenting practices; INC: Inconsistent parenting practices; PC1= Principal Component 1; EXTER; second-order externalizing factor

(B)

	Parent reported disruptive behavior, T3							
	Lower-order dimensions						**Higher-order factor**	
	ODD		**ADHD**		**CU traits**		**EXTER**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**
Sex	-. 21 (.04)	-.24***	-.28 (.04)	-.31***	-.11 (.05)	-.11*	-.47 (.07)	-.28***
Age	-.03 (.02)	-.06	-.02 (.02)	-.03	-.01 (.02)	-.02	-.04 (.04)	-.05
SES	-.03 (.03)	-.06	-.14 (.03)	-.22***	-.03 (.03)	-.05	-.13 (.05)	-.12*
Parenting (T1)								
PUN	.18 (.05)	.18***	.02 (.05)	.02	.18 (.06)	.18**	.30 (.09)	.16*
POS	.04 (.06)	.03	.08 (.06)	.07	-.02 (.06)	-.02	.07 (.10)	.03
INC	.06 (.04)	.08	.08 (.04)	.09	.11 (.05)	.13*	.18 (.08)	.12*
Temperament								
PC2 (neg aff- arousal)	.13 (.02)	.30***	.03 (.02)	.07	-.01 (.03)	-.02	.19 (.04)	.24***
R^2		.20***		.17***		.07**		.20***

Note:*p*<.05; ***p*<.001; ****p*<.000 ; PC2=Principal Component 2

(C)

	Parent reported disruptive behavior, T3							
	Lower-order dimensions						**Higher-order factor**	
	ODD		**ADHD**		**CU traits**		**EXTER**	
	B (SE)	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**
Sex	-.20 (.04)	-.22***	-.26 (.04)	-.28***	-.06 (.05)	-.07	-.43 (.08)	-.26***
Age	-.03 (.02)	-.07	-.02 (.02)	-.03	-.01 (.02)	-.01	-.05 (.04)	-.05
SES	-.05 (.03)	-.08	-.14 (.03)	-.23***	-.03 (.03)	-.06	-.15 (.06)	-.14**
Parenting (T1)								
PUN	.20 (.05)	.21***	.03 (.05)	.03	.19 (.06)	.18**	.35 (.10)	.19***
POS	.05 (.06)	.04	.10 (.06)	.08	.02 (.06)	.01	.11 (.11)	.05
INC	.10 (.04)	.12*	.08 (.04)	.10*	.10 (.05)	.12*	. 22 (.08)	.15**
Temperament								
PC3 (inhibition)	.00 (.02)	.01	-.03 (.02)	-.08	-.08 (.02)	-.16**	-.04 (.04)	-.04
R^2		.12***		.17***		.09*		.16***

Note:*p*<.05; ***p*<.001; ****p*<.000; PC3= Principal Component 3

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Table 3.3S. Associations of specific temperament dimensions operationalized through the CADS (Lahey, Appelgate et al., 2008), and disruptive behavior at different levels of specificity

	Parent reported disruptive behavior, T3							
	Lower-order dimensions						**Higher-order factor**	
	ODD		**ADHD**		**CU traits**		**EXTER**	
Predictors	**B (SE)**	**β**	**B (SE)**	**β**	**B (SE)**		**B (SE)**	**β**
Sex	-.08 (.03)	-.09**	-.18 (.04)	-.20***	.03 (.03)	.04	-.19 (.05)	-.12***
Age	-.01 (.02)	-.02	.00 (.02)	.01	.02 (.02)	.04	.00 (.03)	.00
SES	-.05 (.02)	-.09*	-.12 (.03)	-.20***	-.04 (.03)	-.07	-.14 (.04)	-.14***
Parenting (T1)								
PUN	.09 (.04)	.09*	-.06 (.04)	-.06	.08 (.05)	.08	.11 (.06)	.06
POS	-.03 (.04)	-.03	.03 (.05)	.02	.01 (.05)	.01	-.04 (.07)	-.02
INC	.01 (.03)	.01	.01 (.03)	.02	.07 (.04)	.08*	.05 (.05)	.03
Temperament (T3) (specific-purpose model)								
Negative Emot.	.44 (.03)	.67***	.29 (.03)	.42***	.14 (.03)	.21***	.79 (.04)	.66***
Daring	.04 (.03)	.08*	.11 (.02)	.21***	-.46 (.03)	.16***	.15 (.03)	.17***
Prosociality	-.02 (.03)	-.02	-.03 (.03)	-.04	.08 (.02)	-.62***	-.20 (.44)	-.15***
R^2		.51***		.37***		.46***		.59***

Note:*p*<.05; ***p*<.001; ****** *p*<.000

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SUPPLEMENTARY MATERIAL FOR CHAPTER FOUR

Table 4.1S. Descriptive statistics of DB relevant indicators in the study sample and the original ELISA sample *(parent and teacher -reported)*

	Study sample (T3) (ELISA initial sample and preschoolers incorporated in T2)				**ELISA initial sample at T3**			
	N	*M*	*SD*	*Range*	*N*	*M*	*SD*	*Range*
Sex (% girls)	797 (47.2%)	-	-	-	-	-	-	-
Age	1285	5.39	.68	4-6 (in years)	2283	6.32	.91	4-8
SES	1565	.016	.69	-2.28-1.32	-	-	-	-
Externalizing Behaviors (P)								
Conduct Problems	1283	1.63	.50	1-4.10	1784	1.60	.42	1-4.10*
ADHD	1284	.53	.42	0-2	1785	.52	.42	0-2
Psychopathic Traits	1287	1.62	.40	1-3.39*	1794	1.59	.41	1-3.71*
Reactive Aggression	1283	1.82	.72	1-5	1783	1.81	.72	1-5
Externalizing Behaviors (T)								
Conduct Problems	1430	1.44	.60	1-4.50	2037	1.42	.60	1-4.80*
ADHD	1430	.31	.41	0-2	2037	.31	.41	0-2
Psychopathic Traits	1430	1.44	.49	1-3.81*	2037	1.44	.49	1-3.81*
Reactive Aggression	1430	1.62	.84	1-5	2037	1.62	.85	1-5

Note. P= parent-reported; T= teacher-reported; T3=time 3.
The study sample at T3 are 1688 children attending preschool at the time of the third data collection of the longitudinal study. This subsample includes a group of children incorporated a year after the first data collection, in 2018, T2 (n=361, aged 3-6 years old [M=3.8 years, SD=.86).
*Mean scores are shown.

Table 4.2S. Cross-sectional bivariate correlations for multitrait, multimethod matrix of parent and teacher reports on externalizing indicators examined in the third study of this dissertation

	Parent Ratings				***Teacher Ratings***			
	(1)	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
Parent Ratings								
(1) Conduct Problems	1							
(2) ADHD	.45***	1						
(3) Psychopathic Traits	.60***	.58***	1					
(4) Reactive Aggression	.68***	.39***	.55***	1				
Teacher Ratings								
(1) Conduct Problems	.38***				1			
(2) ADHD	.50***	.49***			.72***	1		
(3) Psychopathic Traits	.31***	.34**	.28***		.73***	.74***	1	
(4) Reactive Aggression	.35***	.33***	.70***	.30***	.84***	.60***	.70***	1

Note:*p*<.05; ***p*<.001; ****p*<.000

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Table 4.3S. Compilation of items assessing Negative Urgency across diverse UPPS-P measures

UPPS-P 59-item English version (adults) : 12 items
2. I have trouble controlling my impulses.
7. I have trouble resisting my cravings (for food, cigarettes, etc.).
12. I often get involved in things I later wish I could get out of.
17. When I feel bad, I will often do things I later regret in order to make myself feel better now.
22. Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse.
29. When I am upset, I often act without thinking.
34. When I feel rejected, I will often say things that I later regret.
39. It is hard for me to resist acting on my feelings.
44. I often make matters worse because I act without thinking when I am upset.
50. In the heat of an argument, I will often say things that I later regret.
53. I always keep my feelings under control.
58. Sometimes I do impulsive things that I later regret.

UPPS-P Short English version (adults) : 4 items
7. When I feel bad, I often do things I later regret in order to make myself feel better now.
11. Sometimes when I feel bad, I keep doing something even though it is making me feel worse.
17. When I am upset, I often act without thinking.
20. When I feel rejected, I often say things that I later regret.

UPPS-P Short Spanish version (adults): 4 items
4. Cuando estoy irritado suelo actuar sin pensar
7. En el acaloramiento de una discusión, con frecuencia digo cosas de las que luego me arrepiento
12. Con frecuencia empeoro las cosas porque actúo sin pensar cuando estoy irritado
17.Cuando me siento rechazado, frecuentemente digo cosas de las que luego me arrepiento

UPPS-P 40-item English version (children): 8 items
1. If I feel like doing something, I tend to do it, even if it's bad.
7. When I feel bad, I often do things I later regret in order to make myself feel better now.
11. Sometimes when I feel bad, I keep doing something even though it is making me feel worse.
17. When I am upset, I often act without thinking.
20. When I feel rejected, I often say things that I later regret.
26. I often make matters worse because I act without thinking when I am upset
30. When I am mad, I sometimes say things that I later regret.
32. Sometimes I do crazy things I later regret.

***Note*:** Although various measures were reviewed, as this compilation reflects, only comparisons between the Short Spanish version of the UPPS-P Behavior Impulsive Scale for adults and the Standard English version for children were made in order to conduct our adaptation (see tables below).

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Table 4.4S. Comparison between scales for item selection (Negative Urgency)

(1) Short Spanish version of the UPPS-P[6] (adults)	(2) Standard English version of the UPPS-P[7] (children)	*Comparison*	
		Results	***Decision***
4. Cuando estoy irritado suelo actuar sin pensar	17. When I am upset, I often act without thinking	Equivalence between forms	The item from the Short Spanish form for adults is retained
7. En el acaloramiento de una discusión, con frecuencia digo cosas de las que luego me arrepiento	30. When I am mad, I sometimes say things that I later regret.	Partial equivalence between forms	The item from the Standard English version for children is retained and translated (more developmentally appropriate)
12. Con frecuencia empeoro las cosas porque actúo sin pensar cuando estoy irritado	26. I often make matters worse because I act without thinking when I am upset	Equivalence between forms	The item from the Spanish form is retained
17.Cuando me siento rechazado, frecuentemente digo cosas de las que luego me arrepiento	15. When I feel rejected, I often say things that I later regret.	Equivalence between forms	The item from the Spanish form is retained

Note: selected items shaded in light green

Table 4.5S. Final version of the Negative Urgency UPPS-P subscale included in our study after selected items were converted into a parent-reported form in Spanish and Galician

Items in Spanish

Cuando está irritado/a suele actuar sin pensar
Cuando está enfadado/a dice cosas de las que luego se arrepiente
Con frecuencia empeora las cosas porque actúa sin pensar cuando está irritado/a
Cuando se siente rechazado/a, frecuentemente dice cosas de las que luego se arrepiente

Items in Galician

Cando está enfadado/a soe actuar sen pensar
Cando está enfadado/a di cousas das que despois se arrepinte
Cando está enfadado/a, con frecuencia empeora as cousas, porque actúa sen pensar
Cando se sinte rexeitado/a, con frecuencia di cousas das que despois se arrepinte

[6] Candido, A., Orduna, E., Perales, J. C., Verdejo-Garcia, A. J., & Billieux, J. (2012). Validation of a short Spanish version of the UPPS-P impulsive behaviour scale [Validacion de una version breve de la escala de comportamiento impulsivo UPPS-P]. *Trastornos Adictivos*, *14*(3), 73 - 78. 10.1016/S1575-0973(12)70048-X

[7] Zapolski, T. C. B., Stairs, A. M., Settles, R. F., Combs, J. L., & Smith, G. T. (2010). The measurement of dispositions to rash action in children. *Assessment, 17*(1), 116–125. 10.1177/1073191109351372

Table 4.6S. Compilation of items assessing Lack of Premeditation across diverse UPPS-P measures

UPPS-P 59-item English version (adults) : 11 items
1. I have a reserved and cautious attitude toward life.
6. My thinking is usually careful and purposeful.
11. I am not one of those people who blurt out things without thinking.
16. I like to stop and think things over before I do them.
21. I don't like to start a project until I know exactly how to proceed.
28. I tend to value and follow a rational, "sensible" approach to things.
33. I usually make up my mind through careful reasoning.
38. I am a cautious person.
43. Before I get into a new situation I like to find out what to expect from it.
48. I usually think carefully before doing anything.
55. Before making up my mind, I consider all the advantages and disadvantages.

UPPS-P Short English version (adults) : 4 items
2. My thinking is usually careful and purposeful.
5. I like to stop and think things over before I do them.
12. I tend to value and follow a rational, "sensible" approach to things.
19. I usually think carefully before doing anything.

UPPS-P Short Spanish version (adults): 4 items
1. Normalmente pienso cuidadosamente antes de hacer cualquier cosa
6. Mi manera de pensar es normalmente meticulosa y centrada
13. Normalmente tomo mis decisiones mediante un cuidadoso razonamiento
19. Antes de implicarme en una nueva situación me gusta informarme sobre qué puedo esperar de ella

UPPS-P 40-item English version (children): 8 items
4. I tend to blurt out things without thinking.
6. I like to stop and think about something before I do it.
10. I like to know just what to do before I start a project.
16. I try to take a careful approach to things.
23. I am very careful.
25. I like to know what to expect, before doing something new.
28. I tend to stop and think before doing things.
29. Before making a choice, I tend to think about both the good things and the bad things about the choice.

***Note*:** Although various measures were reviewed, as this compilation reflects, only comparisons between the Short Spanish version of the UPPS-P Behavior Impulsive Scale for adults and the Standard English version for children were made in order to conduct our adaptation (see tables below).

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Table 4.7S. Comparison between scales for item selection (Lack of Premeditation)

(1) Short Spanish version of the UPPS-P[8] (adults)	(2) Standard English version of the UPPS-P[9] (children)	*Comparison*	
		Results	***Decision***
1.Normalmente pienso cuidadosamente antes de hacer cualquier cosa	28. I tend to stop and think before doing things.	Equivalence between forms	The item from the children version is retained and translated (more developmentally appropriate)
6. Mi manera de pensar es normalmente meticulosa y centrada	16. I try to take a careful approach to things	Partial equivalence between forms	The item from the Spanish version is retained as no substantial alteration in meaning occurs, and it is developmentally appropriate
13. Normalmente tomo mis decisiones mediante un cuidadoso razonamiento	29. Before making a choice, I tend to think about both the good things and the bad things about the choice.	Partial equivalence between forms	The item from the children version is retained and translated (more developmentally appropriate)
19. Antes de implicarme en una nueva situación me gusta informarme sobre qué puedo esperar de ella	25. I like to know what to expect, before doing something new.	Partial equivalence between forms	The item from the children version is retained and translated (more developmentally appropriate)

Note: selected items shaded in light green

Table 4.8S. Final version of the Lack of Premeditation UPPS-P subscale included in our study after selected items were converted into a parent-reported form in Spanish and Galician

Items in Spanish

Tiende a pararse y pensar antes de hacer cualquier cosa
Su manera de pensar es normalmente meticulosa y centrada
Antes de tomar una decisión, tiende a pensar en las consecuencias positivas y negativas acerca de ella
Le gusta saber qué esperar antes de hacer algo nuevo

Items in Galician

Tende a pararse epensar antes de facer calquera cousa
A súa maneira de pensar é organizada e centrada
Antes de tomar unha decisión, tende a pensar nas súas consecuencias positivas e negativas
Gústalle saber a que aterse antes de facer algo diferente ao habitual

[8] Candido, A., Orduna, E., Perales, J. C., Verdejo-Garcia, A. J., & Billieux, J. (2012). Validation of a short Spanish version of the UPPS-P impulsive behaviour scale [Validacion de una version breve de la escala de comportamiento impulsivo UPPS-P]. *Trastornos Adictivos*, *14*(3), 73 - 78. 10.1016/S1575-0973(12)70048-X

[9] Zapolski, T. C. B., Stairs, A. M., Settles, R. F., Combs, J. L., & Smith, G. T. (2010). The measurement of dispositions to rash action in children. *Assessment, 17*(1), 116–125. 10.1177/1073191109351372

Table 4.9S. Compilation of items assessing Sensation Seeking across diverse UPPS-P measures

UPPS-P 59-item English version (adults): 11 ítems
3. I generally seek new and exciting experiences and sensations.
8. I'll try anything once.
13. I like sports and games in which you have to choose your next move very quickly.
18. I would enjoy water skiing.
23. I quite enjoy taking risks.
26. I would enjoy parachute jumping.
31. I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.
36. I would like to learn to fly an airplane.
41. I sometimes like doing things that are a bit frightening
46. I would enjoy the sensation of skiing very fast down a high mountain slope.
51. I would like to go scuba diving.

UPPS-P Short English version (adults): 4 ítems
9. I quite enjoy taking risks.* (R)
14. I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.* (R)
16. I would like to learn to fly an airplane. (R)
18. I would enjoy the sensation of skiing very fast down a high mountain slope. (R)

UPPS-P Short Spanish version (adults): 4 ítems
3. A veces me gusta hacer cosas que dan un poco de miedo
9. Disfruto mucho corriendo riesgos
14.Generalmente busco experiencias y sensaciones nuevas y excitantes
18. Me gustan experiencias y sensaciones nuevas y excitantes, aunque causen un poco de miedo y sean poco convencionales

UPPS-P 40-item English version (children): 8 ítems
2. I like new, thrilling things to happen.
8. I would like water skiing.
12. I enjoy taking risks.
14. I would like parachute jumping.
18. I like new, thrilling things, even if they are a little scary.
21. I would like to learn to fly an airplane.
27. I would like to ski very fast down a high mountain slope.
31. I would enjoy fast driving

***Note*:** Although various measures were reviewed, as this compilation reflects, only comparisons between the Short Spanish version of the UPPS-P Behavior Impulsive Scale for adults and the Standard English version for children were made in order to conduct our adaptation (see tables below).

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Table 4.10S. Comparison between scales for item selection (Sensation Seeking)

(1) Short Spanish version of the UPPS-P[10] (adults)	(2) Standard English version of the UPPS-P[11] (children)	*Comparison*	
		Results	***Decision***
3. A veces me gusta hacer cosas que dan un poco de miedo	18. like new, thrilling things, even if they are a little scary.	Equivalence between forms	The item from the Spanish form is retained
9.Disfruto mucho corriendo riesgos	12. I enjoy taking risks.	Equivalence between forms	The item from the Spanish form is retained
14.Generalmente busco experiencias y sensaciones nuevas y excitantes	2. I like new, thrilling things to happen.	Equivalence between forms	The item from the children version is retained and translated (more developmentally appropriate)
18.Me gustan experiencias y sensaciones nuevas y excitantes, aunque causen un poco de miedo y sean poco convencionales	14. I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional	Equivalence between forms	The item from the Spanish form is retained

Note: selected items shaded in light green

Table 4.11S. Final version of the Sensation Seeking UPPS-P subscale included in our study after selected items were converted into a parent-reported form in Spanish and Galician

Items in Spanish

A veces le gusta hacer cosas que dan un poco de miedo
Disfruta mucho corriendo riesgos
Le gusta que ocurran cosas nuevas y excitantes
Le gustan experiencias y sensaciones nuevas y excitantes, aunque causen un poco de miedo y sean poco convencionales

Items in Galician

Ás veces, gústalle facer cousas que dan un pouco de medo
Desfruta moito correndo riscos
Gústalle que ocorran cousas novas e sorprendentes
Gústanlle as experiencias e sensacións novas e excitantes, mesmo cando dan un pouco de medo e están un pouco en contra das normas

[10] Candido, A., Orduna, E., Perales, J. C., Verdejo-Garcia, A. J., & Billieux, J. (2012). Validation of a short Spanish version of the UPPS-P impulsive behaviour scale [Validacion de una version breve de la escala de comportamiento impulsivo UPPS-P]. *Trastornos Adictivos*, *14*(3), 73 - 78. 10.1016/S1575-0973(12)70048-X

[11] Zapolski, T. C. B., Stairs, A. M., Settles, R. F., Combs, J. L., & Smith, G. T. (2010). The measurement of dispositions to rash action in children. *Assessment, 17*(1), 116–125. 10.1177/1073191109351372

Table 4.12S. Compilation of items assessing Lack of Perseverance cross diverse UPPS-P measures

UPPS-P 59-item English version (adults): 10 ítems
4. I generally like to see things through to the end.
9. I tend to give up easily.
14. Unfinished tasks really bother me.
19. Once I get going on something I hate to stop.
24. I concentrate easily
27. I finish what I start.
32. I am able to pace myself so as to get things done on time.
37. I am a person who always gets the job done.
42. I almost always finish projects that I start.
47. Sometimes there are so many little things to be done that I just ignore them all.

UPPS-P Short English version (adults): 4 ítems
1. I generally like to see things through to the end.*
4. Unfinished tasks really bother me.
7. Once I get going on something I hate to stop.
11. I finish what I start.

UPPS-P Short Spanish version (adults): 4 ítems
5. En general me gusta asegurarme de llevar las cosas a buen término
8. Termino lo que empiezo
11. Casi siempre termino los proyectos que empiezo
16. Soy una persona que siempre deja el trabajo hecho

UPPS-P 40-item English version (children): 8 ítems
3. I like to see things through to the end.
5. I am upset when I am not finished with things.
9. Once I get going on something I hate to stop.
13. It is easy for me to think hard.
15. I finish what I start.
19. I tend to get things done on time.
22. I am a person who always gets the job done.
24. I almost always finish projects that I start.

***Note*:** Although various measures were reviewed, as this compilation reflects, only comparisons between the Short Spanish version of the UPPS-P Behavior Impulsive Scale for adults and the Standard English version for children were made in order to conduct our adaptation (see tables below).

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Table 4.13S. Comparison between scales for item selection (Lack of Perseverance)

(1) Short Spanish version of the UPPS-P[12] (adults)	**(2) Standard English version of the UPPS-P[13] (children)**	***Comparison***	
		Results	***Decision***
5. En general me gusta asegurarme de llevar las cosas a buen término	3. I like to see things through to the end.	Equivalence between forms	The item from the children version is retained and translated (more inappropriate for children)
8. Termino lo que empiezo	15. I finish what I start.	Equivalence between forms	The item from the Spanish form is retained
11. Casi siempre termino los proyectos que empiezo	24. I almost always finish projects that I start.	Equivalence between forms	The item from the Spanish form is retained, however, an example at the end was added *"for instance, a drawing"*
16. Soy una persona que siempre deja el trabajo hecho	22. I am a person who always gets the job done	Equivalence between forms	The item from the Spanish form is retained, but slightly reformulated to be more applicable to children. Instead of "trabajo" (i.e., work), we choose "tareas" (i.e., tasks).

Note: selected items shaded in light green

Table 4.14S. Final version of the Lack of Perseverance UPPS-P subscale included in our study after selected items were converted into a parent-reported form in Spanish and Galician

Items in Spanish

En general le gusta asegurarse de que finaliza lo que ha empezado
Termina lo que empieza
Casi siempre termina los proyectos que empieza (p.ej., un dibujo)
Es un niño/a eficiente y siempre completa sus tareas

Items in Galician

En xeral, gústalle asegurarse de que acaba as cousas que comeza
Remata o que comeza
Case sempre remata as actividades que comeza (p. ex., un debuxo)
É un neno/a eficiente e sempre completa as súas tarefas

[12] Candido, A., Orduna, E., Perales, J. C., Verdejo-Garcia, A. J., & Billieux, J. (2012). Validation of a short Spanish version of the UPPS-P impulsive behaviour scale [Validacion de una version breve de la escala de comportamiento impulsivo UPPS-P]. *Trastornos Adictivos, 14*(3), 73 - 78. 10.1016/S1575-0973(12)70048-X

[13] Zapolski, T. C. B., Stairs, A. M., Settles, R. F., Combs, J. L., & Smith, G. T. (2010). The measurement of dispositions to rash action in children. *Assessment, 17*(1), 116–125. 10.1177/1073191109351372

Table 4.15S. Compilation of items assessing Positive Urgency across diverse UPPS-P measures

UPPS-P 59-item English version (adults): 14 ítems
5. When I am very happy, I can't seem to stop myself from doing things that can have bad consequences.
10. When I am in great mood, I tend to get into situations that could cause me problems.
15. When I am very happy, I tend to do things that may cause problems in my life.
20. I tend to lose control when I am in a great mood.
25. When I am really ecstatic, I tend to get out of control.
30. Others would say I make bad choices when I am extremely happy about something
35. Others are shocked or worried about the things I do when I am feeling very excited.
40. When I get really happy about something, I tend to do things that can have bad consequences.
45. When overjoyed, I feel like I can't stop myself from going overboard.
49. When I am really excited, I tend not to think of the consequences of my actions.
52. I tend to act without thinking when I am really excited.
54. When I am really happy, I often find myself in situations that I normally wouldn't be comfortable with.
57. When I am very happy, I feel like it is ok to give in to cravings or overindulge.
59. I am surprised at the things I do while in a great mood.

UPPS-P Short English version (adults): 4 ítems
3. When I am in great mood, I tend to get into situations that could cause me problems. (R)
10. I tend to lose control when I am in a great mood. (R)
17. Others are shocked or worried about the things I do when I am feeling very excited. (R)
20. I tend to act without thinking when I am really excited.* (R)

UPPS-P Short Spanish version (adults): 4 ítems
2. Cuando estoy realmente animado, no suelo pensar en las consecuencias de mis acciones
10. Cuando estoy rebosante de alegría, siento que no puedo evitar "tirar la casa por la ventana"
15. Cuando estoy realmente contento por algo, tiendo a hacer cosas que pueden tener malas consecuencias
20. Cuando estoy muy feliz, veo bien sucumbir a mis deseos o darme algún capricho de más

UPPS-P 40-item English version (children): 8 ítems
33. When I am very happy, I can't stop myself from going overboard.
34. When I am really thrilled, I tend not to think about the results of my actions.
35. When I am in a great mood, I tend to do things that could cause me problems.
36. I tend to act without thinking when I am very, very happy.
37. When I get really happy about something, I tend to do things that can lead to trouble.
38. When I am really happy, I tend to get out of control.
39. I tend to lose control when I am in a great mood.
40. When I am very happy, I tend to do thing that may cause problems in my life.

***Note*:** Although various measures were reviewed, as this compilation reflects, only comparisons among the Short Spanish version of the UPPS-P Behavior Impulsive Scale for adults and the Standard English version for children were made in order to conduct our adaptation (see tables below).

Table 4.16S. Comparison between scales for item selection (Positive Urgency)

(1) Short Spanish version of the UPPS-P[14] (adults)	(2) Standard English version of the UPPS-P[15] (children)	*Comparison*	
		Results	***Decision***
2. Cuando estoy realmente animado, no suelo pensar en las consecuencias de mis acciones	34. When I am really thrilled, I tend not to think about the results of my actions	Equivalence between forms	The item from the Spanish form is retained
10. Cuando estoy rebosante de alegría, siento que no puedo evitar "tirar la casa por la ventana"	33. When I am very happy, I can't stop myself from going overboard.	Equivalence between forms	The item from the children version is retained and translated (more inappropriate for children)
15. Cuando estoy realmente contento por algo, tiendo a hacer cosas que pueden tener malas consecuencias	35. When I am in a great mood, I tend to do things that could cause me problems.	Equivalence between forms	The item from the children version is retained and translated (more developmentally appropriate for children)
20. Cuando estoy muy feliz, veo bien sucumbir a mis deseos o darme algún capricho de más	38. When I am really happy, I tend to get out of control.	Partial equivalence between forms	The item from the children version is retained and translated (more developmentally appropriate for children)

Note: selected items shaded in light green

Table 4.17S. Final version of the Positive Urgency UPPS-P subscale included in our study after selected items were converted into a parent-reported form in Spanish and Galician

Items in Spanish

Cuando está realmente contento/a, no suele pensar en las consecuencias de sus acciones

Cuando está rebosante de alegría, tiene dificultades para controlarse

Cuando está muy contento/a por algo, tiende a hacer cosas que pueden causarle problemas

Tiende a actuar sin pensar cuando está feliz

Items in Galician

Cando está realmente contento/a, non acostuma pensar nas consecuencias das súas accións

Cando sente unha alegría desbordante, ten dificultades para controlarse

Cando está moi contento/a, tende a facer cousas que poden causarlle problemas

Tende a actuar sen pensar cando está feliz

[14] Candido, A., Orduna, E., Perales, J. C., Verdejo-Garcia, A. J., & Billieux, J. (2012). Validation of a short Spanish version of the UPPS-P impulsive behaviour scale [Validacion de una version breve de la escala de comportamiento impulsivo UPPS-P]. *Trastornos Adictivos*, *14*(3), 73 - 78. 10.1016/S1575-0973(12)70048-X

[15] Zapolski, T. C. B., Stairs, A. M., Settles, R. F., Combs, J. L., & Smith, G. T. (2010). The measurement of dispositions to rash action in children. *Assessment, 17*(1), 116–125. 10.1177/1073191109351372

Disruptive behaviors (DB) are common in the preschool years. However, strong evidence suggests that, for some children, such behaviors might be signaling the onset of a potentially pervasive and harmful trajectory. In the study of these early difficulties, a major challenge is their heterogeneity in clinical presentation (i.e., behavioral phenotypes), origins (i.e., etiological mechanisms) and course (i.e., developmental trajectory). As a result, advances in preventive, and intervention science are frustrated. This dissertation aims to contribute to address some of these issues and to further explore the phenotypic and etiological heterogeneity of DB in the preschool years by using longitudinal data from a large community sample of Galician preschoolers (ELISA Project, N=2467, 48.1% girls, mean age= 4.25 years).