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Apoyo social percibido,
autorregulación motivacional y
rendimiento académico en
adolescentes

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**APOYO SOCIAL PERCIBIDO,
AUTORREGULACIÓN
MOTIVACIONAL Y
RENDIMIENTO ACADÉMICO EN
ADOLESCENTES**

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SANTIAGO DE COMPOSTELA



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RESUMEN

La adolescencia es un periodo transicional durante el cual tienen lugar importantes cambios en el individuo y su contexto. Afrontar con éxito estos cambios es esencial para el bienestar y progreso académico de los/as adolescentes; sin embargo, a menudo encuentran dificultades, como así lo indican las elevadas cifras de fracaso y abandono escolar. La capacidad para autorregular el aprendizaje se considera una condición favorecedora para soslayar las citadas dificultades. En particular, los modelos más recientes de aprendizaje autorregulado (AAR) llaman la atención sobre la relevancia de la autorregulación de la motivación académica. Por otra parte, el apoyo social se ha propuesto como condicionante principal de las inclinaciones de los individuos a la hora de regular su motivación y, por extensión, su cognición ante las tareas de aprendizaje. Partiendo de estas premisas, la presente tesis doctoral busca contribuir a esclarecer el papel del AAR y del apoyo social percibido (ASP) en el rendimiento académico durante la adolescencia. Para alcanzar este objetivo, se llevaron a cabo varios estudios que han permitido: (1) obtener una imagen actualizada de las elaboraciones teóricas sobre el AAR, (2) reunir la evidencia disponible acerca la asociación del ASP con el uso de estrategias de aprendizaje (3) aportar datos sobre las interconexiones entre diferentes provisiones y fuentes de ASP, el conocimiento metacognitivo, las estrategias de aprendizaje (cognitivas, metacognitivas y motivacionales) y el rendimiento académico, durante la adolescencia. Los resultados obtenidos respaldan el efecto esperado del ASP sobre la manifestación de las destrezas para autorregular el aprendizaje, así como el papel mediador de estas destrezas en la relación del ASP con el rendimiento académico.

RESUMO

A adolescencia é un período de transición durante o cal teñen lugar importantes cambios no individuo e na súa contorna. Afrontar con éxito estes cambios é esencial para o benestar e progreso académico dos/as adolescentes; porén, a miúdo atopan dificultades, como así o indican as elevadas cifras de fracaso e abandono escolar. A capacidade para autorregular a aprendizaxe considérase unha condición favorecedora para eludir as citadas dificultades. En particular, os modelos máis recentes de aprendizaxe autorregulada (AAR) chaman a atención sobre a relevancia da autorregulación da motivación académica. Doutra banda, o apoio social tense proposto como condicionante principal das inclinacións dos individuos á hora de regular a súa motivación e, por extensión, a súa cognición ante as tarefas de aprendizaxe. Partindo destas premisas, a presente tese doutoral busca contribuír a esclarecer o papel da AAR e do apoio social percibido (ASP) no rendemento académico durante a adolescencia. Para alcanzar este obxectivo, leváronse a cabo varios estudos que permitiron: (1) obter unha imaxe actualizada das elaboracións teóricas sobre a AAR, (2) reunir a evidencia dispoñible acerca da asociación do ASP co uso de estratexias de aprendizaxe (3) aportar datos sobre las interconexións entre diferentes provisiones e fontes de ASP, o coñecemento metacognitivo, as estratexias de aprendizaxe (cognitivas, metacognitivas e motivacionais) e o rendemento académico, durante a adolescencia. Os resultados obtidos apoian o efecto esperado do ASP sobre a manifestación das destrezas para autorregular a aprendizaxe, así como o papel mediador destas destrezas na relación do ASP co rendemento académico.

ABSTRACT

Adolescence is a transitional period during which important changes take place in the individual and their surroundings. Coping successfully with these changes is essential for well-being and academic progress at this life stage. However, adolescents often encounter difficulties in this respect, as indicated by high rates of academic failure and dropout. The ability to self-regulate learning is seen as a way of overcoming these difficulties. In particular, recent models of self-regulated learning (SRL) draw attention to the importance of motivational self-regulation. Moreover, social support has been proposed as a major determinant of an individual's inclination to regulate their motivation and, by extension, their cognition during learning tasks. Based on these premises, the present doctoral thesis seeks to clarify the role of SRL and perceived social support (PSS) in academic performance during adolescence. To this end, several studies were carried out, with the following aims: (1) to obtain up-to-date information on the theoretical elaborations on SRL, (2) to gather available evidence on the association between PSS and the use of learning strategies, (3) to provide data on the interconnections between different provisions and sources of PSS, metacognitive knowledge, learning strategies (cognitive, metacognitive and motivational) and academic performance during adolescence. The results obtained support the expected effect of PSS on the manifestation of self-regulatory learning skills, as well as the mediating role of these skills in the relationship between PSS and academic performance.

LISTA DE PUBLICACIONES DERIVADAS DE LA TESIS

Artículos que conforman la tesis doctoral



Publicados

1. Tinajero, C.¹, Mayo, M. E.¹, **Villar, E.**¹ y Martínez-López, Z.¹ (2024). Classic and modern models of self-regulated learning: integrative and componential analysis. *Frontiers in Psychology*, 15, 1307574. <https://doi.org/10.3389/fpsyg.2024.1307574>

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 - Revista indexada en el JCR. Índice de impacto (2023): 2,6 (Q2; 56/218)
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 ¹ Universidad de Santiago de Compostela
 ² Instituto Superior de Engenharia do Porto

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3. Martínez-López, Z.¹, Villar, E.¹, Castro, M.¹ y Tinajero, C.¹ (2021). Self-regulation of academic emotions: recent research and prospective view. *Anales de Psicología*, 37 (3), 529-540. <http://orcid.org/0000-0001-9499-7179>

¹ Universidad de Santiago de Compostela

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- Contribución: Investigación, Visualización, Redacción – Revisión y edición.

4. Villar, E.¹, Mayo, M. E.¹, Martínez-López, Z.¹ y Tinajero, C.¹ (2024). What are the principal and most effective strategies for motivational self-regulation? A systematic review and meta-



analysis. *Learning and Individual Differences*, 113, 102480.

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¹ Universidad de Santiago de Compostela

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5. Martínez-López, Z.¹, Moran, V. E.², Mayo, M. E.¹, **Villar, E.¹** y Tinajero, C.¹ (2024).

Perceived social support and its relationship with self-regulated learning, goal orientation self-management, and academic achievement. *European Journal of Psychology of Education*, 39 813-835. <https://doi.org/10.1007/s10212-023-00752-y>

¹ Universidad de Santiago de Compostela

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Contribución: Investigación, Redacción – Revisión y edición.

Enviado

1. **Villar, E.**¹, Real-Deus, E.¹, Martínez-López, Z.¹, Mayo, M. E.¹ y Tinajero, C.¹ (enviado).

Perceived peer support, motivational self-regulation and academic achievement in adolescents. *British Journal of Educational Psychology*.

¹ Universidad de Santiago de Compostela

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 - Revista indexada en el JCR. Índice de impacto (2022): 3 (Q1)
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2. Martínez-López, Z., **Villar, E.**, Mayo, M. E., Nouws, S., Torres, M. C. y Tinajero, C. (2023). Autohabla dirigida a metas académicas y elección vocacional en estudiantes de educación secundaria. En F. Alcantud-Marín, Y. Alonso-Esteban, C. Berenguer, M. J. Cantero, J. C. Meléndez, A. R. Rosello, B. Sánchez, M. M. Sancho, P. Satorres, E. Senent-Capuz, N. Soriano-Ferrer, M. P. Viguer y A. Ygual (Eds.), *Actas del XI Congreso Internacional de Psicología y Educación* (2294 – 2302). Dykinson.
3. Mayo, M. E., **Villar, E.**, Martínez-López, Z., Nouws, S., Real, E., Gómez, J. A. y Tinajero, C. (2023). ARASAC: Una propuesta de investigación en centros públicos de educación secundaria. En F. Alcantud-Marín, Y. Alonso-Esteban, C. Berenguer, M. J. Cantero, J. C. Meléndez, A. R. Rosello, B. Sánchez, M. M. Sancho, P. Satorres, E. Senent-Capuz, N. Soriano-Ferrer, M. P. Viguer y A. Ygual (Eds.), *Actas del XI Congreso Internacional de Psicología y Educación* (1867 – 1872). Dykinson.
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6. **Villar, E.**, Martínez-López, Z., Mayo, M. E., Braña, T., Rodríguez, M. y Tinajero, C. (2022). A systematic review and narrative synthesis of the relationship between social support and binge drinking among adolescents and emerging adults. *Youth*, 2, 570-586. 2022. <http://dx.doi.10.3390/youth2040041>

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1. INTRODUCCIÓN

La educación es un derecho humano fundamental, en cuyo ejercicio se asienta el desarrollo personal, el progreso y la convivencia social (Gil, 2009; Oraá e Isa, 1997). Los estados han de velar por el acceso de toda la ciudadanía a espacios de aprendizaje seguros, adecuadamente equipados, en los que se oferten programas de calidad y apoyo equitativo (UNESCO, 2015; 2020). Esto supone que han de adoptarse medidas de diversificación que se adecuen a las condiciones de los/as aprendices y las dificultades que pudiesen presentar. En este sentido, la etapa de educación obligatoria reviste especial relevancia. Esta abarca, en general, hasta la adolescencia y tiene como cometido garantizar que todo el alumnado adquiera una serie de conocimientos y competencias que se consideran esenciales para la realización personal, la inclusión social, la ciudadanía activa y la empleabilidad (Rebollo-Espinosa, 2009; Valle y Manso, 2013).

En los últimos años, se ha venido intensificando el interés por los desafíos que afrontan las/os adolescentes en el entorno escolar, ante los datos de deficiente rendimiento, fracaso y abandono escolar registrados en informes nacionales e internacionales (Comisión Europea, 2015, 2023; MECFP, 2023; 2024; MEFP, 2018). Los últimos datos publicados en España, relativos al curso 2022/23, sitúan la tasa de alumnado repetidor¹ en Educación Secundaria Obligatoria (ESO) en los 7 puntos porcentuales (MEFPD, 2024). Lo que, es más, la tasa de idoneidad² a los 15 años se sitúa próxima al 75%, lo cual indica que cerca de un cuarto del alumnado matriculado en enseñanzas secundarias obligatorias durante el curso académico



¹ Alumnos/as matriculados en el mismo curso académico durante los años 2021/22 y 2022/23.

² Porcentaje del alumnado que se encuentra matriculado en el curso que le corresponde por edad.

2021/22 presenta cierto retraso escolar (MEFPD, 2024). En cuanto al porcentaje de alumnado propuesto para obtención del título de Graduado/a en ESO para el curso 2021/22, este se sitúa en los 80,7 puntos porcentuales, lo cual representa un descenso del 2,3% con respecto al curso anterior (i.e., 2020/21) (MEFP, 2023). En estrecha relación con este dato, la información disponible relativa al abandono escolar temprano indica que, en el año 2023, el 13,9% de la población entre 18 y 24 años no ha llegado a finalizar la ESO (MEFP, 2024). Este índice, además de superar la media de la Unión Europea (9,6%), representa un aumento de 0,6 puntos con respecto a los datos del 2021 (MEFP, 2023).

De hecho, durante la adolescencia se producen importantes transformaciones en el propio individuo y en su contexto (Anderson et al., 2000; Curtis, 2015). Dichos cambios suponen una oportunidad para que el individuo desarrolle sus potencialidades y comience a aproximarse al estatus adulto, pero también entrañan importantes riesgos que podrían condicionar negativamente su desarrollo a corto, medio y largo plazo (Choudhury, 2017; Dahl, 2004). En función de las destrezas adquiridas de autorregulación y funcionamiento socioemocional, los/as adolescentes pueden mostrar dificultades en la planificación, orientación y seguimiento de su propia conducta (Arain et al., 2013), que se manifestarían en el plano afectivo, motivacional, atencional y conductual (Cutrín et al., 2020). En particular, la investigación sobre la autorregulación académica viene tomando amplio auge desde que se propusiesen los primeros modelos de aprendizaje autorregulado (AAR). Con esta denominación, se hace referencia a la implicación activa y constructiva del estudiante en su propio aprendizaje, que se plantea metas personales y adapta sus pensamientos, sentimientos y acciones según los requisitos de las tareas afrontadas y el entorno académico (Schunk y Zimmerman, 2013). Investigadores/as, profesionales y poderes públicos coinciden en destacar la importancia del AAR para el adecuado progreso académico-vocacional y el aprendizaje a lo largo de la vida (*lifelong*

learning) (Ananiadou y Claro, 2009). En este sentido, disponemos de evidencia que respalda la asociación positiva entre el AAR y el ajuste en el ámbito académico (Cazan, 2012; Cazan y Stan, 2015; García-Ros et al., 2022; Uka y Uka, 2020) y con el rendimiento escolar (Dent y Koenka, 2016; Fong et al., 2021; Mega et al., 2014). Si bien en estas investigaciones ha prevalecido el estudio de la faceta (meta)cognitiva del AAR, la faceta motivacional atrae cada vez más el interés de la comunidad científica (Bakhtiar y Hadwin, 2021; Tinajero et al., 2024). De hecho, esta última es considerada, en la actualidad, un elemento central de la autorregulación, en tanto que contar con niveles adecuados de motivación es condición *sine qua non* para alcanzar niveles óptimos de participación, esfuerzo y persistencia (Wolters, 2011; Zimmerman y Schunk, 2012).

Desde la actual perspectiva sistémica sobre el desarrollo psicológico, se dirige la atención hacia las condiciones personales y contextuales favorecedoras del aprendizaje autorregulado (Schulenberg y Maggs, 2002; Tinajero y Páramo, 2012). En concreto, el apoyo social percibido (ASP) constituye un indicador idóneo de la calidad de la interacción social y su consonancia con las necesidades de los/as adolescentes (Anderson et al., 2000). Se alude, con esta denominación, a la apreciación del individuo acerca de la disponibilidad de recursos de diversa índole (afectiva, instrumental...) que ofrece la red social personal. Esta dimensión se ha mostrado consistentemente como uno de los factores protectores más valiosos ante situaciones perturbadoras o adversas y como un notable predictor de bienestar y ajuste (Cohen et al., 2000).

Distintos autores han enfatizado el papel del apoyo social percibido, en el ámbito educativo. Cabe destacar el modelo teórico *Self-System Model of Motivational Development* (SSMMD; Connell y Wellborn, 1991; Marchand y Skinner, 2007), inspirado en la Teoría de Autodeterminación de Deci y Ryan (2008). En este, se establece una íntima conexión entre el apoyo proporcionado por los principales agentes de socialización y la satisfacción de

necesidades psicológicas básicas, que derivaría en el grado de autorregulación alcanzado en situaciones de aprendizaje.

Tanto el apoyo social percibido como las destrezas de aprendizaje autorregulado podrían servir como marcadores de vulnerabilidad/protección ante las dificultades que debe afrontar el/la adolescente durante la ESO. Sin embargo, es necesario realizar investigaciones que confirmen el papel esperado de estas dimensiones en el progreso académico, finalidad que ha inspirado la presente tesis doctoral. Esta se compone de 5 artículos publicados y uno enviado, así como de secciones narrativas que establecen la necesaria conexión entre los argumentos teóricos y datos empíricos aportados en los artículos.

Se presentan, en primer lugar, sendos apartados dedicados al estado de la investigación sobre el aprendizaje autorregulado y el apoyo social percibido. En cada uno de ellos se integran estudios de revisión bibliográfica publicados con mi participación. Tras el planteamiento de objetivos e hipótesis y un breve recorrido por la metodología utilizada durante el trabajo de tesis, se exponen los resultados. Se reúnen los hallazgos de 4 estudios suplementarios; los dos primeros ofrecen una visión integrada y actualizada de las definiciones y la evidencia empírica disponible sobre los tipos de estrategias afectivo-motivacionales que utilizan los estudiantes en el entorno académico. Los dos restantes estudios exploran las interconexiones entre el ASP el AAR y el progreso académico.

2. MARCO TEÓRICO

2.1 *El Aprendizaje Autorregulado*

2.1.1 **Delimitación conceptual**

El aprendizaje autorregulado ha sido definido como un proceso activo y constructivo, en el que los pensamientos, sentimientos y acciones de los/as estudiantes son autogenerados y sistemática y deliberadamente orientados al logro de metas de aprendizaje personales, en interacción con factores ambientales (Boekaerts et al., 2005; Zimmerman y Schunk, 2012). Para alcanzar dichas metas, el/la aprendiz se vale de distintos tipos de estrategias de aprendizaje (e.g., cognitivas, motivacionales, etc.) que selecciona, ejecuta y adapta según sus propósitos y en función de disposiciones y rasgos personales. Se trata de un proceso situado, en el que distintos factores contextuales, tanto distantes (e.g., las pautas educativas familiares y el clima escolar), como próximos (e.g., instrucciones y recursos relativos a una tarea en marcha), juegan un papel clave, condicionando tanto la adquisición como la implementación de las estrategias de aprendizaje (Ben-Eliyahu y Bernacki, 2015).

Podemos encontrar los antecedentes teóricos del constructo de AAR, reunidos en el clarificador trabajo de Zimmerman (2001), en el que presenta una síntesis de las distintas perspectivas psicológicas desde las que se ha abordado el estudio de las destrezas de autorregulación. En concreto, distinguió las siguientes:

- Operante, de acuerdo con la cual, el origen de las destrezas de AAR se encontraría en procesos de modelado y refuerzo, al tiempo que su ejecución se sustentaría en procesos de auto-monitorización, auto-instrucción y autoevaluación;

naturaleza y su actualización e integración en un autosistema, del que dependería el AAR;

- Del procesamiento de la información, según la cual, el AAR sirve esencialmente al almacenamiento y transformación de la información, que dependerían de un ciclo recurrente de retroalimentación de naturaleza principalmente cognitiva e individual, mediante el que se coteja la información incorporada con algún estándar;
- Sociocognitiva, desde la que se llama la atención sobre la interdependencia de dimensiones personales, conductuales y ambientales en la autorregulación del aprendizaje y se sugiere que la motivación para el AAR dependería de autocreencias personales, como la autoeficacia, las expectativas y metas del individuo. También se proponen los procesos de auto-observación, auto-juicios y auto-reacciones, como centrales y se asume que estos son adquiridos e incrementados a través del modelado y la interacción con el contexto social;
- Volitiva, centrada principalmente en la intención y el autocontrol del individuo en la dirección de la conducta, que se fundamentarían en el valor y expectativas ante una meta particular, así como en el uso de estrategias de autocontrol cognitivas, motivacionales, emocionales y del entorno;
- Vygotskiana, de acuerdo con la cual, el AAR dependería del nivel de conciencia del aprendizaje (sujeto a la zona de desarrollo próximo), alcanzado a través del habla privada, internalizada dentro el marco de interacciones con el contexto social; y
- Constructivista, en la que se enfatiza la conformación de esquemas y teorías personales durante el aprendizaje y la curiosidad y los conflictos cognitivos como principales fuerzas motivacionales en el AAR, que se verían condicionados por el desarrollo evolutivo y la estimulación educativa.

El origen histórico del constructo AAR suele ubicarse en 1986, cuando tuvo lugar un simposio de la *American Educational Research Association*, organizado con el objetivo de aunar aportaciones de especial repercusión sobre componentes esenciales del funcionamiento estratégico en el ámbito educativo: estrategias de aprendizaje, metacognición, autoconcepto, estrategias volitivas y autocontrol (Zimmerman, 2008). Se considera especialmente provocador para la implosión del interés sobre la autorregulación del aprendizaje, la publicación de un artículo de Rohwer (1984) en el que se denuncia el olvido por parte de educadores/as e investigadores/as de las destrezas que el/la aprendiz ha de desplegar al estudiar.

A partir de entonces, se inician numerosas investigaciones sobre AAR, que se plasman en multitud de artículos y obras monográficas (ver e.g., Boekaerts et al., 2000; Suárez-Riveiro y Fernández-Suárez, 2004; Schunk y Green, 2018), que buscan esclarecer, entre otros aspectos, la naturaleza y desarrollo del AAR, su relación con el rendimiento académico y el papel de las metas personales en los procesos de autorregulación. El destacado lugar que ocupa el constructo en los manuales actuales de Psicología Educativa, y el reconocimiento internacional de las destrezas de autorregulación como competencia básica que ha de ser promovida desde los sistemas educativos (Ananiadou y Claro, 2009), dan buena cuenta de la importancia que ha llegado a adquirir el AAR. Las aportaciones más recientes sobre el estudio del AAR permiten profundizar en el funcionamiento en línea (entendido como aquel que tiene lugar durante la realización de la tarea) de los procesos de autorregulación (Rovers et al., 2019), su manifestación en diversos contextos (e.g., de aprendizaje colaborativo, entornos virtuales, etc.) (Hadwin et al., 2018; Wong et al., 2019) y el papel de la autorregulación afectivo/motivacional (Pekrun y Stephens 2009; Wolters, 2003).

2.1.2 Modelización del aprendizaje autorregulado

2.1.2.1 Artículo 1

Tinajero, C., Mayo M.E., **Villar, E.** y Martínez-López, Z. (2024). Classic and modern models of self-regulated learning: integrative and componential analysis. *Frontiers in Psychology*, 15, 1307574. <https://doi.org/10.3389/fpsyg.2024.1307574>

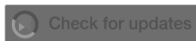
Sin duda, el constructo AAR ha resultado ser de gran valor heurístico, inspirando numerosos modelos teóricos en los que se delimitan fases y componentes cognitivos, afectivo-motivacionales y conductuales (i.e., procesos, disposiciones, estados y condiciones situacionales). Los modelos difieren en aspectos como sus antecedentes teóricos y el detalle y énfasis con que se tratan las fases y componentes del AAR. Las revisiones críticas de Puustinen y Pulkkinen (2001) y Panadero (2017) ayudaron, en su momento, a revelar las comunalidades y diferencias entre los planteamientos de mayor repercusión realizados. Sin embargo, con posterioridad, se propusieron nuevos modelos que adoptaban perspectivas originales y que complementan a los anteriores. Estos han de ser tenidos en cuenta a la hora de plantear investigaciones empíricas e interpretar sus resultados.

Con la intención de obtener una visión actualizada, comprensiva e integrada de los principales modelos propuestos hasta la fecha y contribuir a su comprensión y divulgación, realizamos una revisión crítica de los mismos, que plasmamos en el artículo que se presenta a continuación. Realizamos una búsqueda, en bases de datos especializadas, de informes en los que se mencionase explícitamente algún modelo de AAR y recopilamos las publicaciones originales de todos los modelos. Analizamos pormenorizadamente las características de los distintos modelos, prestando especial atención a los componentes abarcados (i.e., procesos y

dimensiones personales y situacionales) y a los supuestos sobre sus interrelaciones. Esto nos permitió proporcionar una descripción de los rasgos comunes y peculiaridades de los modelos.

Todos los modelos recopilados comparten un entramado de nociones relativas al funcionamiento intelectual y afectivo-motivacional, interconectadas en una secuencia temporal recurrente prototípica. Los distintos modelos aportan, sin embargo, un enfoque peculiar del citado entramado, al modo de una cámara que se desplazase sobre un paisaje desconocido, cuyo zum nos permite descubrir el ecosistema subyacente. Los modelos más recientes se caracterizan por un enfoque relativamente cercano al acto de aprendizaje. Su entronque en los modelos clásicos es evidente; sin embargo, ofrecen una imagen más reconocible de la complejidad y multidimensionalidad de los procesos implicados en el AAR. También otorgan la relevancia debida a la regulación afectivo-motivacional y ponen de relieve el papel de los condicionantes contextuales y de las disposiciones y rutinas conformadas en el marco de la historia personal de experiencias de aprendizaje.

En cuanto a su enfoque, en términos generales, los modelos más recientes se pueden caracterizar como derivaciones de las propuestas clásicas, en cuatro direcciones: desde un abordaje macro (genérico) y a uno micro (detallado/situado), desde la autorregulación fría hacia la caliente (mediante la paulatina pormenorización de estados afectivo-motivacionales y de su autorregulación), desde la actividad consciente a la implícita y desde el enfoque en el funcionamiento individual al interindividual.



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Classic and modern models of self-regulated learning: integrative and componential analysis

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Self-regulated learning (SRL) is considered a construct of great heuristic value and has attracted the attention of numerous researchers and inspired influential theoretical models. The objective of the present study was to provide an up-to-date, comparative and integrated description of the theoretical models of SRL used in current empirical research. For this purpose, we conducted a critical review of the scientific literature referring explicitly to any SRL model and we described, compared and integrated the processes and personal and situational dimensions considered in each model. The models have clearly evolved from focusing on cold self-regulation, conscious activity and individual functioning, to emphasizing hot self-regulation and considering implicit activity and interindividual functioning. Among empirical research lines based on the most recent models, the following stand out: detailed analysis of SRL during its progress, the manifestation of SRL in diverse instructional formats and the role of affective/motivational self-regulation.

KEYWORDS

components, phases, models, review, self-regulated learning

1 Introduction

Self-regulated learning (SRL) has been defined as an active constructive process, in which students' thoughts, feelings and actions are self-generated and deliberately oriented to achieving personal learning goals, and which is influenced by environmental factors (Boekaerts, 1996a,b; Pintrich, 2000; Zimmerman, 2000). Students use different types of learning strategies (e.g., cognitive, motivational, etc.) that they select, execute and adapt according to their aims and depending on their personal dispositions and characteristics. It is a situated process, in which various distant (e.g., family educational patterns and school climate) and proximal (e.g., instructions and resources regarding a task in process) contextual factors play a key role, thus determining the acquisition and implementation of learning strategies (Ben-Eliyahu and Bernacki, 2015).

The historical origin of the SRL construct is usually considered to have occurred in 1986, when the *American Educational Research Association* organized a symposium with the aim of combining contributions of particular importance regarding what were then judged to be the essential components of strategic functioning in the educational field: learning strategies, metacognition, self-concept, volitional strategies and self-control (Zimmerman, 2008). Numerous research studies have since been conducted in relation to SRL, yielding a multitude



of articles and monographs (see, e.g., [Boekaerts et al., 2000](#); [Schunk and Green, 2018](#)). These reports aim to clarify the nature and development of SRL, its relationship with academic achievement and the role of personal goals in self-regulation processes, among other aspects. The importance that SRL has acquired is demonstrated by the attention given to the construct in current Educational Psychology handbooks and by the international recognition of the value of self-regulation as a basic skill that should be promoted in educational systems ([Ananiadou and Claro, 2009](#)).

The construct has undoubtedly been of great heuristic value, inspiring global theoretical models in which phases and components (processes and personal and situational dimensions) are delimited. The proposed SRL models, from the earliest to the most recent, differ in aspects such as their theoretical background and the detail and emphasis with which the SRL phases and components are treated. Critical reviews by [Panadero \(2017\)](#) and [Puustinen and Pulkkinen \(2001\)](#) have helped to reveal common points and differences in the various models. By taking these reviews into consideration and adopting a similar approach to analyze the most recent theoretical proposals, the main aim of this study was to provide an up-to-date, comparative and integrated description of the main SRL models, i.e., those referred to in the scientific literature as valuable for exploring the nature of the SRL components and their interrelationships and conditioning factors. More precisely, we aimed to undertake the following:

- Compile the main theoretical models of SRL that guide empirical research on the construct, including graphical representations.
- Describe the main assumptions of the models and the essential characteristics of the representations, highlighting contributions of each.
- Disentangle the SRL components (processes and personal and situational dimensions) considered in each model and compile a comprehensive, integrated list of these components.

This critical review addresses the following research questions:

RQ1: What are the essential characteristics and components of existing theoretical models on SRL?

RQ2: How have theoretical models of SRL evolved?

2 Method

We conducted a literature search in the WOS and PsycInfo databases, using the expression “self-regulated learning AND model*,” for the period from 2015 to the present. In order to encompass the diversity of theoretical developments and empirical lines of research inspired by SRL models, we decided to prioritize the sensitivity of the search strategy over its specificity. Thus, we selected generic search terms. The search expression used was “self-regulated learning AND model*.” In total, we compiled 705 references, 11 of which were duplicates. The reports retrieved consisted of 688 peer reviewed articles and 6 book chapters.

We examined the theoretical basis of the reports retrieved, selecting those that explicitly referred to an SRL model or review of SRL models (total, 198). Exclusion criteria were not applied. The complete text of each study selected was screened for theoretical background and citations of theoretical models of SRL. Finally, we compiled the original publications reporting each of the models referred to in the reports reviewed and proceeded to summarise them. Focus was placed on the components and processes of the models as well as on the assumptions about their interrelations.

3 Results

The number of reports published, expressly based on SRL models, has increased gradually, with 2021 and 2022 being the most productive years. Most of the reports selected (51%) were explicitly based on the cyclical phase model developed by [Zimmerman \(1998b, 2000\)](#). The model of [Winne and Hadwin \(1998\)](#) was the second most cited (35%), followed by those of [Pintrich \(2000\)](#) (31%) and [Boekaerts \(2006, 2007\)](#) (12.6%). Unsurprisingly, given that there will be a time lag before the publication of relevant research findings in relation to the theoretical proposals, the most recent models were the least commonly cited. In addition, the review article by [Panadero \(2017\)](#) was cited in 16.6% of the reports, while that by [Puustinen and Pulkkinen \(2001\)](#) was less frequently cited (5%).

Below we present a summarised description of the characteristics and central assumptions of the SRL models selected. For this purpose, we have included figures representing the models and we have focused on emphasising the characteristics of each in the text. Thus, the reader can observe the evolution and status of SRL construct, which have been shaped by the most outstanding authors in the field.

3.1 Classic models

We consider the models included in this section as classic, as they have served to forge a body of assumptions shared by different psychological perspectives, which constituted an important stimulus for the research on SRL ([Zeidner et al., 2000](#); [Usher and Schunk, 2018](#)).

The proposals of [Zimmerman \(1989, 1990, 1994, 1998a,b, 2000\)](#) are some of the first and most widely recognised in relation to SRL. Specifically, in the Triadic Analysis of SRL, [Zimmerman \(1989, 1990\)](#) adopts the assumptions of the social cognitive perspective of human self-regulation and proposes multidimensionality as its essential characteristic. This model considers three sources of reciprocal influence involved in self-regulation and that should be considered in the field of education: personal (covert beliefs, such as self-perception and knowledge of one’s own regulatory processes, and affective processes), behavioural (covert and overt conduct) and environmental (physical and social context). Projection of these sources of influence on the agentic functioning of students led ([Zimmerman, 1994, 1998a](#)) to distinguish different dimensions of self-regulation related to fundamental research questions: motivational (*why* is the individual taking part in the learning process), methodological (*how* the individual approaches the learning process), temporal (*when* the different steps of the personal action plan are applied), behavioural (*what* overt conduct is initiated/modified), contextual (*where* the learning takes place, in terms of the physical

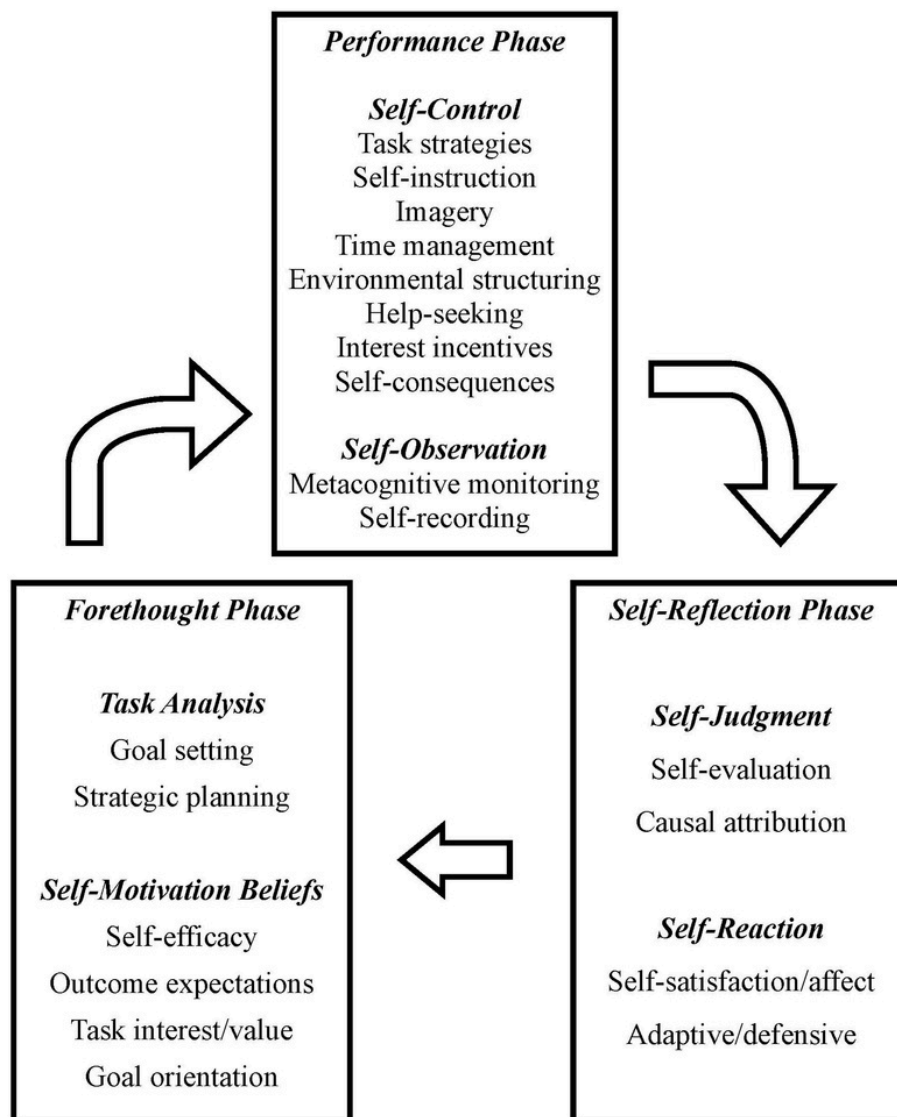


FIGURE 1

Zimmerman and Moylan's cyclical model. From Zimmerman and Moylan (2009, p. 300). Copyright (© 2009) and Imprint. Reproduced by permission of Taylor & Francis Group.

environment) and social (*who* the student can and would like to count on for support during the learning process).

Finally, the cyclical phase model (Zimmerman, 1998b; Zimmerman and Moylan, 2009) delimits three recursive stages of SRL (see Figure 1):

- 1 Forethought, which includes processes that precede and form the basis of the learning effort and the development of the self-regulation process, particularly to establish objectives.¹
- 2 Performance, related to the processes that take place during the learning task and that affect attention and the course of action.

3 Self-reflection, which involves processes posterior to task execution, and accounts for cognitive and motivational reactions in response to the learning experience and that form the basis of the forethought phase in subsequent trials of the learning cycle.

¹In this case, we use the term “objective” rather than “goal,” as we consider the former is more in keeping with the aims pursued in a task execution. We use the term “goal,” throughout the text, to refer to more general purposes.

The models developed by Boekaerts (1991, 1995, 2006, 2007) have also had an important influence in the field of educational psychology. This author focuses on the role of the motivational dynamics that drive the individual within the SRL cycle. Her adaptable learning model (see Figure 2) considers two alternative processing modes (mastery and coping), which correspond to the preponderance of one or other type of the principal motives of the student when confronted with a learning task.

The mastery mode originates in the aspiration to expand the personal repertoire of knowledge and skills and entails activation of learning strategies. On the other hand, the coping mode is brought

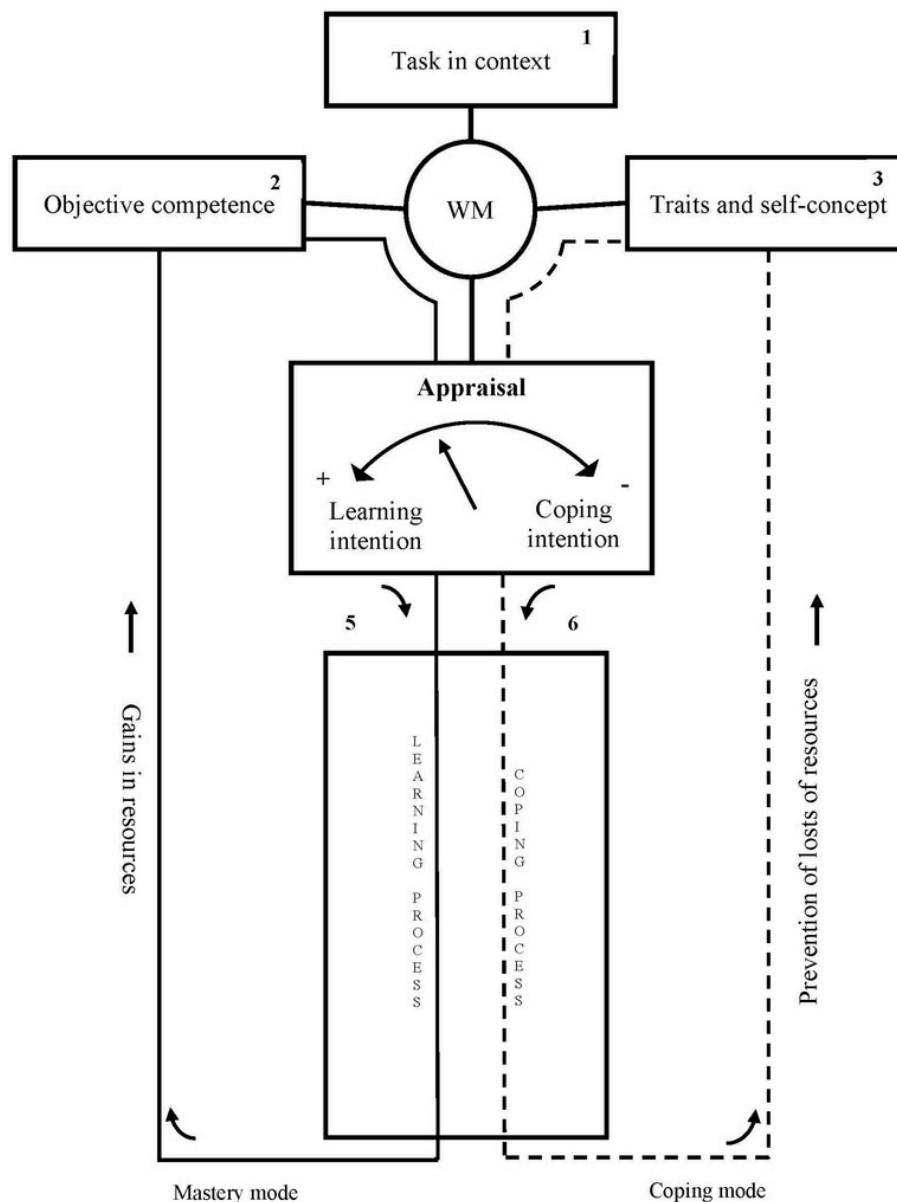


FIGURE 2

Boekaerts' adaptable learning model. WM = working model. From Boekaerts (1996a, p. 456). Copyright (1996) by John Wiley & Sons, Inc. Reproduced with permission.

about by the desire to preserve well-being and prevent any possible loss, damage or distortion of this state (Boekaerts, 1991, 1995) and involves activation of self-defence strategies, which may hamper learning. The balance between these modes depends on the *appraisal* based on an internal model of the learning situation (*working model*, WM), conformed according to three sources of information: (1) the characteristics of the task in question (demands and conditions in which it is presented); (2) the domain, declarative and procedural information that the student possess relative to the task, and (3) the contents of the self-system which are activated by the task (motivational values and beliefs). The appraisal may involve the perceived congruence between the value attributed to and the resources available for conducting the task, which will produce positive affective reactions and direct the student towards the mastery mode. On the other hand, appreciation of incongruencies, which may

threaten personal well-being, will generate negative affective states and direct the individual towards the coping mode. The individual's actions linked to a task may be initiated by either of these routes and then change depending on successive appraisals of the task being undertaken.

After the initial formulation of her model, Boekaerts showed increasing interest in the circumstances that determine the transition between the two alternative routes of processing and the role of the satisfaction of basic psychological needs and also in volitional processes that maintain or, where applicable, return the student to the mastery mode (see, e.g., Boekaerts and Niemivirta, 2000). The author further explored theoretical arguments in support of her view of SRL, compiled empirical evidence and finally presented her a dual-processing model (Boekaerts, 2006, 2007) (see Figure 3). This model includes a volitional self-regulation path,

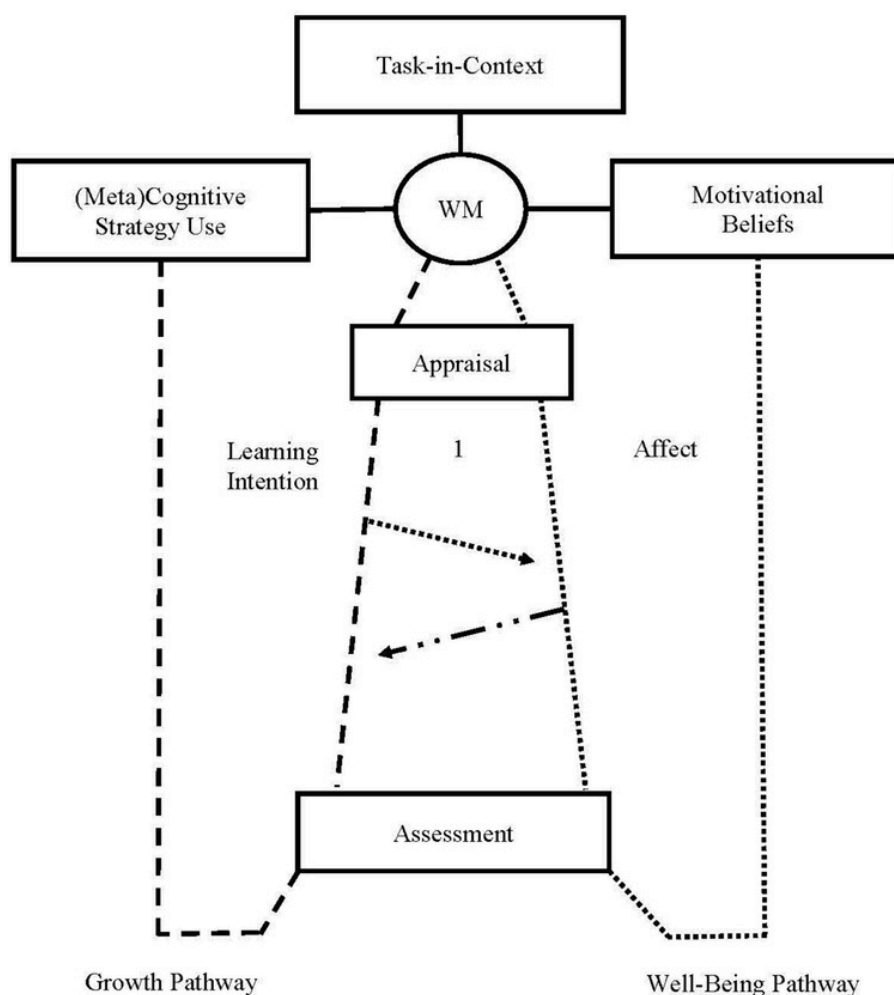


FIGURE 3 Boekaerts' dual processing model. WM = working model. From Boekaerts (2006, p. 350). Copyright (2006) by John Wiley & Sons, Inc. Reproduced with permission.

which ranges from the coping pathway (now denominated well-being) to the mastery pathway (now growth) and which reflects the student's attempts to remain focused on the task, despite any obstacles or distractions that may arise. This would involve the use of different strategies aimed at controlling affective and motivational reactions associated with the difficulties found in undertaking the task.

Coinciding with publication of the previous models, Winne and Hadwin (1998) also made an influential proposal, elaborated from the perspective of information processing. In the proposal, the student's monitoring of their own cognitive activity acquires a central role, as a key process that guides control of the activity in each of the phases of SRL (see Figure 4). Illustrative examples of the way in which monitoring is manifested in the different phases of SRL are given in the original release of the model and in later publications by Winne and colleagues (Winne and Perry, 2000; Winne, 2001, 2011; Winne and Hadwin, 2008).

The planning phase identified in Zimmermann's model (Zimmerman, 1998b, 2000) is divided into (1) task definition and (2) goal setting and planning. The available information about the task conditions, including the specifications provided for execution

(e.g., materials and knowledge required, individual or group learning method, etc.), is processed in the first phase. These appear in Figure 4 as standard (s). The student can decide to monitor this initial representation of the task, ensuring correct understanding of the demands. In the second phase, the student generates a personal profile of selected standards, i.e., a set of objectives in terms of ideal, optimal or satisfactory states to achieve, regarding behaviour, cognition or motivation. Once this profile has been established, the operations (tactics and strategies) that constitute the plan of action are activated. The plan can be monitored metacognitively (mentally tested), which may lead to redefinition of the task or of the plan of action. In the third phase (enacting tactics), the student carries out the plan, the results of which are also monitored and, in this case, checked against the personalized standards. This internal feedback will be complemented by any external feedback provided and can also lead to changes in the profile of standards and the plan of action. Optionally, on completing the task, in a fourth (adaptation) phase, the student monitors the overall way that the procedure has occurred, generating an improved representation of the task features and the best way of acting, which can later be applied to similar tasks.

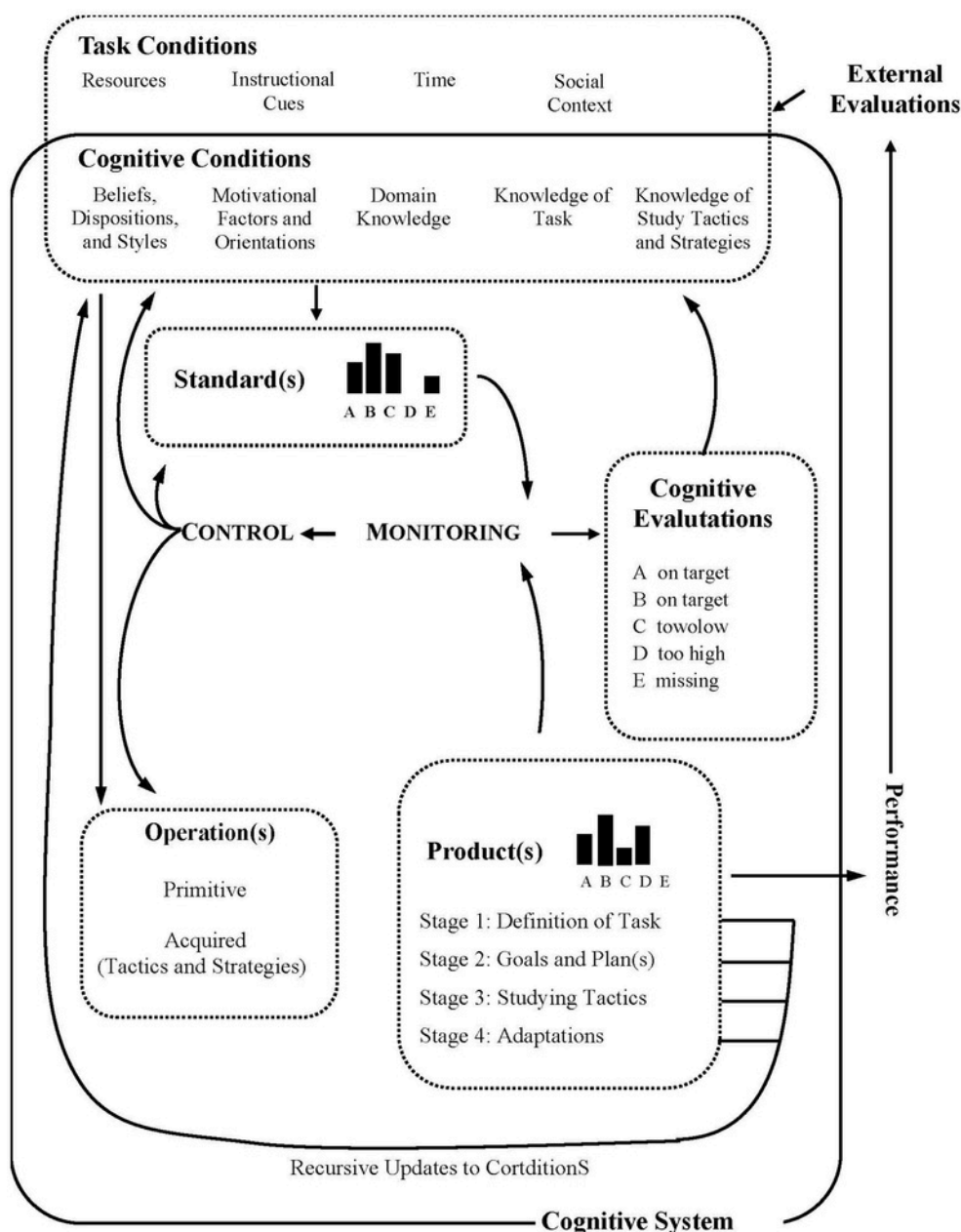


FIGURE 4 Winne and Hadwin's COPES metacognitive monitoring and control. From Winne and Hadwin (1998, p. 329). Copyright (© 1998) and Imprint. Reproduced by permission of Taylor & Francis Group.

The phases are implicitly included in the diagram of the model (Figure 4), in which a series of boxes that include essential components of SRL stand out. We will consider these components in the following section.

Finally, any review of the classic models must include mention of those developed by Pintrich (2000, 2004), who, also inspired by a social cognitive view, integrated both phases and areas of self-regulation, which are, respectively, placed in the columns and rows of a representative table (see Table 1). The model subdivides the performance phase into two (monitoring and control) and subsumes the 6 dimensions of self-regulation differentiated by Zimmerman in four areas (cognition, motivation/affect, behaviour and context). Pintrich also adds specifications about the personal

processes and dimensions involved, based on metacognitive and motivational notions.

Regarding the metacognitive facet, in the first phase of SRL (forethought, planning and activation) the model of Pintrich (2000) includes *efficacy judgements* and *ease of learning judgements*, derived from the knowledge about the task and its context and self-knowledge in relation to the task (in the table, metacognitive knowledge). The monitoring phase includes *feelings of knowing* and *judgements of learning*, the latter being related to the fluidity of task processing and impediments that arise during its execution.

Regarding the motivational facet, the model includes self-efficacy, attributions, task value and affective reactions; the activation, monitoring and control of these are explicitly contemplated in the

TABLE 1 Pintrich's phases and areas model.

Phases	Areas for regulation			
	Cognition	Motivation/affect	Behaviour	Context
1 Forethought, planning and activation	Target goal setting	Goal orientation adoption	[Time and effort planning]	[Perceptions of task]
	Prior content knowledge activation	Efficacy judgments	[Planning for self-observations of behavior]	[Perceptions of context]
	Metacognitive knowledge activation	Ease of learning judgments: perceptions of task difficulty Task value activation Interest activation		
2 Monitoring	Metacognitive awareness and monitoring of cognition (feelings of knowing, judgments of learning)	Awareness and monitoring of motivation and affect	Awareness and monitoring of effort, time use, need for help	Monitoring changing task and context conditions
			Awareness and monitoring of effort, time use, need for help Self-observation of behavior	
3 Control	Selection and adaptation of cognitive strategies for leaning, thinking	Selection and adaptation of strategies for managing motivation and affect	Increase/decrease effort	Change or renegotiate task
			Persist, give up Help-seeking behavior	Change or leave context
4 Reaction and reflection	Cognitive judgments Attributions	Affective reactions Attributions	Choice behavior	Evaluation of task Evaluation of context

Brackets indicate reference to cognitive-volitional processes. From Pintrich (2000, p. 454). Copyright (2000) by Elsevier Inc. Reproduced with permission.

different phases of the model. The inclusion of self-regulation of motivational dimensions is, in fact, one of the distinctive features of the model. The so-called *goal orientations* deserve special mention for the special role that the author confers them in SRL. Thus, the author conceives these as general motives explaining why the student engages in academic tasks, which originate from the representations of desired results and/or states, and which condition the monitoring and control processes used during task execution (Pintrich, 2000).

Indeed, Pintrich's interest in both the (meta) cognitive and motivational facets of learning is patent in studies published prior to the model, and it is projected in the *Motivated Strategies for Learning Questionnaire* (MSLQ; Pintrich et al., 1991), which is probably the questionnaire most widely used internationally to evaluate SRL. Pintrich's model has been given visibility by its integrative nature as it explicitly includes cognitive, motivational, behavioural, and contextual dimensions and thus highlights the multidimensionality of SRL (Limón et al., 2004).

3.2 Modern models

In general, the models presented below can be characterized as derivations of the classic models in four directions: from a macro (generic) to a micro (detailed/situated) focus; from cold to hot self-regulation (by the gradual weighting of affective-motivational states and their self-regulation); from conscious to implicit activity; and from individual to interindividual functioning.

The *Metacognitive and Affective Model of Self-Regulated Learning* (MASRL) developed by Efklides (2011, 2018) is a clear

example of the first three tendencies. This model distinguishes two levels of processing, which include three types of metacognitive phenomena differentiated by Flavell (1979) (see Figure 5). Thus, the macro or *Person* level, comprising stable characteristics of the individual that transcend specific learning episodes, includes *metacognitive knowledge*. This refers to declarative information about oneself, academic tasks and learning strategies stored in memory and that form the basis of performance of academic tasks. The micro or *Task x Person* level includes online processing of the task, in which *metacognitive experiences* become important. These experiences include judgements and feelings generated during task monitoring, in the three phases of SRL contemplated in the model (task representation, cognitive processing and task performance) and the active knowledge related to the task. Finally, *metacognitive skills* condense procedural knowledge (represented in the macro level) and the practical application (represented at the micro level) of strategies for controlling cognition (executive processes), understood as conscious and intentionally displayed procedures.

The author considers in detail the role of metacognitive experiences, regarded as manifestation of metacognition in everyday situations, and she emphasizes the role of *metacognitive feelings* (e.g., confidence in carrying out a task correctly or satisfaction with having achieved an established objective). These feelings emerge unconsciously and transmit the personal relevance attributed to a particular learning task, endowing the cognitive act with affective load (pleasant or unpleasant emotions) associated with the cognitive act. The author of the model also contemplates the possibility that unconscious heuristic processes, i.e., routines established by

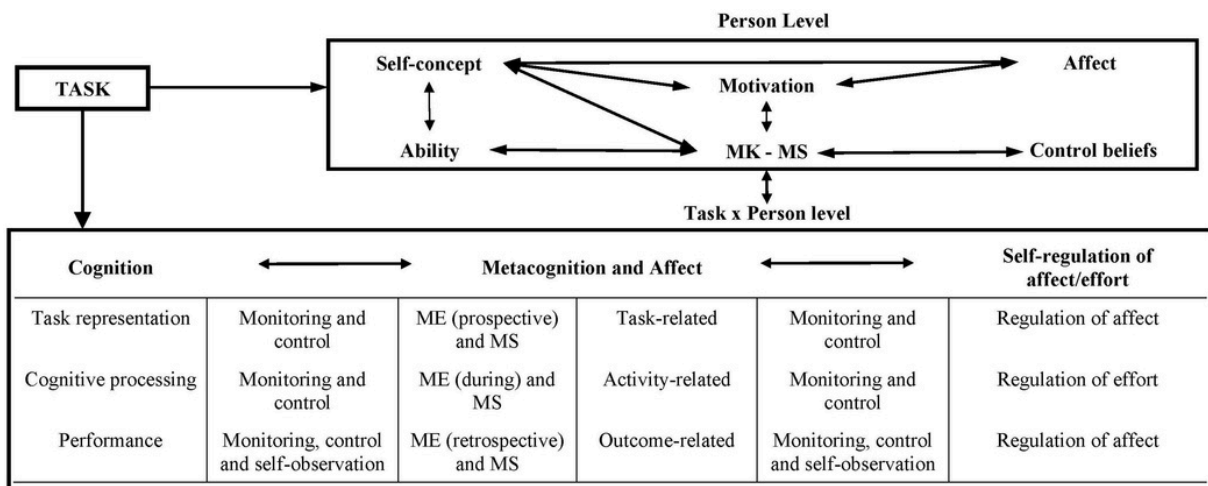


FIGURE 5
Efklides' metacognitive and affective model of self-regulated learning. metacognitive knowledge; MS = metacognitive skills; ME = metacognitive experiences. From Efklides (2011, p. 7). Copyright © by Division 15, American Psychological Association. Reproduced by permission of Informa UK Limited, trading as Taylor & Francis Group, www.tandfonline.com on behalf of Division 15, American Psychological Association.

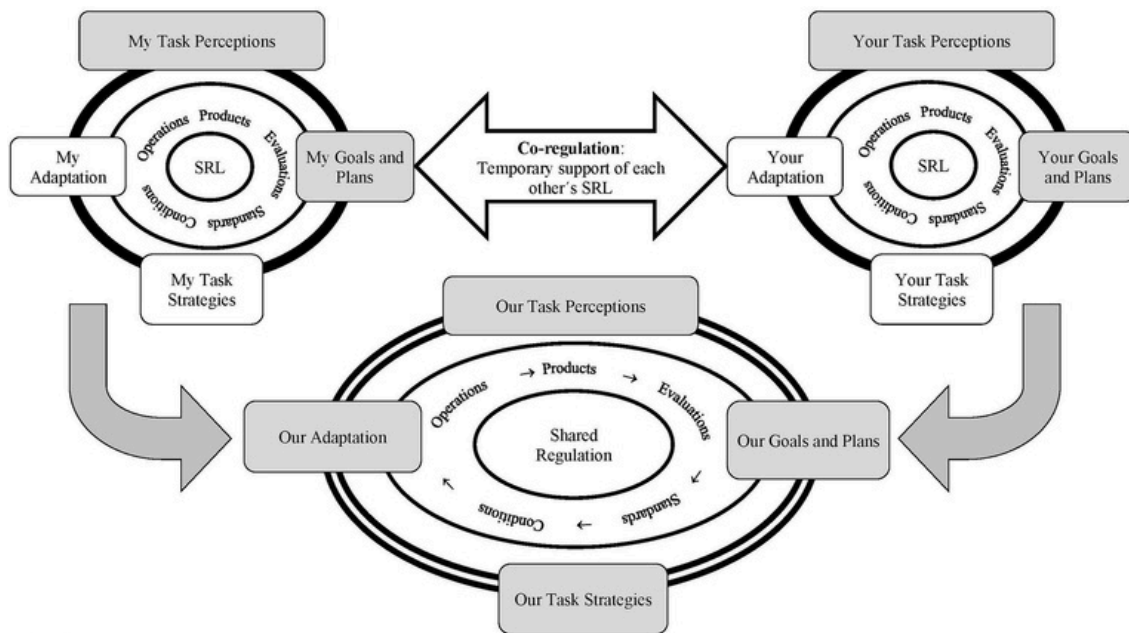


FIGURE 6
Hadwin et al.'s model of socially shared regulated learning. From Järvelä and Hadwin (2013, p. 29). Copyright © Division 15, American Psychological Association. Reproduced by permission of Informa UK Limited, trading as Taylor & Francis Group, www.tandfonline.com on behalf of Division 15, American Psychological Association.

experience with other similar tasks, also participate in SRL processes. On the other hand, Efklides (2011) draws attention to the role of metacognitive experiences in the social shaping of cognition, as well as in teaching SRL and in collaborative learning dynamics, aspects which this author studied prior to publication of the MASRL model (Salonen et al., 2005; Efklides, 2008).

The model developed by Hadwin et al. (2011), Järvelä and Hadwin (2013), and Hadwin et al. (2018) illustrates precisely the necessary

social nature of SRL and differentiates three modes in which this can be manifested, in an interactive and collaborative learning environment (see Figure 6).

First, *self-regulated learning*, which refers to the functioning of each student separately, regarding the same task. The authors emphasize that, even in this case the SRL process is a socio-historic and environmentally situated process, in the sense that it is shaped by personal and group beliefs and experiences, by the context of the task

and by the involvement, along with others, in its execution. Second, *co-regulated learning*, consisting of the stimulation produced by the self-regulated learning experience of another, giving rise to exchange or internalization of self-regulation processes. Third, *socially shared regulation*, produced when the self-regulation processes are interdependent and/or jointly constructed during episodes of cooperative learning.

We consider the motivational regulation model of Schwinger and Stiensmeier-Pelster (2012) a clear example of the gradual incorporation of hot aspects of self-regulation. This model directs our attention towards the role of the strategies that the students use to regulate their motivation, as an essential factor determining their performance. Such strategies are activated in response to the realization that the motivational state is insufficient for continuing with a task once initiated (see Figure 7).

Once the deficit has been perceived, the student deduces the cause, which may be *situational* (transitory) or *fundamental* (stable). Taking these aspects into account, the student will select which strategies of motivational self-regulation to apply and the way of doing so (either maintaining the activity or elevating the basic motivation). The efficacy of the process is assumed to depend on the student's skill in detecting a possible deficit in motivation and adjusting the strategy accordingly. Regarding the latter, the contribution made by Schwinger's group can be considered essential, i.e., design of the *Motivational Regulation Questionnaire* (MRQ; Schwinger et al., 2009), a tool that has been well received by the scientific community.

Miele and Scholer (2018) provide a more recent, detailed their conceptualization of motivational self-regulation in Metamotivational Model (see Figure 8).

In this model, the initial motivation to engage in a task is understood to be formed as a function of a specifically established objective (oval G in Figure 8; e.g., getting a good mark in an exam), which in turn depends on some type of aspiration of a higher order (oval F; e.g., performing well throughout the course). The self-efficacy and the task value are specified as motivational dimensions to be monitored and controlled (box B1 in Figure 8), at the start and throughout execution of the task. The state of these dimensions is assumed to be bidirectionally associated with the processing mode

used in the task (box B2); this association is modulated by the predicted cost and obstacles that will occur during execution (box A). Monitoring the motivational state (*metamotivational monitoring*; routes between C and D) can occur in a downwards direction, when it is controlled by executive processes, such as, e.g., when the student evaluates whether their motivation is sufficient to allow a plan of action to be carried out.

On the other hand, it can occur in an upwards direction when it is guided by *metamotivational feelings* (phenomenological experiences such as pleasure or frustration), indicative of the state of the motivational components and, when applicable, of the possible risk of abandonment or change in the initial objective. This process is sustained in *metamotivational knowledge* (oval H), i.e., that related to the motivational requisites of the task, the motivational self-regulation strategies and the personal ability to execute the strategies. Finally, the motivational self-regulation strategies play a key role in the *metamotivational control* (route from box E to B), i.e., in maintaining or increasing the level of motivation for carrying out a specific task, with an established objective. The model authors point out that metamotivational monitoring and control can proceed in a conscious or automatic manner.

Both of these modes of processing are specifically represented in the interactive layers model recently proposed by Wirth et al. (2020) (Figure 9). The authors include sensorial memory as a necessary explanatory structure, through which information from the environment and that activated by the task in the individual student enters the cognitive system. The information may be of three types (learning content, cognitive procedures and metacognitive procedures) corresponding to three simultaneous layers of processing. The authors provide a representative figure for each of the layers. The figure including the learning content layer is shown below by way of example.

If the information that the sensory memory accesses coincides with that stored in the long-term memory, resonance occurs, i.e., the coincidental information is reinforced and acquires prominence in the learning process, which can proceed unconsciously. However, if the resonance is sufficiently intense or lasting, a conscious process may occur, whereby the resonant information is intentionally processed in the short-term memory. On the other hand, the non-resonant information is discarded, except when it is sufficiently strong, in which

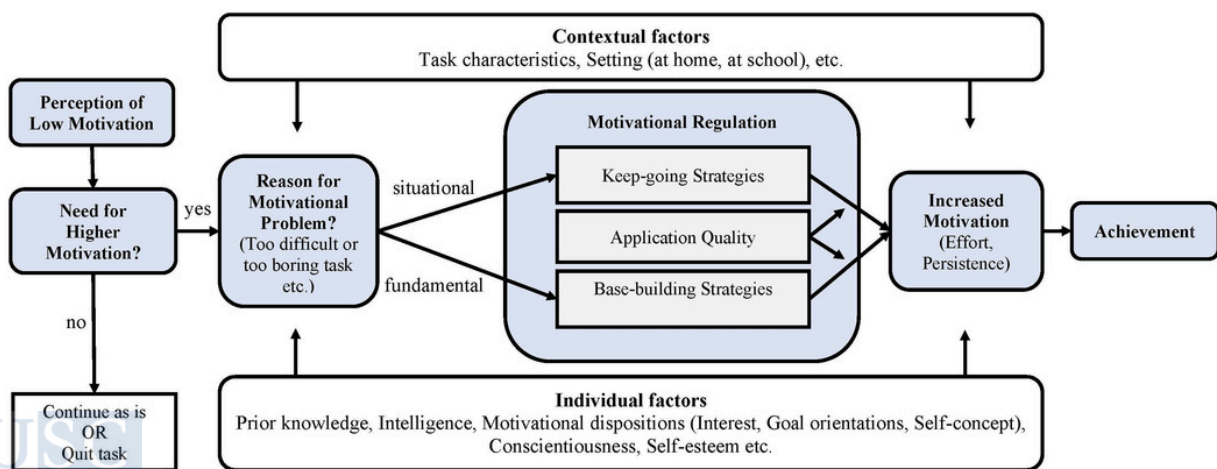


FIGURE 7 Schwinger and Stiensmeier-Pelster's model of motivational regulation. From Schwinger and Stiensmeier-Pelster (2012). Copyright (2012) by Elsevier Inc. Reproduced with permission.

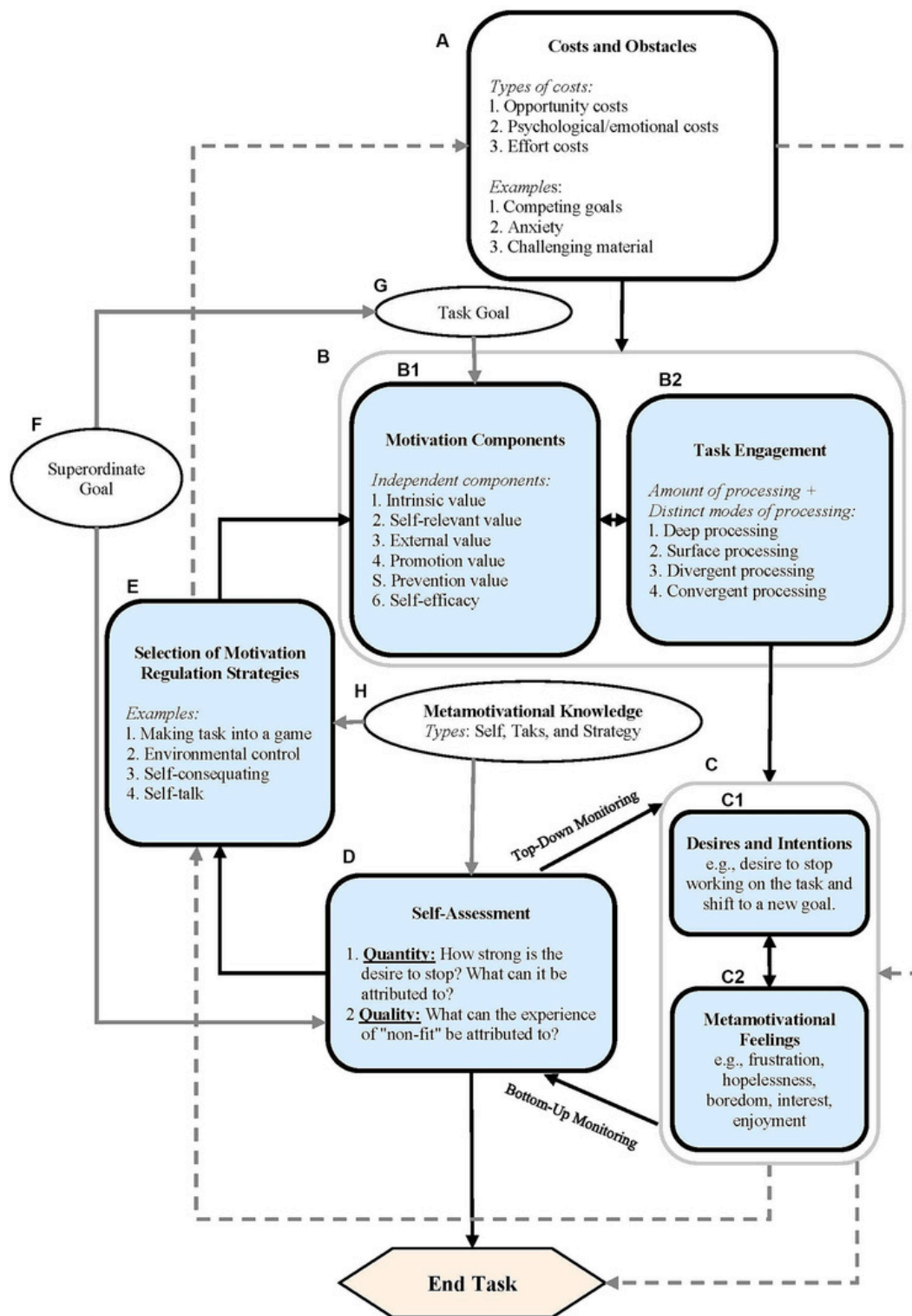


FIGURE 8 Miele and Scholer's model of motivational regulation. From Miele and Scholer (2018, p. 2). Copyright (© 2017) by Division 15, American Psychological Association. Reproduced by permission of Informa UK Limited, trading as Taylor & Francis Group, on behalf of Division 15, American Psychological Association.

case a search is initiated for concordant information in the long-term memory.

A common feature of all of the models described is that they all have a dynamic view of SRL, i.e., they propose a cyclical sequence of events that form a prototypical generic learning episode (Zeidner and

Stoeger, 2019). Different interdependent components come into play throughout the sequence (processes, dispositions, states and environmental conditions). As an alternative mode of analyzing the nature of SRL, some authors have considered differentiating and classifying these components, proposing what have come to be known

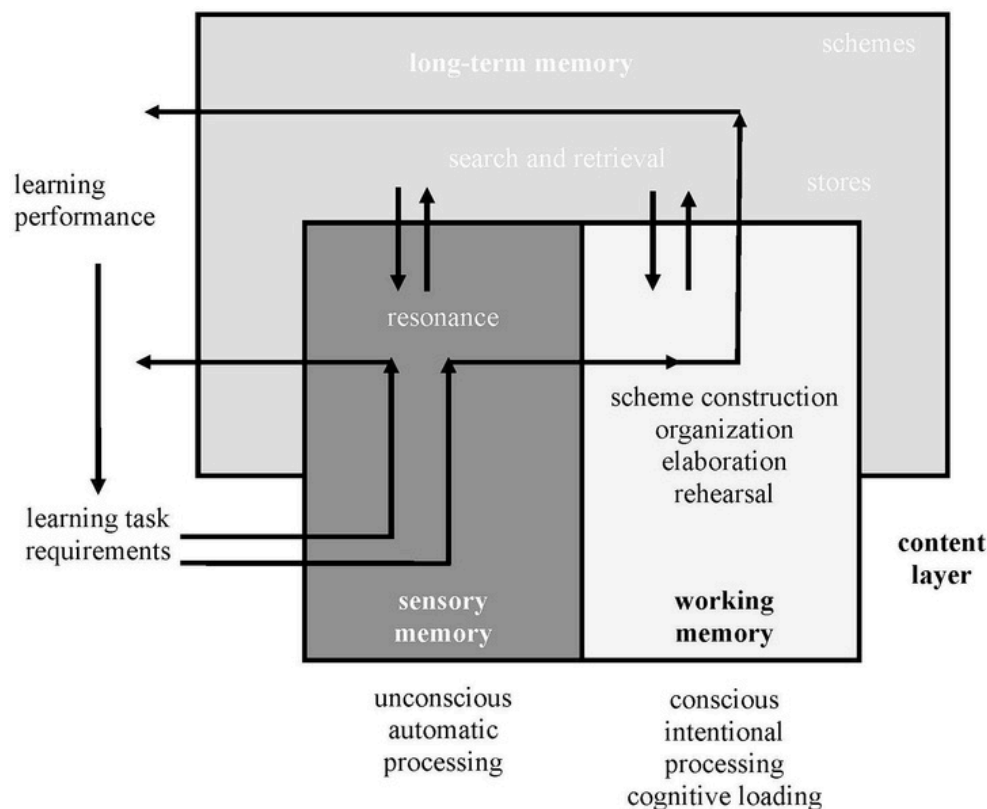


FIGURE 9
Wirth et al.'s interactive layers model. From Wirth et al. (2020, p. 1132). Copyright (2020) by Springer. CC-BY-NC.

as static or componential models (Wirth and Leutner, 2008; Sitzmann and Ely, 2011), in contrast to the models described so far, distinguished as dynamic. Below we present an analysis of the treatment of SRL components in both types of proposals.

3.3 Components analysis

We have compiled five published classifications of SRL components, which we present in Table 2, with the aim of facilitating comparison of the similarities and differences. As can be observed, the first two classifications subdivide the components depending on whether they correspond to motivation or cognition, understood as domains of self-regulation in the approach used by Garcia and Pintrich (1994) and as regulatory systems in that used by Boekaerts (1996b). A coincident transverse organization can also be noted, which corresponds to the facets of metacognition differentiated by Flavell (1979) and specifically recognised in the dynamic models of Pintrich (2000, 2004) and Efklides (2011, 2018): metacognitive knowledge, skills and experiences. However, the last type of component is only included in the last three classifications, giving these a more situated nature than the first two.

The proposal of Winne and Hadwin (1998) deserves special mention. This model includes five componential categories (represented by the acronym COPES), which we understand are also similar to the metacognitive facets. Thus, the category *conditions* groups components that determine the personal

representation of the task, including the available resources and restrictions, derived from the external context (e.g., instructional clues and social dynamics of the classroom) and internal conditions (e.g., prior knowledge of the learning strategies and styles); this is therefore the equivalent of metacognitive knowledge. The *operations* category combines the different modes of cognitive manipulation of the information (tactics and strategies) and thus corresponds to metacognitive skills. These generate *products*, a third category that includes the cognitive, motivational, affective and behavioural results of the operations. These products constitute new conditions for successive phases of SRL. In fact, in the dynamic model of Winne and Hadwin (1998), the phases take the names of the characteristic products generated: (1) task definition, (2) goals and plan (s), (3) study tactics and (4) adaptations. The category *evaluations* includes the judgements and feelings generated during execution of the task, thus coinciding with the metacognitive experiences. Finally, the category *standards* combines attributes, in terms of ideal, optimal and satisfactory states, which the student aspires to in the task being executed. These constitute the task objectives and serve as reference points for successive evaluations. In this respect, the standards can be considered part of metacognitive knowledge.

With the aim of evaluating the importance attributed to the SRL components and localizing their position in the cyclical sequence reflected in the dynamic models, we have elaborated a comparative table (Table 3), in which we list the components that explicitly appear in the models.

TABLE 2 Components of self-regulated learning (SRL) considered in static models.

Gale Pintrich (1994)	Boekaerts (1996b)	Wirme and Hadwin (1998)	Pintrich et al. (2000)	Efklides (2006, 2008)
<p>Beliefs about task/class:</p> <ul style="list-style-type: none"> - Goal orientation - Personal interest - Classroom norms <p>Self-schemas:</p> <ul style="list-style-type: none"> - Affect [self-esteem] - Temporal sign [past, present future selves] - Efficacy - Value/centrality [placed on the task] <p>Conceptual knowledge:</p> <ul style="list-style-type: none"> - Content knowledge - Disciplinary knowledge <p>Metacognitive knowledge:</p> <ul style="list-style-type: none"> - Regarding tasks - Regarding strategies 	<p>Metacognitive knowledge and motivational beliefs [domain specific knowledge related to tasks]:</p> <ul style="list-style-type: none"> - Beliefs, attitudes, and values - Strategy beliefs - Capacity beliefs - Goal orientation <p>Content domain:</p> <ul style="list-style-type: none"> - Conceptual knowledge - Procedural knowledge - Misconceptions - Inert knowledge 	<p>Conditions:</p> <ul style="list-style-type: none"> - Interest - Goal orientation - Learning styles - Time constraints - Available resources - Knowledge of tactics - Task knowledge - Subject matter expertise <p>Products:</p> <ul style="list-style-type: none"> - Task definition - Goals & plans - Tactics enacting - Adaptation <p>Standards:</p> <ul style="list-style-type: none"> - Ideal, optimal, or satisfying states in relation with the task, objective(s) and plans, studying tactics, and adaptations 	<p>Metacognitive knowledge:</p> <ul style="list-style-type: none"> - Knowledge of cognition and cognitive strategies - Knowledge of tasks and contexts - Knowledge of self 	<p>Metacognitive knowledge: Ideas, beliefs, theories of person/self, task, strategies, goals, cognitive functions, validity of knowledge, theory of mind</p>
<p>Motivational strategies</p> <ul style="list-style-type: none"> - Self-handicapping - Defensive pessimism - Self-affirmation - Attributional style 	<p>Motivational regulatory strategies</p> <ul style="list-style-type: none"> - Mental representation of behavioral intention - Linking behavioral intention to action plan - Maintaining action plan in the phase of obstacles and competing action tendencies - Disengaging action plan and behavioral intention <p>Motivation strategies</p> <ul style="list-style-type: none"> - Create learning intention - Coping processes to alter stressors and to reduce negative emotion - Prospective and retrospective attributions - Effort avoidance - Using social resources 	<p>Operations:</p> <ul style="list-style-type: none"> - Searching - Monitoring - Assembling - Rehearsing - Translating 	<p>Self-regulation and control:</p> <ul style="list-style-type: none"> - Planning activities - Strategy selection and use - Allocation of resources - Volitional control 	<p>Metacognitive skills:</p> <p>Conscious, deliberate activities and use of strategies for: Effort allocation, time allocation, orientation/monitoring of task requirements/demands, planning, check and regulation of cognitive processing, evaluation of the processing outcome</p>



TABLE 2 (Continued)

García and Pintrich (1994)	Boekaerts (1996b)	Winne and Hadwin (1998)	Pintrich et al. (2000)	Efklides (2006, 2008)
<p>Regulatory learning strategies</p> <ul style="list-style-type: none"> - Goal-setting - Planning - Monitoring - Self-testing <p>Cognitive learning strategies</p> <ul style="list-style-type: none"> - Rehearsal - Elaboration - Organization <p>Results</p> <ul style="list-style-type: none"> - Effort (quantity and quality) - Self-schema activation/restructuring - Knowledge activation/restructuring - Choice - Persistence - Academic performance 	<p>Cognitive regulatory strategies</p> <ul style="list-style-type: none"> - Mental representation of learning goals - Design of action plan - Monitoring progress and evaluation goal achievement <p>Cognitive strategies</p> <ul style="list-style-type: none"> - Selective attention - Decoding - Rehearsal - Elaboration - Structuring - Generating questions - Activation of rule(s) + application - Repair: reapply a rule, search for a new rule, decide that no rule is available - Proceduralize a skill 	<p>Evaluations: Judgments about the task, objective(s) and plans, studying tactics, and adaptations</p>	<p>Metacognitive judgments and monitoring:</p> <ul style="list-style-type: none"> - Task difficulty or ease of learning judgments - Learning and comprehension monitoring or judgments of learning - Feeling of knowing - Confidence judgments 	<p>Metacognitive experiences: Feelings of familiarity, difficulty, knowing, confidence, satisfaction Judgments/estimates: of learning, source memory information, estimate of effort, estimate of time Online task-specific knowledge Task features Procedures employed</p>

In the dynamic models, the components corresponding to metacognitive knowledge are located systematically in the phase prior to the start of task execution, except in the model of Miele and Scholer (2018). This model emphasizes that self-efficacy and the task value are modulated by metamotivational monitoring and control throughout the whole SRL cycle. The authors thus adopt a componential approach that we can qualify as “state-based,” complementary to the view of the components analysis in terms of traits, which prevail in the models.

The components related to metacognitive skills are linked to execution of the task, although in the model of Miele and Scholer (2018) motivation is controlled from the start to the end of the learning episode.

The components related to metacognitive experiences reflect the monitoring process that takes place during task execution. However, in the model of Miele and Scholer (2018), this process extends to the phase(s) prior to task execution, while those of Zimmerman and Moylan (2009) and Winne and Hadwin (1998) also explicitly includes self-evaluation after finalization of the task.

Finally, we can see that the dynamic models delimit SRL processes and states. However, the degree of detail varies depending on the metacognitive facets. Thus, metacognitive and metamotivational knowledge and beliefs are very detailed (particularly the latter). The learning strategies are generally referred to in a global way in the dynamic models, with the exceptions of the detailed cognitive strategies included in the models of Zimmerman and Moylan (2009) and Wirth et al. (2020), of resource management strategies in the model of Zimmerman (1998a) and of the motivational strategies in the model of Miele and Scholer (2018). Metacognitive experiences are also not detailed, although the model of Pintrich (2000) refers to metocognitive judgements and feelings, and the model of Miele and Scholer (2018) includes metamotivational feelings.

4 Discussion and conclusions

Our aim in the present study was to provide an up-to-date, comparative and integrative description of the major models of SRL proposed to date. Two research questions were posed. The first referred to delimiting the essential characteristics and components of the theoretical models on SRL. In this regard, we demonstrated that all of the models considered share a framework of ideas related to intellectual and affective-motivational functioning, interconnected in a prototypical recurring temporal sequence. However, each model provides a particular focus within the common framework, in a similar way to a camera scanning an unknown landscape with a zoom that enables visualization of the underlying ecosystem.

The model of Zimmerman (1998b, 2000), which adopts a distant focus, established the structural basis of the representation of the SRL construct: 3 basic process stages (before, during and after performance of a task/learning episode), in which essential processes and dimensions are located. Unsurprisingly, this is the model most frequently cited in the scientific literature. Boekaerts (1991, 2006) and also Winne and colleagues (Winne and Hadwin, 1998; Winne and Perry, 2000) adopted a more closely focused approach and directed attention to the role of experiences and representations generated in response to a task, which would give rise to the development of action- reaction loops, advances and backwards steps throughout the basic

phases of self-regulation. Pintrich (2000) adjusted the zoom to an intermediate distance, considering the different areas of self-regulation (cognition, motivation/affect, behaviour and context), while still detailing processes and dimensions. As discordant feature of Pintrich’s model relative to the others, although he recognises the role that the monitoring the student carries out of their own action of learning, this is circumscribed to a phase concurrent to the control phase (selection, application and adaptation of learning strategies), both corresponding to the execution of the learning task.

Regarding delimitation of the SRL components, theoretical elaborations in the field of metacognition and information processing have been fundamental, generating a consistent list of notions of fundamental personal and situational processes and dimensions. However, the location of the different components in specific phases of the SRL cycle, as considered in some of the classic dynamic models, may be misleading. Although the weight of some components (such as monitoring or self-schemes) may vary between phases, these can be manifested throughout the SRL cycle and in the different feedback loops generated during execution of the task (Bakhtiar and Hadwin, 2021). This aspect is clearly reflected in the modern dynamic models.

We have been able to identify various components of a common organizational framework; however, we have observed that the components are unequally weighted. While the components related to metacognitive knowledge are usually detailed in the models, those related to skills and metacognitive experiences are referred to more globally. The literature on SRL includes investigations on specific categories of the components, which complement the list that we have extracted from the models considered. These studies must be considered in order to obtain an overall view of the complex framework of processed and dimensions involved in SRL. Thus, regarding metacognitive knowledge, we have available analytical studies on epistemic beliefs (Schommer-Aikins, 2004; Muis and Singh, 2018), on motivational beliefs (Eccles and Wigfield, 2002) and on contextual conditions (Ben-Eliyahu and Bernacki, 2015; De la Fuente- Arias, 2017). Regarding metacognitive skills, classifications of (meta) cognitive and affective-motivational learning strategies have been proposed (Dresel et al., 2015; Martínez-López et al., 2021). The microprocesses executed by students in response to complex tasks, making use of hypermedia environments, have also been explored (Winne, 2017). Finally, the studies by Efklides (2002, 2006) can be highlighted in regard to the analysis of metacognitive experiences.

Our second research question considered the evolution of theoretical models of SRL. In comparison with classic models, the modern models are characterized by a focus that is relatively close to the action of learning. Although their relationship to the classic models is evident, the recent models generally provide a more recognisable view of the complexity and multidimensionality of the processes involved in SRL. Affective-motivational regulation is also given the necessary prominence in these models, along with the role of contextual conditions and attitudes and routines shaped in the personal history of learning experiences.

In summary, SRL has appeared as a central topic in Educational Psychology in the past few decades, and a series of shared assumptions regarding the nature of the construct have since been consolidated and a legacy has been built consisting of the processes and dimensions involved. Without these achievements it would be difficult to account for the large number of studies conducted in the field of SRL. The models have inspired recent lines of study including detailed analysis



TABLE 3 Components of self-regulated learning considered in dynamic models.

<p>Zimmerman and Moylan (2009)</p>	<p>1. Forethought</p> <p>Motivational beliefs:</p> <ul style="list-style-type: none"> - Self-efficacy - Outcome expectations - Task interest/value - Goal orientation <p>Task analysis:</p> <ul style="list-style-type: none"> - Goal setting - Strategic planning 	<p>2. Performance</p> <p>Self-control:</p> <ul style="list-style-type: none"> - Task strategies - Self-instruction - Imagery - Time management - Environmental structuring - Help seeking - Interest incentives - Self-consequences <p>3. Studying tactics</p> <p>Control:</p> <ul style="list-style-type: none"> - Operation(s); Primitive, acquired (tactics & strategies) 	<p>3. Self-reflexion</p> <p>Self-judgment:</p> <ul style="list-style-type: none"> - Self-evaluation - Causal attribution <p>Self-reaction:</p> <ul style="list-style-type: none"> - Self-satisfaction/affect - Adaptive/defensive
<p>Winne and Hadwin (1998)</p>	<p>1. Definition of task</p> <p>Task conditions:</p> <ul style="list-style-type: none"> - Resources - Instructional clues - Time - Socia context <p>Cognitive conditions</p> <ul style="list-style-type: none"> - Beliefs, dispositions, & styles - Motivational factors & orientations - Domain knowledge - Knowledge of task - Knowledge of study tactics & strategies <p>2. Goals & plan(s): standards</p>	<p>Monitoring: Cognitive evaluations</p>	<p>4. Adaptations</p> <ul style="list-style-type: none"> - External evaluations

(Continued)

TABLE 3 (Continued)

	1. Forethought, planning, and action	3. Monitoring	2. Control	4. Reaction & reflection
Pintrich (2000)	<ul style="list-style-type: none"> - Target goal setting - Prior content knowledge activation - Metacognitive knowledge activation 	<p>Cognition</p> <ul style="list-style-type: none"> - Metacognitive awareness and monitoring of cognition (feelings of knowing, judgments of learning) <p>Motivation</p> <ul style="list-style-type: none"> - Awareness and monitoring of motivation and affect 	<ul style="list-style-type: none"> - Selection and adaptation of cognitive strategies for learning, thinking 	<ul style="list-style-type: none"> - Cognitive judgments - Attributions
	<ul style="list-style-type: none"> - Goal orientation adoption - Efficacy judgments - Ease of learning judgments - Perceptions of task difficulty - Task value activation - Interest activation 	<p>Behavior</p> <ul style="list-style-type: none"> - Awareness and monitoring of effort, time use, need for help - Self-observation of behavior 	<ul style="list-style-type: none"> - Selection and adaptation of strategies for managing motivation and affect 	<ul style="list-style-type: none"> - Affective reactions - Attributions
	<ul style="list-style-type: none"> - [Time and effort planning] - [Planning for self-observation of behavior] 	<p>Context</p> <ul style="list-style-type: none"> - Monitoring changing task and context conditions 	<ul style="list-style-type: none"> - Increase/decrease effort - Persist, give up - Help-seeking behavior 	<ul style="list-style-type: none"> - Choice behavior
Bockaerts (2006)	<p>Work model:</p> <ul style="list-style-type: none"> - (Meta) cognitive strategy use - Task-in-context - Motivational beliefs - Appraisal 	<p>Learning intention: growth pathway Affect: well-being pathway Volition</p>	<ul style="list-style-type: none"> - Change or renegotiate task - Change or leave context 	<ul style="list-style-type: none"> - Evaluation of task - Evaluation of context

(Continued)

TABLE 3 (Continued)

<p>Efklides (2011)</p>	<p>- Metacognitive experiences (prospective) and metacognitive skills</p>	<p>Metacognition and affect</p> <ul style="list-style-type: none"> - Metacognitive experiences (during) and metacognitive skills <p>Cognition</p> <ul style="list-style-type: none"> - Cognitive processing <p>Regulation of affect/effort</p> <ul style="list-style-type: none"> - Regulation of effort <p>Monitoring and control</p>	<p>- Metacognitive experiences (retrospective) and metacognitive skills</p>
<p>Miele and Scholer (2018)</p>	<p>Superordinate goal > task goal</p>	<p>Deep, Surface, divergent, convergent processing</p> <p>Motivation components:</p> <ul style="list-style-type: none"> - Self-efficacy - Task value - Cost and obstacles <p>Metamotivational monitoring:</p> <ul style="list-style-type: none"> - Memamotivational knowledge - Desires and intentions - Metamotivational feelings - - Self-assessment <p>Metamotivational control</p> <ul style="list-style-type: none"> - Motivation regulation strategies 	<p>- Performance</p> <p>- Regulation of affect</p>
<p>Wirth et al. (2020)</p>	<p>Learning task requirements (long-term memory):</p> <ul style="list-style-type: none"> - Search and retrieval 	<p>Learning performance (sensory memory):</p> <ul style="list-style-type: none"> - Resonance <p>Working memory:</p> <ul style="list-style-type: none"> - Scheme construction - Organization - Elaboration - Rehearsal 	<p>Long-term memory</p> <ul style="list-style-type: none"> - Store

of online SRL (during its course) (Rovers et al., 2019), its manifestation in diverse instructional formats (e.g., collaborative learning, virtual environments, etc.) (Winne, 2017; Hadwin et al., 2018) and the role of affective/motivational self-regulation (Wolters, 2003; Pekrun and Stephens, 2009).

Thus, appreciable advances have been made in bridging the gap between the abstractions represented in SRL models and the reality of the phenomenon under study, in itself complex, multidimensional and contextual. However, as already pointed out by Jakešová and Kalenda (2014) regarding the classic models, the precision of the causal mechanisms involved in SRL remains limited; on the other hand, we can assume that at least some parts of the mechanisms represented by the models are bidirectional. Thus, the following are proposed as priority lines of further research in the field of SRL: (1) modelling the dimensions and processes involved in SRL in more precise terms, taking into account possible reciprocal causalities; and (2) reviewing the empirical evidence to support or, where appropriate, question new, more detailed models. Regarding the educational applications of the present and future theoretical analyses of SRL, their potential for inspiring general guiding principles and enhancing the effectiveness of programmes aimed at providing training in learning skills should be highlighted.

Author contributions

CT: Conceptualization, Formal analysis, Methodology, Project administration, Supervision, Writing – original draft. MEM: Investigation, Methodology, Visualization, Writing – review &

editing. EV: Conceptualization, Investigation, Methodology, Writing – original draft. ZM-L: Methodology, Visualization, Writing – review & editing.

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2.1.2.2 Componentes fundamentales

A partir de la síntesis de los modelos dinámicos clásicos y modernos, así como del análisis componencial realizado en nuestro trabajo de revisión crítica, identificamos distintos componentes esenciales del aprendizaje autorregulado que se describen brevemente a continuación.

2.1.2.2.1 Orientaciones a meta

Con la expresión orientación a meta se alude al tipo de propósitos del aprendiz al afrontar las tareas académicas y los estándares con los que se comparan los resultados obtenidos, para determinar el éxito o el fracaso, en el marco distintos episodios de aprendizaje (Pintrich y Schunk, 2006). Las teorías de orientación a meta parten del supuesto de que en el individuo se conforman patrones de creencias integrados, relativos a los resultados deseables de su implicación académica, que condicionan la forma en la se aproxima, participa y responde ante situaciones de aprendizaje y, en última instancia, su aprendizaje y logro académico (Senko, 2016; Vandeveldel et al., 2015). Se distinguen tres tipos de orientación: de aprendizaje, de rendimiento y de evitación del trabajo (Pintrich y Schunk, 2006; King y McInerney, 2014). La orientación de aprendizaje (también denominada de dominio) se caracteriza por el interés por mejorar competencialmente, por superar retos y dominar las tareas. La orientación de rendimiento (también denominada de ejecución) consiste en la aspiración de demostrar el nivel competencial personal. La orientación de evitación del trabajo supone la pretensión de eludir el esfuerzo en la medida de lo posible. Es habitual, por otra parte, que se diferencie entre una actitud de aproximación y otra de evitación, respecto a las orientaciones de aprendizaje y rendimiento. La primera supone dirigirse hacia estados finales positivos o deseados (automejora y progreso competencial, en el caso de la orientación de aprendizaje, y logro en términos normativos o personales, en el caso de la orientación de rendimiento). La segunda implica

concentrase en prevenir estados negativos o no deseados (fallos de comprensión o actuación, respecto a la orientación de aprendizaje, y bajo desempeño en lo concerniente a la orientación de rendimiento) (Hulleman et al., 2010; Pintrich y Schunk, 2006).

En el marco de las elaboraciones teóricas sobre el AAR, la adopción de metas suele considerarse como el punto de partida del ciclo de autorregulación que toma parte en los distintos episodios de aprendizaje (Miele y Scholer, 2018; Wolters, 2003). En este sentido, contamos con evidencia que apunta hacia la existencia de un efecto positivo de la orientación a meta de dominio sobre la auto-monitorización (Cellar et al., 2011), el uso de estrategias (meta)cognitivas (Merett et al., 2020) y la autorregulación motivacional (Gaeta et al., 2012; Wang et al., 2017). Por otra parte, la asociación entre las metas de rendimiento y las destrezas de autorregulación parece estar condicionada por la actitud del alumnado. En este sentido, si el objetivo último del aprendiz es demostrar su competencia y/u obtener un buen rendimiento (i.e., actitud de aproximación) cabe esperar un efecto positivo sobre el AAR, en contraposición con la adopción de una actitud de evitación (Brdar et al., 2006; Wolters y Rosenthal, 2000). En lo que respecta a las metas de evitación del trabajo, estas han sido consistentemente asociadas a un menor uso de estrategias de aprendizaje (Suárez-Riveiro et al., 2001; Takashiro, 2016).

2.1.2.2.2 Autoeficacia

Este componente hace referencia a las creencias acerca de la capacidad personal para ejecutar una acción que produzca los resultados esperados (Bandura, 1977). Existe evidencia empírica que avala el efecto positivo de esta dimensión sobre el AAR (Lim y Yeo, 2021). En lo relativo a los mecanismos de actuación de este componente motivacional, la investigación sugiere que los/as aprendices con alta autoeficacia persiguen metas más ambiciosas, emplean estrategias cognitivas y metacognitivas más útiles e invierten mayor esfuerzo y persistencia a la hora de realizar una tarea (Bandura, 1977; Schunk y Ertmer, 2000; Zimmerman, 2000).

2.1.2.2.3 Valor de la tarea

Se alude con esta expresión a la importancia (en relación con el sistema del yo), la utilidad (en función de objetivos personales) y el interés que se otorgan a las tareas de aprendizaje (Pintrich y Schunk, 2006). Atendiendo a las elaboraciones derivadas de la Teoría del Foco Regulatorio (Higgins, 1998, 2012), el valor de la tarea puede condicionar en qué medida el/la aprendiz optará por una vía regulatoria de promoción (o crecimiento) o una vía de prevención (o seguridad), en los términos descritos en el modelo de procesamiento dual de Boekaerts (2006, 2007). Independientemente de la aproximación de referencia, cabe esperar un efecto positivo del valor de la tarea sobre el AAR. Contamos, de hecho, con estudios que respaldan este efecto, así como del papel mediador del valor de la tarea en la relación entre la autoeficacia y la autorregulación (Lim y Yeo, 2021; Neuville et al., 2007).

2.1.2.2.4 Atribuciones

Las atribuciones causales o creencias de control hacen referencia a los intentos por esclarecer las condiciones que conducen a los resultados del aprendizaje (Pintrich y Schunk, 2006). Cuando el fracaso o éxito en una tarea se atribuyen a causas internas y estables (e.g., falta de capacidad), se hace menos probable que los/as aprendices traten de mejorar en sucesivos eventos de aprendizaje, pudiendo incluso llegar a adoptar una actitud de abandono (Zimmerman, 2000). Sin embargo, cuando se vincula el éxito/fracaso a factores internos y modificables (e.g., falta de esfuerzo), la propensión a autorregular el propio aprendizaje tiende a ser mayor (Borkowski et al., 2000; Schunk, 2008).

2.1.2.2.5 Estrategias de aprendizaje

Con independencia de la aproximación de referencia a la hora de modelizar el AAR, existe cierto consenso a la hora de asumir que implican la utilización, por parte del aprendiz, de estrategias de aprendizaje (Zimmerman, 2013; Wolters y Benzon, 2013). Estas se han definido

como mecanismos intrapsicológicos multidimensionales que generan conductas y pensamientos, orientados a operar recursos personales, para alcanzar determinadas metas de aprendizaje (Pozo y Monereo, 1999).

Es posible diferenciar cuatro tipos principales de estrategias de aprendizaje: cognitivas, metacognitivas, de gestión de recursos y motivacionales (Pintrich et al., 1991). Las estrategias cognitivas se emplean para codificar, comprender y recuperar información en línea con metas de aprendizaje específicas. Se incluyen, dentro de este conjunto, las estrategias de repetición (i.e., repetir información para facilitar su memorización), selección (i.e., separar la información relevante de la secundaria, redundante o confusa, para facilitar el procesamiento profundo de la primera), elaboración (i.e., añadir significado al material realizando construcciones simbólicas) y organización (i.e., identificar o asignar estructura al material). Por otra parte, las estrategias metacognitivas permiten al estudiante planificar, monitorizar y evaluar su aprendizaje. En cuanto a las estrategias agrupadas bajo la denominación de gestión de recursos, estas permiten al estudiante controlar los diferentes medios de los que dispone durante el proceso de aprendizaje (i.e., tiempo, entorno, esfuerzo, búsqueda de ayuda). Por último, las estrategias motivacionales se orientan a la autorregulación de la motivación, categoría en la que se incluyen, entre otras dimensiones, las creencias motivacionales del individuo sobre sí mismo en relación con la tarea, sus intereses e inquietudes y las reacciones afectivas asociadas al proceso de aprendizaje (Pintrich, 2002). Si bien ha prevalecido el estudio de las estrategias cognitivas y metacognitivas, las orientadas a la regulación de la faceta motivacional han adquirido una notable relevancia en los últimos años, en línea con la creciente incorporación de la cognición “caliente” en los modelos teóricos contemporáneos (Panadero, 2017; Tinajero et al., 2024).

2.1.3 El aprendizaje autorregulado durante la adolescencia

La adolescencia es un periodo de carácter transicional, durante el cual tienen lugar importantes transformaciones tanto en el individuo como en su contexto, así como en la interacción entre ambos (Anderson et al., 2000; Curtis, 2015). Los cambios puberales (e.g., aceleración del crecimiento, desarrollo de caracteres sexuales primarios y secundarios, etc.) dotan al individuo de una apariencia más adulta, dando lugar a nuevas demandas por parte del contexto y desencadenando una serie de transformaciones psicosociales normativas (Arnett, 2008; Schulenberg y Maggs, 2002). En el ámbito socioafectivo tiene lugar una reorganización de las relaciones interpersonales, pues con el objetivo de desarrollar su identidad y establecer nuevos márgenes de autonomía e independencia, los/as adolescentes se distancian de la familia, al tiempo que aumenta el peso de las interacciones con los iguales y se inician las relaciones de pareja (Berger, 2016). Por otra parte, los cambios neuromadurativos propios de la adolescencia repercuten en el desarrollo de la cognición social y las funciones ejecutivas (Paus, 2005). En lo que respecta a las condiciones contextuales, el paso desde el nivel de primaria al de secundaria conlleva asociados importantes cambios en el entorno educativo, tanto de naturaleza organizativa (tamaño de los centros, ratio profesor/alumno) como instruccional (currículo más exigente y complejo, dinámica más impersonal y competitiva, mayor énfasis en la disciplina), a los que el/la adolescente tendrá que adaptarse (Anderson et al., 2000; Chouinard et al., 2017).

La situación transicional descrita conlleva desafíos y oportunidades para que los/as adolescentes desarrollen sus potencialidades y se aproximen al estatus adulto, pero también pueden resultar excesivos para aquellos/as que no cuenten con los recursos personales y contextuales necesarios para efectuar requerido reajuste. En todo caso, disponemos de datos que revelan el modo en que los/as adolescentes acusan la transición (Dahl, 2004; Eccles y Roeser, 2009). Así, con la incorporación a la educación secundaria, se observa un acusado

descenso de la autoeficacia, del valor percibido de las tareas y de la motivación académica (Chouinard et al., 2017; Effeney et al., 2013). En consonancia, se constata también un descenso en el rendimiento académico, resultando en elevadas tasas de fracaso y abandono escolar (Gutman et al., 2003).

Llama la atención, en especial, el decremento observado de la orientación a metas de aprendizaje, que se acompaña de un aumento de la orientación a metas de rendimiento y evitación del trabajo (Chouinard et al., 2017; Ryan y Patrick, 2001). Estas tendencias han sido atribuidas a distintos factores asociados al nuevo contexto académico, como una mayor competitividad, el estrés vinculado a la transición escolar o la aparición de otras metas (e.g., metas de carácter social) que pudieran ocupar la atención de los/as estudiantes (Pajares y Valiante, 2002). A este respecto, Boekaerts (2007) apunta la necesidad de reconocer que el alumnado contempla multitud de metas (tanto académicas como sociales y de bienestar) de manera simultánea y que estas pueden estar en armonía (i.e., estado de facilitación) o en discordancia (i.e., conflicto). Los entornos educativos, así como los agentes sociales presentes en este contexto, parecen influir tanto en la relevancia atribuida a las distintas metas, como en las experiencias emocionales asociadas a su activación (Boekaerts y Niemivitra, 2000).

Por otra parte, durante la etapa adolescente se adquieren nuevas destrezas, entre las que revisten especial protagonismo las relativas a funciones las ejecutivas (e.g., memorización estratégica, planificación compleja, actitud abstracta, etc.). Estas permiten al individuo procesar y manipular una mayor cantidad de información, identificar condiciones en tareas y/o problemas que faciliten su comprensión, usar de manera eficiente estrategias de aprendizaje, planificar y organizar con mayor facilidad actividades personales y escolares y secuenciar acciones (submetas) orientadas al logro de un objetivo superordinado (Flores-Lazaro et al., 2014).

Sin embargo, la investigación sobre los procesos neuromadurativos implicados han puesto de manifiesto ciertas asincronías que podrían ser fuente de dificultad en el ajuste de los/as adolescentes. Así, el sistema límbico madura antes que la corteza prefrontal, lo que parece repercutir en una especial sensibilidad a las condiciones psicosociales y emocionales, en particular ante situaciones que demandan autorregulación (Blakemore y Robbins, 2012; Shulman et al., 2016). Entraña especial relevancia en este sentido, la autorregulación del aprendizaje, con claras implicaciones para el progreso académico. Numerosas investigaciones avalan el poder predictivo del AAR en relación con el ajuste el compromiso y el rendimiento académico, así como con la persistencia/abandono escolar (Antúnez et al., 2020; Dent y Koenka, 2016; García-Ros et al., 2022; Grunschel et al., 2016; Saez-Delgado et al., 2021; Tavakolizadeh et al., 2012).

2.2 El Apoyo Social Percibido

2.2.1 Delimitación conceptual

El apoyo social se define como la disponibilidad, experiencial o percibida, de asistencia por parte de la red social del individuo (Cohen et al., 2000; Gottlieb y Bergen, 2010). El afianzamiento del estudio sobre este constructo parece situarse a finales de los años setenta, pues es durante estos años que la obra de autores como Cassel (1974), Caplan (1974) o Cobb (1976) evidenció la contribución del apoyo social al bienestar personal, principalmente a través de la moderación de las repercusiones negativas de los eventos vitales estresantes. A lo largo de las últimas cuatro décadas, el apoyo social ha suscitado un gran interés, impulsado por una creciente preocupación por el papel de las relaciones interpersonales para el bienestar del individuo y el valor atribuido a la promoción de la integración social como parte de actuaciones preventivas y de rehabilitación (Bender et al., 2019; Taylor, 2011).

En particular, la apreciación personal de disponibilidad de apoyo o apoyo social percibido (ASP) se considera nuclear respecto a los efectos beneficiosos de los recursos relacionales. El ASP parece dar lugar a un sentimiento estable de confianza en los otros y la expectativa de que es posible recurrir a ellos en caso de ser necesario (Sarason et al., 1990). El ASP constituye una característica estable de la persona y ha llegado a ser considerada por distintos autores como un rasgo de personalidad (Lakey y Cohen, 2000).

Dos aproximaciones complementarias han guiado el estudio del ASP: la global y la funcional. La primera, centrada en los modelos mentales generados en torno a la percepción de apoyo, ha dado pie a medidas de percepción de disponibilidad general de apoyo y de satisfacción con el mismo (Lakey y Cohen, 2000; Sarason et al., 1994). La segunda, fundamentándose en elaboraciones teóricas sobre estrés y habilidades de afrontamiento, se ha centrado en los recursos que ofrece la red de apoyo y su adecuación a las necesidades del individuo en situaciones difíciles o desafiantes, incorporando medidas que discriminan distintos tipos de recursos (Cutrona y Russell, 1987).

En efecto, los recursos derivados de las relaciones sociales son variados y cumplen diferentes funciones. De acuerdo con la hipótesis de concordancia, distintos contextos, problemas o situaciones pueden suscitar diferentes necesidades de apoyo, cuya satisfacción depende de distintos recursos de apoyo (Wills y Shinar, 2000). En este sentido, la conocida taxonomía, de provisiones de apoyo de Weiss (1974), resulta esclarecedora. En ella, se distinguen seis provisiones: apego, integración social, guía, refuerzo de valía, alianza confiable y oportunidad de cuidado. El apego alude al ofrecimiento de intimidad, proximidad emocional y seguridad. La integración social se refiere a promover el sentimiento de pertenencia a un grupo social mediante el descubrimiento de intereses, aficiones, actitudes y/o creencias que se comparten. La provisión de guía se define como la disponibilidad de consejo o información en

caso de ser necesario. El refuerzo de valía hace referencia al reconocimiento de la competencia, habilidades y valor del individuo por parte del contexto social. La alianza confiable implica percibir que se dispondrá de ayuda material en caso de necesidad. Por último, la oportunidad de cuidado consiste en transmitir al individuo apoyado que es digno de confianza en caso de requerir su ayuda. Posteriormente, otros autores desarrollaron sus propias taxonomías de provisiones del apoyo (Cohen y Hoberman, 1983; House, 1981; Lin et al., 1986; Schafer et al., 1981; Scholte et al., 2001).

Durante la adolescencia, se destacan como principales fuentes de apoyo a la familia, los iguales y el profesorado (Arnett, 2008). En el caso de la familia, su rol como principal agente de socialización sienta las bases de la relevancia de esta fuente. Así, se espera que las familias ejerzan su influencia sobre el desarrollo adaptativo de los/as adolescentes a través de prácticas como el modelado, la comunicación inductiva y el refuerzo (Hardie, 2022; Morris et al., 2017). En efecto, el apoyo familiar parece favorecer en los/as adolescentes la autoestima, la autoeficacia, y las habilidades de autorregulación (Chu et al., 2010; Yang et al., 2022). Estos efectos incrementales parecen ser especialmente relevantes en el contexto académico, en línea con investigaciones previas (Danielsen et al., 2009; Liu et al., 2019).

En el ámbito académico, el profesorado toma especial protagonismo (Chu et al., 2010). Por la propia naturaleza de su labor educativa, han de ofrecer su apoyo de distintas maneras. Por una parte, han de guiar la adquisición de conocimientos disciplinares, habilidades y actitudes y, por otro, han de esforzarse en gestionar el clima de aula para que los estudiantes se sientan integrados y motivados para aprender (American Psychological Association, 2015). Por lo tanto, parece acertado asumir que la percepción de apoyo por parte de este colectivo facilitará el ajuste académico y psicosocial de los/as adolescentes (Stroet et al., 2013).

Por último, el apoyo de los iguales adquiere especial relevancia durante la adolescencia, como consecuencia del distanciamiento de la familia y el tiempo dedicado al establecimiento y fortalecimiento de relaciones horizontales (compañeros y amigos) característico de este estadio evolutivo (Lerner y Steinber, 2009). Los/as iguales comparten intereses y preocupaciones y ofrecen accesibilidad y complicidad (Aude et al., 2021). Además, estas relaciones son percibidas como espacios especialmente adecuados para la autoexploración, autoconciencia y la autorrepresentación, esenciales para el desarrollo de la identidad de los/as adolescentes (Galliher y Kerpelman, 2012). Cabe destacar, por otra parte, la relevancia de esta fuente de apoyo en el contexto educativo, en tanto que las interacciones entre iguales son frecuentes a la hora de enfrentar la realización de tareas académicas (Jelas et al., 2016; Patrick et al., 2007).

2.2.2 Sendas de incidencia del apoyo social sobre el desarrollo y el bienestar personal

Los efectos optimizadores y protectores del apoyo social respecto al desarrollo y bienestar de los individuos han sido ampliamente argumentados y documentados, en estudios que han adoptado tanto una perspectiva global como funcional y atendiendo a distintas fuentes. Se destaca, además, como variable clave a tener en cuenta durante periodos transicionales como la adolescencia (Viner et al., 2012). Los procesos implicados en tales efectos continúan siendo objeto de estudio y debate. A este respecto, dos hipótesis han prevalecido en la investigación: la hipótesis del efecto buffer o mediador y la hipótesis del efecto directo o principal. La primera hipótesis, desarrollada a partir de teorías sobre afrontamiento y estrés, es defendida principalmente por autores que abordan el apoyo social desde una perspectiva funcional, mientras que la segunda, cuyos antecedentes se sitúan en el constructivismo social, el interaccionismo simbólico y la teoría de la anomia de Durkheim (1951), es principalmente

apoyada por autores que estudian el apoyo social desde una perspectiva global (Lakey y Cohen, 2000; Sarason et al., 1990).

De acuerdo con la primera hipótesis, la percepción de las diferentes provisiones de apoyo reduciría o eliminaría los efectos negativos que las situaciones estresantes o amenazadores puedan tener para la persona (Cohen y McKay, 1984; Cohen y Wills, 1985). En consecuencia, el estrés ejercería un mayor impacto en aquellas personas con bajos niveles de apoyo social percibido, mientras que para las personas que percibiesen altos niveles de apoyo el efecto sería, si no nulo, sí mucho menor.

Este efecto moderador, esencialmente cognitivo, parece estar estrechamente relacionado con las evaluaciones o reacciones del individuo ante una situación potencialmente estresante. De acuerdo con la teoría clásica sobre estrés-afrontamiento de Lazarus y Folkman (1984), es la evaluación que realiza el individuo de una determinada relación con su entorno, la que la convierte en estresante. A través de la evaluación cognitiva, se establece si las demandas del entorno entrañan potencial desafío, riesgo, daño o pérdida de algún tipo (evaluación primaria) y si los recursos disponibles son suficientes para hacerle frente (evaluación secundaria). Posteriormente a la evaluación, se produce el afrontamiento, el proceso mediante el cual la persona maneja las demandas (afrontamiento dirigido al problema) y emociones (afrontamiento dirigido a la emoción suscitada) que plantea la situación estresante. En este contexto, el apoyo social, siempre y cuando concuerde con las demandas situacionales, actúa como variable moderadora: (a) durante la evaluación primaria, haciendo menos probable la interpretación de una situación como estresante y (b) durante la evaluación secundaria, al favorecer una evaluación más positiva de los recursos personales disponibles para hacer frente a la situación (Lakey y Cohen, 2000; Schwarzer y Leppin, 1991; Uchino, 2009). La percepción de

disponibilidad de apoyo, además, parece favorecer la búsqueda de apoyo social como estrategia de afrontamiento adaptativa en situaciones estresantes (Schwarzer y Knoll, 2007).

Los defensores de la hipótesis del efecto directo, por otra parte, apoyan la existencia de un efecto positivo general y acumulable de las relaciones sociales para el bienestar personal, al modular permanentemente pensamientos, emociones y acciones (Lakey y Orehek, 2011; Pierce et al., 1997; Sarason et al., 1990). El efecto protector del apoyo social, por lo tanto, dependería no solo de episodios aislados de apoyo, sino también de la existencia y los efectos acumulativos positivos de las relaciones sociales.

El apoyo social es considerado, desde esta perspectiva, como una variable con estabilidad temporal, semejante a un rasgo de personalidad, en tanto que determina, de manera estable, el modo en que las transacciones sociales son interpretadas y recordadas (Lakey y Cassady, 1990). Atendiendo a su historia de interacciones de apoyo, el individuo desarrolla una serie de creencias sobre las conductas de apoyo de los otros, que a su vez condicionarán las consideraciones diarias sobre apoyo social recibido.

En cuanto a los procesos subyacentes a este efecto positivo general sobre el bienestar del apoyo social, Cohen (1988) sintetiza las principales elaboraciones de la hipótesis del efecto directo en 4 tipos de modelos: (a) según los modelos centrados en el ASP como fuente de información, disponer de vínculos sociales proporciona múltiples fuentes de información, lo que a su vez incrementa la probabilidad de recibir información apropiada que lleve al individuo a adoptar conductas beneficiosas para su salud y/o a evitar situaciones estresantes; (b) de acuerdo con los modelos enfocados en la identidad y autoestima, favorece el desarrollo de sentimientos de predictibilidad y estabilidad y el reconocimiento de la valía por parte de la red, estando todos estos constructos positivamente relacionados con el bienestar; (c) atendiendo a los modelos basados en el proceso de socialización, la integración social se asocia a controles

y presiones sociales, y en la medida en que estas promuevan conductas saludables normativas, la probabilidad de que el individuo se adhiera a las mismas aumentaría; (d) los modelos basados en el suministro de recursos tangibles (e.g., alimentos, ropa, etc.), atención y cuidados por parte de una red social, parten del supuesto de que tales recursos podrían prevenir el desarrollo o empeoramiento de posibles afecciones. En líneas generales, se asume que el apoyo social ejercería su efecto protector influyendo sobre la valoración de uno mismo y del entorno social (Cohen et al., 2000; Schwarzer y Knoll, 2007).

En definitiva, tanto la hipótesis del efecto buffer como la del efecto directo han contribuido a esclarecer la naturaleza de las sendas de incidencia del apoyo social. En cuanto al modo en que estas sendas se incardinan con las distintas provisiones de apoyo social y derivan en la autorregulación, revisten especial relevancia los supuestos de la Teoría de Autodeterminación (Deci y Ryan, 1985, 2008, 2015), así como distintas elaboraciones teóricas complementarias. A continuación, se ofrece una síntesis de estas contribuciones.

2.2.3 El apoyo social percibido y el aprendizaje autorregulado

En la Teoría de Autodeterminación (Deci y Ryan, 1985, 2008, 2015) se plantea como supuesto central que las persona son activas por naturaleza, manifiestan una tendencia a adquirir conocimientos y habilidades que posibilitan el desarrollo de su autorregulación y su ajuste al entorno.

Esta tendencia se ve condicionada por la satisfacción de tres necesidades básicas: relación, competencia y autonomía. La necesidad de relación se refiere a la aspiración de experimentar sentido de pertenencia, incluyendo la conexión con profesorado y compañeros/as. La necesidad de competencia se refiere al deseo de interactuar de forma eficiente con el entorno y experimentar oportunidades para desarrollar y expresar las capacidades individuales.

Finalmente, la necesidad de autonomía se manifiesta en la pretensión de alcanzar el sentido de volición y autoaprobación respecto a la conducta personal.

De acuerdo con la Teoría de Autodeterminación, los ambientes de aprendizaje que facilitan la satisfacción de las necesidades básicas contribuyen al desarrollo adaptativo de los individuos. Como mecanismo esencial en este proceso, se propone la interiorización e integración en el sistema del yo de valores y pautas regulatorias exteriormente ofrecidos (Deci y Ryan, 1985, 2008, 2015). Basándose en este principio, distintos autores han detallado mecanismos plausibles a través de los que el contexto social podría favorecer cada una de las necesidades básicas. Así, Connell (1990) señaló tres características fundamentales: compromiso, estructura y apoyo a la autonomía. El compromiso alude a la comunicación de interés y dedicación de tiempo y amparo afectivo. La estructura supone el suministro contingente y consistente de información relativa a expectativas y consecuencias relativas a la conducta del individuo. El apoyo a la autonomía implica proporcionar la posibilidad de elegir y sustentar la conexión entre las metas y las acciones del individuo y promover su iniciativa.

Según el ajuste entre las necesidades y los recursos contextuales, Ryan y Deci (2000) identificaron diferentes estilos autorregulatorios que se corresponderían con tres tipos motivacionales: desmotivación, motivación extrínseca y motivación intrínseca (Grolnick et al., 1997). La desmotivación representa la falta de la actitud necesaria para llevar a cabo una tarea de aprendizaje, mientras que en la motivación intrínseca el desempeño está guiado por la satisfacción inherente, el interés o el placer que el estudiante obtiene mientras realiza la tarea. En un lugar intermedio se ubica la motivación extrínseca, de acuerdo con la cual los estudiantes realizan la tarea para obtener un resultado ajeno a la misma, por lo que se considera instrumental. La motivación extrínseca se compone, a su vez, de cuatro tipos de

regulación/motivación que se asocian de manera diferencial a un determinado rango de creencias, dependencia del contexto y nivel de autodeterminación. En concreto:

- Regulación externa, en la que la conducta es dependiente de contingencias externas (obtención de recompensas/evitación de castigos).
- Regulación introyectada, guiada por contingencias parcialmente internalizadas, vinculadas a la autovalía (demostración de habilidad, evitación del fracaso).
- Regulación identificada, que refleja la valoración consciente de una meta y la regulación necesaria para alcanzarla, por cuanto que la acción se acepta como personalmente relevante.
- Regulación integrada, que implica una asimilación de la regulación en el sistema de valores y necesidades del individuo.

Los distintos tipos motivacionales pueden ser agrupados en dos perfiles: autorregulado y controlado. El primero abarcaría los tipos identificado, integrado e intrínseco. Los individuos que encajan en este perfil sienten que la fuente de su motivación está en sí mismos. Por el contrario, el sentimiento de actuar al margen de la propia voluntad daría cuenta del perfil controlado, que abarca la regulación externa y la introyectada (De Brabander y Martens 2014; Deci y Ryan, 2000; Vansteenkiste et al., 2009).

En las condiciones adecuadas, los individuos evolucionan, en términos generales, desde un funcionamiento externamente determinado hacia la autodeterminación. En este sentido, cabe esperar que la percepción de apoyo de los principales agentes de socialización juegue un papel clave en el desarrollo y manifestación del AAR, en la medida que estos contribuyen a la satisfacción de las necesidades psicológicas básicas, mediante el suministro de provisiones de distinta naturaleza (Şimşek y Demir, 2013; Tian et al., 2016). Así lo sugieren los planteamientos teóricos realizados por Skinner et al. (2008) y Skinner y Saxton (2020), entre otros, a partir de

la Teoría de Autodeterminación. Sostienen que el apoyo proporcionado por la familia, el profesorado, los iguales y estructuras sociales como el colegio o, en su caso, la carencia de apoyo, condicionan el tipo de autopercepciones, cogniciones sociales, apreciaciones situacionales y, en última instancia, el grado de implicación o desafección de los individuos en sus actividades cotidianas.

Por otra parte, basándonos en la taxonomía de provisiones de apoyo de Weiss (1974) anteriormente descrita, podemos esperar que las distintas facetas del apoyo percibido incidan diferencialmente en la satisfacción de las necesidades de relación, competencia y autonomía. Estas, a su vez, contribuirían al despliegue de distintas facetas del AAR. Con la intención de encontrar respaldo para estas hipótesis, realizamos un estudio de revisión que fue publicado y que presentamos a continuación.

2.2.3.1 Artículo 2

Martínez-López, Z., Nouws, S., **Villar, E.**, Mayo, M. E. y Tinajero, C. (2023). Perceived social support and self-regulated learning: A systematic review and meta-analysis. *International Journal of Educational Research Open*, 5, 100291. <https://doi.org/10.1016/j.ijedro.2023.100291>

En este trabajo se exploraron los datos disponibles acerca de la relación entre el apoyo social percibido y las destrezas de AAR. Se tuvieron en cuenta tanto las evaluaciones globales de apoyo como las de provisiones particulares y se consideraron las distintas fuentes de apoyo documentadas (familia, profesorado e iguales). Recopilamos la evidencia disponible sobre posibles factores moderadores de la relación estudiada. En función de los datos obtenidos, pudimos realizar propuestas acerca de la naturaleza de los procesos implicados en los efectos del apoyo y su correspondencia con la satisfacción de las necesidades básicas.

En líneas generales, los resultados de este trabajo ponen de manifiesto una asociación positiva y moderada en tamaño entre el apoyo de la familia, el profesorado y los iguales con el uso de distintas estrategias de aprendizaje. Así, se constató tanto respecto al apoyo considerado globalmente como en el caso de algunas provisiones (refuerzo de valía, guía, integración social y apego).

En cuanto a los posibles mecanismos tras la mencionada asociación, se proponen distintas vías de influencia. En concreto, sugerimos que las provisiones de integración social y apego satisfarían la necesidad de relación de los individuos al generar sentimientos de seguridad y cercanía (Connell y Wellborn, 1991). De esta manera, se favorecería la autoestima y una mayor aceptación e internalización de los valores y metas educativos (Danielsen et al., 2011; Patrick et al., 2007; Perry et al., 2018). En cuanto a la provisión de guía, que residiría en la conformación de un entorno estructurado, en el que se evidenciaran los estándares comportamentales y resultados esperados (Skinner y Belmont, 1993), parecerían favorecer las destrezas de autorregulación facilitando el establecimiento de metas de dominio y creencias de autoeficacia ajustadas a la realidad (Patrick et al., 2007), así como mediante procesos de modelado y andamiaje. Se estaría satisfaciendo, por lo tanto, la necesidad de competencia del estudiante. Por último, el apoyo a la autonomía por parte de la familia, el profesorado y los iguales, estrechamente relacionado con la noción de refuerzo de valía, implica reconocer los intereses y perspectivas del estudiante, satisfaciendo así su necesidad de autonomía y promoviendo el AAR (Connell y Wellborn, 1991), presumiblemente a través de un incremento de la motivación autónoma (Soenens y Vansteenkiste, 2005).



Perceived social support and self-regulated learning: A systematic review and meta-analysis

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A B S T R A C T

Self-regulated learning (SRL) is conceived as an active, constructive process aimed at the attainment of personal learning goals. It is considered essential for academic achievement and life-long learning. Distal and proximal social influences, among which perceived social support (PSS) has been receiving increasing attention, are thought to play a key role in the development and display of SRL. In this paper, we aim to summarize the available data on the relationship between PSS and SRL by reviewing published studies that include samples comprising students at different stages of education, ranging from elementary school to university. We conducted a systematic literature review and meta-analysis, seeking to examine the association between PSS and SRL, by considering the possible moderating effects of different support provisions and sources. In addition, we tentatively propose explanations for the relationship based on broadly supported theoretical models of PSS and SRL.

1. Introduction

Self-regulated learning (SRL) is conceived as an active, constructive process which consists of thoughts, feelings and actions that are planned and proactively and reactively adapted for the attainment of personal goals. The SRL process includes feedback loops that integrate triadic areas of regulation (personal, behavioral, and environmental). Personal self-regulation involves monitoring and adjusting cognitive and affective states, while behavioral self-regulation involves self-observation and strategic adjustment of performance processes, and environmental self-regulation involves observation and adjustment of environmental conditions or outcomes (Panadero, 2017).

Appropriate knowledge and use of learning strategies are considered key components of SRL. Four principal types of learning strategies have been distinguished: cognitive, meta-cognitive, motivational, and resource management (Pintrich et al., 1991). Cognitive strategies are used to encode, comprehend, and retrieve data for specific learning goals, and they encompass activities involving rehearsal, selection, elaboration, and organization. Rehearsal consists of repeating the information the student wants to remember; by using selection strategies, students separate relevant from secondary, redundant, or confusing information, to facilitate deeper processing of the former; elaboration implies adding meaning to the learning material by making symbolic

constructions; organizational strategies are based on identifying or assigning structure to learning material. Metacognitive strategies include activities that help students plan, monitor, and evaluate their learning. Motivational strategies consist of procedures for managing self-motivation (e.g., goal orientation self-management or self-efficacy self-talk), and resource management strategies serve to actively control different resources (e.g., time, study environment, effort, and help-seeking).

These types of skills conform a basic competence which is considered key to academic success and life-long learning (Ananiadou & Claro, 2009; Beishuizen & Steffens, 2011). Research involving diverse educational levels and situations has consistently found that SRL is positively associated with academic engagement (Danielsen et al., 2011; Reeve, 2012), adjustment (Cazan, 2012; Cazan & Stan, 2015; Koivuniemi et al., 2017), and achievement (Dent & Koenka, 2016; Mega et al., 2014; Robbins et al., 2004).

Distal and proximal social contexts are assumed to have an essential influence in the development and display of SRL. First, socializing agents act to model and guide the acquisition of self-regulatory skills (Schunk & Zimmerman, 1997). In addition, in line with the self-determination theory developed by Ryan and Deci (2000), satisfaction of students' basic psychological needs for autonomy (i.e., to feel a sense of volition), competence (i.e., to experience oneself as effective in interactions with

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the environment), and relatedness (i.e., to feel loved, appreciated, and connected with important others) is a necessary basis of self-motivation and self-regulation, and supportive educational conditions are thus required for these outcomes (Boekaerts, 2006). According to the self-system model of motivational development (SSMMD), supportive social environments are particularly important in this regard (Newman, 2000; Skinner et al., 2008), as they are assumed to supply warmth, structure, respect and confidence. Thus, we expect that close interpersonal relationships may play a fundamental role in inducing and enhancing the display and maintenance of SRL skills, as they are expected to provide social support when required. In fact, perceived availability of social support from significant others (teachers, family, and peers) is considered to enhance academic adjustment (Martínez-López et al., 2019; Rodríguez et al., 2017) and achievement (Tina-jero et al., 2020).

Perceived social support (PSS) is conceived as the awareness and evaluation of resources provided through social interaction, leading to a relatively stable sense that the individual is valued and will be assisted by others if necessary (Cutrona & Russell, 1987; Sarason et al., 1990). PSS from the primary agents of socialization (namely teachers, family, and peers) seems to contribute to the degree to which basic psychological needs are satisfied (Şimşek & Demir, 2013; Tian et al., 2016) and to include perceived availability of different types of resources (i.e., socioemotional and instrumental) (Cutrona & Russell, 1987; Wills & Shinar, 2000), and it is therefore expected to have an important influence on SRL. In general terms, PSS is thought to moderate the appraisal of situations as threatening and to enhance self-confidence to cope with new challenges. Perception of the availability of social support is also a source of sense of belonging, security and recognition of self-worth (Cohen et al., 2000; Schwarzer & Knoll, 2007).

In accordance with the matching hypothesis, specific provisions of support from social relationships are thought to be particularly effective in the face of certain types of demands or stressors (Wills & Shinar, 2000). In this regard, the taxonomy proposed by Weiss (1974) distinguishes six main types of support provisions: reassurance of worth (recognition of one's competence, skills, and value by others), guidance (advice or information), attachment (emotional closeness), reliable alliance (tangible support), social integration (belonging to a social group), and opportunity for nurturance (being depended on or needed by others). Thus, we can expect that these support provisions will be related in different ways to the various facets of SRL. Provisions of a more socio-emotional nature (e.g., attachment) may be particularly valuable for stimulating self-regulation of academic emotions and motivation, while more instrumental provisions (e.g., guidance) may play a more important role in enhancing cognitive, metacognitive and resource management strategies (Cutrona & Russell, 1987; Wills & Shinar, 2000). Moreover, as proposed by Pierce et al. (1991), different types of relationships could be regarded as more appropriate for specific provisions. For example, friendships would mainly be provided

Table 1
Theoretical correspondence between sources and provisions of support.

Provisions	Sources of support		
	Teachers	Family	Peers
Reassurance of worth	Recognition of one's competence, skills, and value by others		
Guidance	Advice or information		
Attachment	Affect, emotional closeness		
Reliable alliance	Tangible support		
Social integration	Belonging to a social group		
Opportunity for nurturance	Being depended on or needed by others		

Note. Provisions of a more socioemotional nature are indicated in bold, adequacy of sources of support for provisions are indicated by shaded cells.

integration, while teachers and parents would be expected to provide guidance (Table 1).

In the present paper, we explore perceived global social support, perceived support from different sources and specific provisions of support (as classified by Weiss, 1974) in relation to SRL. We posed the following research questions: (1) how does perceived social support affect SRL? (2) does the effect of perceived support on SRL vary depending on the type of sources and/or provisions of support? Obtaining an integrated view of the available evidence on the relationship may help to unravel the psychological processes involved and refine interventions used to enhance academic adjustment and achievement. No previous studies have systematically summarized this evidence. The following more specific objectives were formulated:

- To explore how global perceived social support and different sources and provisions of support are related to self-regulated learning.
- To collect evidence about possible mediating and moderating factors of the relationship between perceived social support and self-regulated learning.
- To propose tentative arguments that apply to processes that may explain the relationship between different types of perceived support and self-regulated learning.

2.Methods

2.1. Literature search

The PRISMA (Page et al., 2021) and Cochrane (Higgins et al., 2022) guidelines for elaborating systematic reviews were followed in order to summarize evidence accurately and to provide a reliable basis for decision-making. A literature search was performed using four databases: Web of Science, Scopus, PsycINFO and ERIC. The search was performed between April and May 2018, and it was regularly updated through search alerts created in the databases. The latest update was completed in February 2023. The key search terms used were “Self-regulated learning”, “Learning strategies” and “Metacognition”. For each of these three terms, the Boolean operator AND was used to combine these with the following six terms: “Social support”, “Family support”, “Parent* support”, “Peer* support”, “Friend* support”, and “Teacher support”. No date restrictions were applied. The reference lists of the studies selected from the databases were also screened manually, to prevent research gaps or bias, and a further 11 eligible documents were identified.

The Covidence systematic review software (Babineau, 2014) was used to identify duplicates and to screen studies. The records were selected according to the inclusion/exclusion criteria listed in Table 2. Two team members independently and blindly screened titles and abstracts of 551 documents and excluded those that did not match the eligibility criteria. The same two team members then examined the full

Table 2
Eligibility criteria for screening documents.

Inclusion criteria	Exclusion criteria
1. The relationship between perceived social support and self-regulated learning must be addressed in the document.	1. Studies involving social support networks or received social support.
2. The sample should consist of students enrolled in K-20 formal education.	2. Participants receiving non-attendance instructional methods, external practices or extra-curricular courses or activities.
3. The articles must be written in English, Spanish, French or Portuguese.	3. Gifted or talented participants.
	4. Participants with disabilities, mental disorders, or physical illness.
	5. Participants, whose chronological age does not correspond to the educational level.
	6. Population in non-ordinary circumstances (violence, pregnancy, etc.).

texts of the pre-selected studies and decided whether they were finally eligible for inclusion in the review.

The details of this process are depicted in a flow diagram (Fig. 1). All disagreements during the pre-selection and selection phases were resolved through discussion, and consensus was reached by all authors of the review. Inter-rater reliability, measured using Cohen's kappa coefficient, was intermediate ($k=0.43$) at the preselection stage (title and abstract screening) and high ($k=0.81$) at the selection stage (full text review). The methodological quality of the studies considered for inclusion in the review was examined. The NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, JBI Checklist for Analytical Cross-Sectional Studies, JBI Checklist for Qualitative Research and the Cochrane template for quality assessment were used for reference purposes, as appropriate. The studies were categorized as low quality (8%), intermediate quality (15.2%) or high quality (76.8%).

2.2. Statistical analysis

A meta-analysis was performed considering the association between PSS and SRL. SRL strategies (i.e., cognitive, metacognitive, motivational and resource management) and PSS sources and provisions were considered globally, as further divisions would have yielded a very small sample of studies. Although the narrative synthesis included 38 studies, only 32 of these were finally included in the meta-analysis. Of the studies excluded, two followed a qualitative methodology (Abdulghani et al., 2014; Jouhari et al., 2015), while the other four did not provide the necessary information (Pearson's correlation) for inclusion in the analysis (Cheung & Pomerantz, 2011; Choe, 2020a; Hafzan et al., 2015; Schauber et al., 2015). On the other hand, one report (Soenens & Vansteenkiste, 2005) included two independent studies, and two correlation coefficients were therefore extracted.

Statistical analysis, funnel plots and forest plots were constructed with the R package METAFOR (Viechtbauer, 2010). The procedures proposed by Hedges and Olkin (1985) were used to analyze the sample of effect size values: Q test for homogeneity, Qb for categorical moderators and QR for continuous moderators.

Pearson's product moment correlation, transformed to Fisher's Z value, was used as the effect size. The degree of heterogeneity (τ^2) was calculated using a restricted maximum-likelihood estimator. The meta-analysis was performed assuming a random-effects model, as this allows for generalization of the results beyond the specific set of studies included and is considered more conservative than fixed effects models in regard to statistical inference (Botella & Gambara, 2006; Quintana, 2015).

As an estimate of the risk of publication bias, deviations from symmetry in the funnel plot were analyzed (Light & Pillemer, 1984), and Egger's regression and Rank correlation tests (Quintana, 2015) were applied. Visual inspection of the funnel plot (Fig. 2) and the tests applied (Egger's test $p=.457$; Rank's test $p=.919$) suggest that symmetry can be assumed, and therefore no publication bias was observed.

Sex (47.05% of males across all samples) and educational level

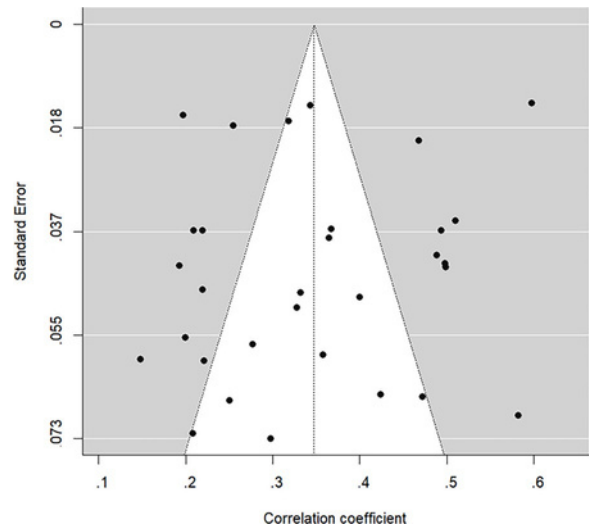


Fig. 2. Funnel plot of the meta-analysis of PSS on SRL.

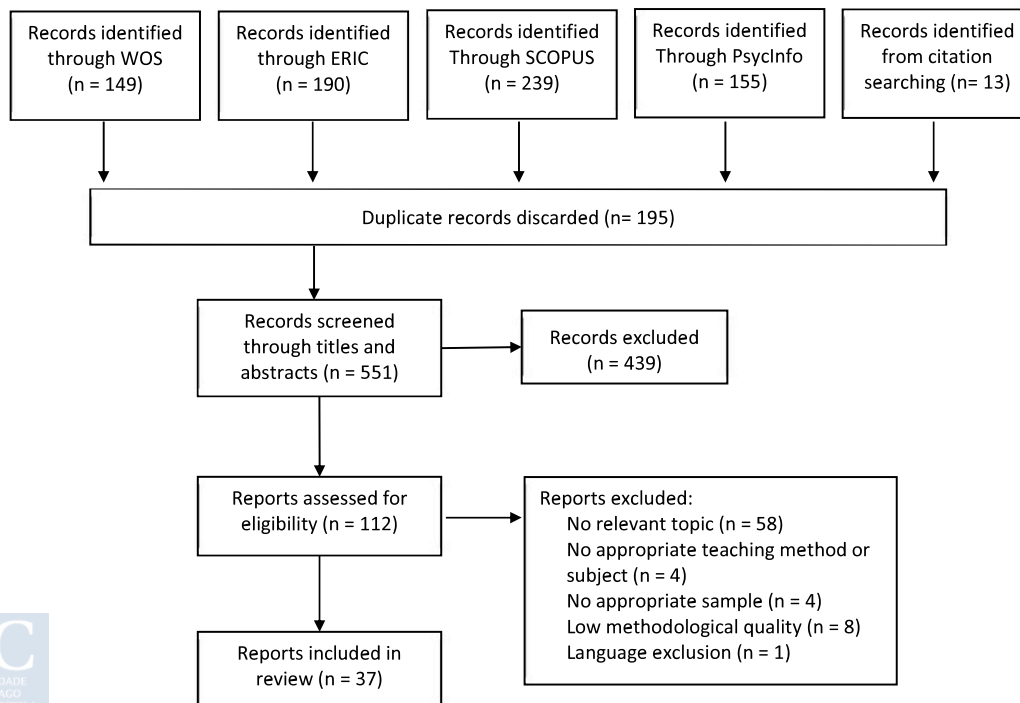


Fig. 1. Flowchart of the literature search process and selection of documents.

(elementary, secondary, and university), as well as different sources (i. e., teachers, family, and peers) and provisions (i.e., reassurance of worth, guidance, attachment, and social integration) of support were considered potential moderators. Owing to the small number of studies reporting attachment and social integration, both provisions were merged into a single category entitled “emotional support”.

The complete protocol for this systematic review was registered on PROSPERO (ID number CRD42018115461; <http://www.crd.york.ac.uk/prospéro/>).

3. Results

The main characteristics (authors, year published, country where the study was conducted, sample size, dimensions, and SRL and PSS measures) and the results of the selected studies were extracted and summarized in [Table 3](#).

3.1. Study characteristics

Three of the papers reviewed were published in the 1990s and another four in the 2000s. The remaining 30 reports were published in the last 15 years. This indicates that the relationship between SRL and PSS has been receiving increasing attention from researchers and that the body of empirical research has increased gradually.

The study samples were quite heterogeneous. The sample size, excluding those from qualitative studies, varied between 93 ([Hafzan et al., 2015](#)) and 6370 ([Choe, 2020](#)) participants (mean=1.179). The educational level of participants ranged from elementary school to university (6 studies included elementary school students, 25 included secondary school students, and 8 included university students), showing that adolescence has attracted most attention, probably because reasoning capacity and decision-making skills develop greatly during this life stage ([Keating, 2014](#)), while a high level of disengagement from school is also observed at this stage ([Chouinard et al., 2017](#)).

Regarding the origin of the participants, 14 samples were from Europe, 10 from Asia, 14 from USA, 1 from Australia, and 1 from Ghana. One of the transcultural studies identified ([Lam et al., 2014](#)) involved 12 countries (see [Table 3](#) for details). This diversity of origins manifests the generalized interest attracted at an international level by the theme of the present review.

The Motivated Strategies for Learning Questionnaire (MSLQ; [Pintrich et al., 1991](#)) was the instrument most commonly used to evaluate SRL, specifically in 13 studies. The MSLQ is composed of two sections: one involves cognitive, metacognitive, and resource management strategies, and the other involves motivation. The MSLQ does not assess the self-regulation of motivation, but rather dimensions that account for the motivation itself, such as anxiety and self-efficacy ([Wolters, 2003](#)). The second most commonly used measure to assess SRL was the Self-Regulation Questionnaire (SRQ; [Ryan & Connell, 1989](#)) (in 7 of the 37 selected reports). This questionnaire focuses on the degree of academic motivational self-regulation and consists of four subscales designed to assess motivational autonomous and controlled types delimited in the context of the self-determination theory ([Ryan & Deci, 2000](#)). The remaining instruments used to assess SRL also consisted of self-report questionnaires (see details in [Table 3](#)); only 2 studies used different methods to evaluate SRL. [Abdulghani et al. \(2014\)](#) carried out focus group discussions in which students were encouraged to reflect on their learning strategies and activities during learning and exam preparation. In the other study of this type, [Jouhari et al. \(2015\)](#) used semi-structured in-depth interviews, introducing the factors that affect self-regulation of learning as a major question.

Regarding the instruments used to assess PSS, a high degree of heterogeneity was noted. The most frequent assessment strategies in this case were the selection of items from more generic self-report measures and the combination of items from other questionnaires (see [Table 3](#) for details). In general, these instruments are composed of statements about

the availability of and satisfaction with social support from significant others. The individual must indicate the extent to which they agree/disagree with the statements. In relation to the sources of social support, 22 studies evaluated perceived support from teachers. Perceived social support from the family was evaluated in 16 studies, and perceived support from peers in 7 studies. As regards specific provisions of support and using Weiss's taxonomy as a framework, 14 studies focused on reassurance of worth, 6 studies assessed attachment, another 5 considered guidance, and 2 studies explored social integration.

3.2. Summary of results

The findings of the studies are presented below. First, the findings referring to the relationship between PSS and SRL were organized considering sources and provisions of support. The results on the moderating and mediating factors of the relationship between PSS and SRL were then summarized.

All of the studies included in this systematic review examined specific sources of support, except that by [Schauber et al. \(2015\)](#), in which global PSS in university students was found to indirectly predict the use of metacognitive strategies, specifically planning and monitoring activities. Social support was related to students' appraisals, namely self-efficacy and perception of the learning environment. In turn, both dimensions predicted a study-related affect which encompassed effort and metacognitive strategies.

Social support from teachers was consistently positively associated with SRL. Thus, global support from teachers has been shown to be a positive predictor of the use of metacognitive and cognitive strategies in secondary and university education (see, e.g., [Ginns et al., 2014](#)). The effect of different support provisions provided by the teacher has also been explored; specifically, autonomy support (reassurance of worth in Weiss's taxonomy) has received special attention, showing a predictive effect on metacognitive, cognitive, and help-seeking learning strategies in high school and university students, and on motivational self-regulation in elementary and high school students (see, e.g., [Trigueros & Navarro, 2019](#)). Teachers' provision of attachment has been shown to have a predictive effect for metacognitive strategies in elementary and high school students ([Patrick et al., 2007](#); [Schuitema et al., 2016](#)) and for help-seeking in middle-school students ([Schenck et al., 2015](#)). Guidance has been found to predict metacognitive strategies in elementary school students ([Patrick et al., 2007](#)), as well as SRL globally in high school and university students ([Karabenick & Sharma, 1994](#); [Yildirim, 2012](#)). Integration has also been shown to be predictive of metacognitive strategies in high-school students and help-seeking among elementary and middle school students ([Danielsen et al., 2011](#); [Marchand & Skinner, 2007](#)).

Regarding family support, two qualitative studies with university students were included in the present review ([Abdulghani et al., 2014](#); [Jouhari et al., 2015](#)). The perception of the participants regarding factors affecting academic learning was analyzed, and in both studies students referred to family support as an important aid. Global parental support has also been found to predict the use of cognitive strategies in middle school ([Rubel, 2008](#)), high school ([Jelas et al., 2016](#)), and university students ([Roman et al., 2008](#)), as well as the use of metacognitive strategies and learning strategies jointly considered in middle school students ([Rubel, 2008](#)). On the other hand, parental support for autonomy has been shown to predict motivational self-regulation in elementary ([Gronick et al., 1991](#)) and high school students (see e.g. [Soenens & Vansteenkiste, 2005](#)), as well as cognitive strategies in high school and university students ([McEown & Sugita-McEown, 2018](#); [Mih, 2013](#)) and metacognitive strategies in secondary school students ([Won & Yu, 2018](#)) and university students ([McEown & Sugita-McEown, 2018](#)). Guidance and attachment support from family have also been shown to be predictors of cognitive and resource management strategies in elementary and high school students, as well as of metacognitive strategies in high school students ([Bong, 2008](#); [Choe, 2020](#)).

Table 3 Summary of the main characteristics and findings of the studies included in the review.

Author(s) and Publication Year	Sample characteristics	Dimensions and measures of PSS and AAR	Findings
Grolnick et al. (1991)	456 ESS from USA	Perceived support from father and mother (reassurance of worth) ^a Motivational self-regulation (relative autonomy index) ^b	Autonomous motivation was positively correlated with and predicted by perceived support from mother ($\beta=0.17^*$) and father ($\beta=0.12^*$). Autonomous motivation was positively correlated with and predicted by perceived teacher support ($\beta=0.09^{***}$) and perceived parental support ($\beta=0.77^{***}$). Perceived teacher support for classroom questioning was positively correlated with learning strategies.
Stiller and Ryan (1992)	755 HSS (53 % males) from USA	Perceived teacher and parental support (reassurance of worth) ^a Motivational self-regulation (relative autonomy index) ^b	Perceived teacher support was positively correlated with and predicted metacognitive strategies ($\beta=0.21^{**}$). Autonomous motivation was positively correlated with and predicted by support from mother ($\beta=0.24^{**}$) and teachers ($\beta=0.35^{**}$). Autonomous motivation was positively correlated with and predicted by support from mother ($\beta=0.27^{**}$) and teachers ($\beta=0.35^{**}$). Support from teachers was positively correlated with help-seeking and autonomous motivation and predicted help-seeking ($\beta=0.24^{***}$). Motivational self-regulation partially mediated the relationship between teacher support and help-seeking. Metacognitive strategies were positively correlated with and predicted by teacher attachment ($\beta=0.18^*$) and classmates' guidance ($\beta=0.22^*$). Motivational beliefs mediated both associations. Support from parents was positively correlated with learning strategies and indirectly predicted (through achievement goals and self-efficacy) help seeking avoidance.
Karabenick and Sharma (1994)	288 US (36 % males) from USA	Perceived teacher support (guidance) ^c Metacognitive (planning, monitoring, and regulating), cognitive (rehearsal, elaboration, and organization) and resource management (time and effort) strategies ^d	
Ryan and Patrick (2001)	233 MSS (43 % males) from USA	Perceived teacher support ^e Metacognitive (planning, monitoring, and regulating) strategies ^d	
Soenens and Vansteenkiste (2005)	Study 1 328 HSS (74 % males) from Belgium Study 2 285 HSS (46 % males) from Belgium	Perceived support from father, mother and teachers (reassurance of worth) ^e Motivational self-regulation (relative autonomy index) ^b	
Marchand and Skinner (2007)	765 ESS and MSS (51 % males) from USA	Perceived teacher support (social integration) ^a Motivational self-regulation (relative autonomy index) ^b Resource management strategies: help-seeking ^a	
Patrick et al. (2007)	602 ESS (49 % male) from USA	Perceived teacher and classmate support (attachment and guidance) ^e Metacognitive (planning, monitoring, and regulating) strategies ^a	
Bong (2008)	753 HSS (60 % males) from South Korea	Perceived parental support (attachment) ^c Metacognitive (planning, monitoring, and regulating) and cognitive (rehearsal, elaboration, and organization) strategies ^d Resource management strategies: help-seeking avoidance ^c Perceived family support ^f Surface (rehearsal) and deep processing (elaboration and organization) learning strategies ^c	
Roman et al. (2008)	553 US (19–45 years, 40 % males) from Spain		Family support was positively correlated with and predicted deep processing ($\beta=0.10^*$), but not surface learning. Deep processing strategies mediated the relationship between perceived support and academic achievement. Learning strategies were positively correlated with and predicted by support from parents ($\beta=0.24^{**}$) and classmates ($\beta=0.17^{**}$).
Rubel (2008)	296 MSS (mean age of 12.7 years, 47 % males) from USA	Perceived support from teachers, parents, and classmates ^g Metacognitive (planning, monitoring, and regulating) and cognitive (rehearsal, elaboration, and organization) strategies ^d	
Cheung and Pomerantz (2011)	825 HSS (52 % males) from China and USA	Perceived parental support (reassurance of worth) ^c Metacognitive (planning, monitoring, and regulating) and cognitive (rehearsal and elaboration) strategies ^e	Support from parents predicted learning strategies globally considered, both in China ($\beta=0.27^{***}$) and USA ($\beta=0.22^{***}$). Support from teachers predicted metacognitive strategies in 13-year-old boys ($\beta=0.15^*$), 13-year-old-girls ($\beta=0.22^{***}$), 15-year-old boys ($\beta=0.16^{***}$), and 15-year-old-girls ($\beta=0.14^{***}$). The association was partially mediated by school satisfaction and academic competence. Support from classmates only predicted metacognitive strategies in 13-year-old boys ($\beta=0.25^{***}$). Support from teachers was positively correlated with and directly predicted learning strategies globally considered ($\beta=0.14^{**}$) and indirectly through motivational beliefs and anxiety. Support from parents positively correlated with and directly predicted autonomous motivation
Danielsen et al. (2011)	3125 MSS (1591 aged 13 years, 1534 aged 15 years, 52 % males) from Norway	Perceived support from teachers and classmates (social integration) ^c Metacognitive strategies ^a	
Yildirim (2012)	4855 HSS (57 % males) from Turkey	Perceived teacher support (guidance) ^e Metacognitive (planning, monitoring, and regulating) and cognitive (elaboration) strategies ^a	
Mih (2013)	189 HSS (51.3 % males) from Romania	Perceived parental support (reassurance of worth) ^e Motivational self-regulation (relative autonomy index) ^h	

Table 3 (continued)

Author(s) and Publication Year	Sample characteristics	Dimensions and measures of PSS and AAR	Findings
		Surface (rehearsal) and deep (elaboration, organization, critical thinking, and metacognition) processing learning strategies	($\beta=0.37^*$) and indirectly predicted deep learning (through autonomous motivation, and effort).
Abdulghani et al. (2014)	19 university high achieving students (52.6 % males) from Saudi Arabia	Students' perceptions of factors contributing to academic achievement: focus groups of discussion on learning strategies and activities during their learning and exam preparation.	Family support was considered to contribute to effective time management.
Ginns et al. (2014)	5198 HSS (11–19 years, 56.5 % males) from Australia	Perceived teacher support Cognitive (memorization and elaboration) strategies	Support from teachers was positively correlated with and predicted memorization ($\beta=0.09^*$) and elaboration ($\beta=0.30^*$). Learning strategies mediated the relationship between perceived support and academic achievement.
Lam et al. (2014)	3420 HSS from 12 countries (Austria, Canada, China, Cyprus, Estonia, Greece, Malta, Portugal, Romania, South Korea, United Kingdom, and USA)	Perceived support from teachers, parents, and peers Cognitive (meaningful information processing) strategies	Support from teachers, parents, and peers was correlated with cognitive strategies.
Shim and Finch (2014)	446 MSS (46 % males) from USA	Perceived peer support (guidance and attachment) Resource management strategies: expedient help-seeking, adaptive help-seeking and help-seeking avoidance Perceived peer support	Support from peers was positively correlated with adaptive help-seeking and negatively correlated with expedient help-seeking. Support from peers was positively correlated with and predicted deep processing ($\beta=0.30^{**}$) and cognitive learning strategies ($\beta=0.31^{**}$).
Hafzan et al. (2015)	93 US (67.4 % males) from Malaysia	Surface (work avoidance and rehearsal) and deep processing learning strategies (elaboration and organization) Cognitive (imagery, verbal elaboration, organization strategies, and reasoning skills) strategies Factors affecting self-regulated learning: semi-structured in-depth interviews.	Students expressed that family could play a supportive role in self-regulation.
Jouhari et al. (2015) Schauber et al. (2015)	19 university medical students (52.6 % males) from Iran 1646 US from Germany	Perceived social support Metacognitive (planning, monitoring, and regulating) and resource management (effort) strategies Perceived teacher support (attachment) Resource management strategies: instrumental and expedient help-seeking	Social support indirectly predicted (through self-efficacy, study affect, and effort) metacognitive strategies.
Schenke et al. (2015)	3897 MSS (48 % males) from USA	Perceived teacher support (reassurance of worth and attachment) Metacognitive (planning and comprehension monitoring) strategies Perceived support from teachers, parents and peers Cognitive strategies	Support from teachers was positively correlated with and predicted help seeking ($\beta=0.36^{**}$). Support from teachers was positively correlated with and predicted metacognitive strategies at the five times of measurement (path coefficients ranging from $\beta=0.05^{***}$ to $\beta=0.06^{***}$). Support from teachers, peers and parents was positively correlated with cognitive strategies.
Schuitema et al. (2016)	701 HSS (52 % males) from The Netherlands Evaluated five times for two years	Perceived support from teachers, parents and peers Cognitive strategies	Cognitive strategies were predicted by support from teachers ($\beta=0.23^{***}$), peers ($\beta=0.10^{**}$), and parents ($\beta=0.32^{**}$). Cognitive strategies mediated the relationship between perceived support and academic achievement.
Jelas et al. (2016)	2359 HSS (49.6 % males) from Malaysia	Perceived teacher support (reassurance of worth) Motivational self-regulation (intrinsic, identified, and controlled)	Support from teachers was positively correlated with and predicted intrinsic ($\beta=0.27^{**}$) and identified ($\beta=0.31^{**}$) motivation. Support from teachers mediated the relationship between age and self-regulation of motivation. Support from teachers was positively correlated with and predicted global strategic learning ($\beta=0.13^*$).
Martinek (2016)	432 ESS and HSS from Austria	Perceived teacher support (reassurance of worth) Motivational self-regulation (intrinsic, identified, and controlled)	Support from teachers was positively correlated with and predicted global strategic learning ($\beta=0.13^*$).
Tas (2016)	315 MSS (42 % males) from Turkey	Perceived teacher support Metacognitive (planning, monitoring, and regulating) and cognitive (rehearsal and elaboration) strategies Perceived support from teachers and parents (reassurance of worth) Metacognitive (planning, monitoring, and regulating) and cognitive (rehearsal, elaboration, and organization) strategies Task intrinsic value Perceived teacher support Metacognitive (planning, monitoring, and regulating) and effort management strategies Perceived teacher support (reassurance of worth) Motivational self-regulation (autonomous type) Resource management strategies (help-seeking)	Support from teachers and parents was correlated positively and predicted (through intrinsic value) metacognitive and cognitive strategies.
McEown and Sugita-McEown (2018)	212 US from Japan	Perceived teacher support Metacognitive (planning, monitoring, and regulating) and effort management strategies Perceived teacher support (reassurance of worth) Motivational self-regulation (autonomous type) Resource management strategies (help-seeking)	Support from teachers was positively correlated with and predicted global strategic learning ($\beta=0.02^*$).
Perry et al. (2018)	229 HSS (13–19 years, 41 % males) from USA 461 HSS (14 years) from Norway	Perceived teacher support (reassurance of worth) Motivational self-regulation (autonomous type) Resource management strategies (help-seeking)	Support from teachers directly predicted autonomous motivation ($\beta=0.34^*$) and indirectly predicted (through autonomous motivation) help-seeking.
Ulstad et al. (2018)			

Table 3 (continued)

Author(s) and Publication Year	Sample characteristics	Dimensions and measures of PSS and AAR	Findings
Won and Yu (2018)	194 MSS (mean age =14 years, 52.1 % male) from USA	Perceived parental support (reassurance of worth)l Resource management learning strategies (planning and monitoring time)m	Parental support was positively correlated with and predicted planning time ($\beta=0.25^{***}$) and monitoring time ($\beta=0.19^{***}$). Support from parents was positively correlated with and predicted emotional self-regulation ($\beta=0.25^{***}$). Parental support was positively correlated with autonomous motivation, but not with controlled motivation. Support from parents was positively correlated with and predicted learning strategies globally considered in the USA ($\beta=0.39^{***}$) and in China ($\beta=0.49^{***}$). Positive emotions partially mediated the association in both cases. Support from teachers positively predicted elaboration ($\beta=0.24^{**}$) and monitoring ($\beta=0.32^{***}$). Support from teachers was positively correlated with and indirectly predicted learning strategies (through satisfaction of needs and autonomous motivation) and autonomous motivation (through satisfaction of needs).
Liu et al. (2019)	832 ESS (53.2 % males) from China	Perceived parental support (reassurance of worth)e Emotional self-regulation (cognitive reappraisal and expressive suppression)l	
Marbell-Pierre et al. (2019)	401 HSS (39 % males) from Ghana	Perceived parents' support (reassurance of worth)c Motivational self-regulation (controlled and autonomous types)b	
Monroy et al. (2019)	327 MSS (mean age =12.7, 40.6 % males) from USA and 235 (mean age =12.6, 60.8 % males) from China	Perceived parental support (reassurance of worth)c Cognitive (rehearsal and elaboration) and metacognitive (monitoring and planning) learning strategiesd Perceived teacher supporte Cognitive (elaboration) and metacognitive (monitoring) strategiese	
Schweder and Raufelder (2019)	754 HSS (50.6 % males) from Germany	Perceived teacher support (reassurance of worth)l Metacognitive (planning, monitoring, and regulating) and cognitive (rehearsal, elaboration, and organization) strategiesd Motivational self-regulation (relative autonomy index)p	Learning strategies were predicted by parental guidance ($\beta=0.35^{***}$) and attachment ($\beta=0.22^{***}$). Support from teachers was positively correlated with and predicted learning strategies ($\beta=0.39^{**}$).
Trigueros and Navarro (2019)	545 HSS (13–19 years, 52.8 % males) from Spain	Perceived parental support (guidance and attachment)e	
Choe (2020)	6370 ESS (41.1 % males) from South Korea	Cognitivee and resource managementd strategies Perceived teacher supporte Metacognitive (planning, monitoring, and regulating) and cognitive (rehearsal, elaboration, and organization) strategiesd	
Sava et al. (2020)	236 US (19–53 years, 24.6 % males) from Romania	Perceived parental support (reassurance of worth)l Resource management learning strategies (planning and monitoring time)m	

Note. Dimensions of PSS and AAR are specified in brackets. ESS=elementary school students; HSS=high school students; MSS=middle school students; SS=Secondary students; US=university students; aSelf-reported measure with items ad hoc, bSelf-Regulation Scale (SRQ; Ryan & Connell, 1989), cSelf-reported measure with items gathered from other questionnaires, dMotivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 1991; Pintrich & DeGroot, 1990), eItems from a validated more generic self-report measure with good psychometric properties, fMultidimensional Social Perceived Support Scale (MSPSS; Zimmet et al., 1988), gChild and Adolescent Social Support Scale (CASSS; Malecki & Demaray, 2002), hAcademic Motivation Scale (AMS; Vallerand et al., 1992), iStudy Process Questionnaire (R-SPQ-2F; Biggs et al., 2001), jLearning and Study Strategies Inventory (LASSI; Weinstein & Palmer, 2002), kTeacher Support Scale (TSS; Metheny et al., 2008), lPerceived Parental Autonomy Support Scale (P-PASS; Mageau et al., 2015), mAcademic Time Management Scale (Won & Yu, 2018), nEmotion Regulation Questionnaire (ERQ; Gross & John, 2003), oPerceived Autonomy Support Scale for Exercise Settings (Hagger et al., 2007), pPerceived Locus of Causality Revised (PLOC-R; Vlachopoulos et al., 2011), qOnline Self-regulated Learning Questionnaire (OSLQ; Lan et al., 2004; Barnard et al., 2008).

The research collected for this review regarding global support from peers indicates a positive effect of this dimension on cognitive strategies in middle school, high school, and university students (see e.g. Hafzan et al., 2015) and on metacognitive strategies in middle school and university students (Rubel, 2008). Guidance and emotional support (attachment in Weiss's taxonomy) from peers have also been associated with metacognitive strategies in elementary school students (Patrick et al., 2007), while integration has been associated with metacognitive strategies in middle school students (Danielsen et al., 2011).

A forest plot of effect sizes for the correlations between the total score for social support and students' SRL was constructed (Fig. 3). The data correspond to 31 effects and 34,216 participants. The combined effect size was $r = 0.33$, CI 95 % [.29, 0.37] confirming the existence of a moderate positive correlation between social support and SRL.

Finally, some of the studies included in the present review explored possible mediating effects in the relationship between PSS from teachers and parents and learning strategies. In particular, several motivational dimensions (i.e., achievement goals, self-efficacy, school satisfaction, task value, and academic emotions) have been found to have a significant mediational role (Bong, 2008; Danielsen et al., 2011; McEown & Sugita-McEown, 2018; Monroy et al., 2019; Patrick et al., 2007; Schaubert et al., 2015; Yildirim, 2012). Likewise, a mediational effect has also been found for autonomous motivational self-regulation (Marchand & Skinner, 2007; Mih, 2013; Trigueros & Navarro, 2019; Ulstad et al.,

2018). However, none of the potential moderators were statistically significant in the meta-analysis (Table 4).

4. Discussion

The aim of this systematic review and meta-analysis was to explore the available evidence and theoretical contributions regarding the relationship between PSS and SRL. Studies that adopted a global approach to these dimensions and also studies with a more specific focus were considered. Thus, we collected findings regarding different learning strategies and various support provisions (namely reassurance of worth, guidance, integration, and attachment) and also three social sources of support (i.e., teachers, family, and peers) (Cutrona & Russell, 1987; Wills & Shinar, 2000).

One of the reviewed studies (Schauber et al., 2015) examined global PSS, reporting that this variable positively predicted the use of learning strategies in university students. The findings summarized in the present review regarding the overall PSS from the primary agents of socialization (teachers, family, and peers) also show consistent positive effect of support on SRL (see, e.g., Rubel, 2008).

Indeed, the results of the meta-analysis show a consistent positive moderate relationship between social support and SRL. The lack of significance of the moderation analysis considering the total score of support suggests that all provisions and sources examined have a similar

overall weight in the manifestation of SRL. Moreover, in the metanalysis, neither sex nor educational level were found to moderate this relationship. This is consistent with the results reported in the studies reviewed. Although the possible confounding influences of sex and age were statistically controlled, 3 of the studies explored sex differences in the relationship between perceived social support and self-regulated learning and did not find any moderation effect (see e.g., Danielsen et al., 2011; Rubel, 2008). Nevertheless, this effect should be analysed further, since it can occur under some circumstances, as suggested by the findings of Yu and Zhou (2022) in a study involving university students who took courses online during the COVID-19 pandemic. The association between perceived support and online self-regulated learning was significantly stronger for male participants than for their female classmates. Future studies should also further explore the moderating effect of specific sources and provisions of support.

As assumed in the SSMM and demonstrated by Schaubert et al. (2015), the relationship between PSS and SRL was mediated by motivational dimensions (i.e., students' appraisals of self and the academic tasks) and motivational self-regulation (see, e.g., Ulstad et al., 2018) that are thought to denote the degree of satisfaction of basic psychological needs. As also suggested by the study results, the relationship between support and SRL may be at least partly explained by self-regulation of effort, which is consistent with the widely ascertained role of PSS on the academic adjustment (Martínez-López et al., 2019; Rodríguez et al., 2017) and achievement (Tinajero et al., 2020). In fact, some of the studies selected for the present review showed a mediating effect of SRL in the relationships between social support and academic engagement (Ginns et al., 2014) and achievement (Jelas et al., 2016; Roman et al., 2008). Taken together, the available data suggest that social support enhances self-regulated learning through academic motivation and its self-regulation, which would, in turn, favor academic effort and achievement.

Nonetheless, analysis at a finer level is required prior to disentangling the possible mechanisms underlying the relationship between support and SRL. The theoretical background of social support and the data collected in the present review regarding different provisions of support could serve as the basis for new suggestions. In fact, we can establish a similarity between some of the provisions (reassurance of worth, guidance, attachment and social integration), in the taxonomy of Weiss (1974) and the contextual variables considered in the SSMM. The similarity, along with the interconnections between provisions of support and the different facets of AAR are illustrated in Fig. 4, which is based on a graphic representation of the SSMM model (Marchand & Skinner, 2007). We did not find any studies on the possible relationships between SRL and either provision of reliable alliance or opportunity for nurturance. In our opinion, such relationships would not be expected from a theoretical point of view, at least on the basis of the SSMM model.

According to the findings of this review, the most frequently investigated provision of support in relation to SRL is autonomy support. In the context of the SSMM, autonomy support is defined as the provision of choice, relevance, and respect (Skinner et al., 2008), and it is thus clearly related to Weiss's notion of the reassurance of worth provision. Providing support for learners' autonomy entails valuing their interests and perspectives and recognizing them as volitional subjects, and it is assumed to be the primary basis for satisfying the need for autonomy (Connell & Wellborn, 1991) and promoting self-regulation. In fact, in the present review, autonomy support from teachers and family was shown to be related to SRL (see, e.g., Ginns et al., 2014; Rubel, 2008). To our knowledge, no research has yet aimed to disentangle the mechanisms underlying the relationship between autonomy support and SRL. However, the conceptualization of self-determination as a motivational resource has been tentatively suggested as a possible explanation for the relationship (Soenens & Vansteenkiste, 2005). Autonomy support would increase feelings of agency, which in turn would enhance the autonomous motivation of students, a key component of the

affective dimension of SRL (Hu & Zhang, 2017). Thus, when students become confident, their motivation to self-regulate seems to develop (Sierens et al., 2009). Considering diverse theoretical contributions (see, e.g., Boekaerts & Corno, 2005; Miele & Scholer, 2018), motivational beliefs also appear to be the processes underlying other forms of SRL, such as the use of cognitive and metacognitive and resource management.

The provision of autonomy support from teachers and family has attracted particular interest. Teachers are the adults most directly involved in the academic domain and personify its goals and demands; thus, when teachers promote learning environments in which students are encouraged to make choices and follow their interests, SRL is expected to increase (Stiller & Ryan, 1992). Indeed, the findings of the research reviewed show a consistent relationship between teachers' autonomy support and the use of different learning strategies (metacognitive, cognitive, resource management, and volitional control strategies). Moreover, the relationship has been reported to be bidirectional (Marchand & Skinner, 2007; Schuitema et al., 2016), indicating that SRL in students affects provisions of autonomy support, through feedback loops. As suggested by Marchand and Skinner (2007), the behavioral engagement manifested by students may elicit more involvement by teachers. By contrast, lack of (or at least concealment of) self-regulation may exert an impact on support by feeding behavioral and emotional disaffection and leading teachers to generally withdraw their support over time. Parental autonomy support, on the other hand, probably has a more distal influence on SRL in students. Indeed, parents are assumed to exert an influence by tailoring a suitable environment in which their children can feel responsible for their own actions, fostering autonomous self-regulation in general (Grolnick et al., 1999).

Guidance is another support provision that has attracted researchers' attention. Defined by Weiss (1974) as the supply of advice or information, it has been conceptualized within the framework of the SSMM as a structured environment, in which means of achieving desired outcomes are clarified (Skinner & Belmont, 1993). This provision is expected to fulfill students' needs for competence through the improvement of metacognitive knowledge regarding learning strategies and oneself as learner (Connell & Wellborn, 1991; Marchand & Skinner, 2007), thus enhancing positive self-assessments and perceptions regarding the capacity of students to perform successfully (Schunk & Ertmer, 2000). Along this line, the findings of a study by Patrick et al. (2007) with elementary school students showed that perceived guidance support from teachers was found to predict metacognitive strategies through academic efficacy and mastery goals. Further investigation is needed to clarify processes mediating the relationship between guidance support and SRL.

The prominent role of teachers in guidance support has been considered, as they are expected to explicitly instruct, scaffold and act as models from which students can learn how to better regulate academic tasks (Ginns et al., 2014; Liu et al., 2019). The findings of the reviewed studies are consistent with a positive effect of guidance from teachers on SRL in elementary, high-school, and university students (Karabenick & Sharma, 1994; Patrick et al., 2007; Yildirim, 2012). On the other hand, at least two studies reported a positive correlation between guidance from peers and learning strategies (Patrick et al., 2007; Shim & Finch, 2014). As indicated by Patrick et al. (2007), classmates frequently interact in academic tasks (Jelas et al., 2016) and may therefore act as models providing suitable options for self-regulating and enhancing focus on mastery and feelings of efficacy. Teachers can also promote these interactions by creating collaborative/cooperative learning environments and favoring peer mentoring. Only one recent study regarding the provision of guidance by family has been identified in the present review, even though parental modeling, reinforcement and instruction about student homework is consistently recognized (Hoover-Dempsey et al., 2001; Walker et al., 2004). In accordance with this assumption, Choe (2020) reported a positive effect of parental guidance on cognitive and resource management strategies used by elementary students.

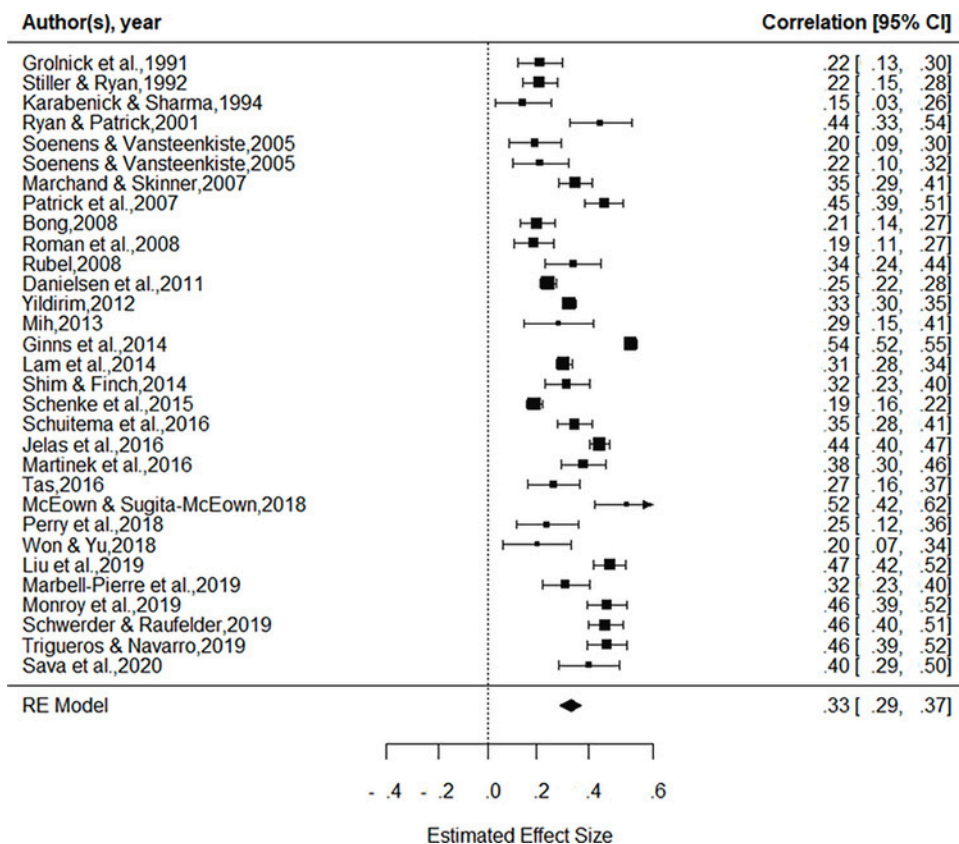


Fig. 3. Forest plot of the meta-analysis performed on the relationship between PSS and SRL.

Table 4

Random effects model and effects of moderating variables.

Heterogeneity	Tau2	.015 (se=0.004)	
	I2	93.77 % (95 % CI [89.78	
	Q (df=30)	%-93.77 %)	
	.347 (se=	635.785***	
Summary effect size	0.023)***		
	.33		
Pearson's correlation			
Quantitative moderator			
Moderating variable	k		QM(1)
Sex	27		0.032 (p=.858)
Categorical moderators			
Moderating variable	k	4	QB
Educational level	Elementary	23	0.010 (p=.921)
	Secondary	4	
	University	13	
Source	Teachers		
	Family Peers	6	0.595 (p=.440)
	Various	1	
	Reassurance of worth	9	
	Guidance	12	
	Emotional	4	
Provision		5	0.076 (p=.782)

*p> .1 **p> .05 ***p> .01.

Finally, offering warmth is expected to fulfill students' needs for relatedness by fostering feelings of emotional security and closeness (Connell & Wellborn, 1991). In the context of the SSMM, it is defined as a degree of interest and emotional connectedness, thus covering provisions of attachment and social integration of Weiss's (1974) taxonomy. The present review has revealed a consistent and positive association between provision attachment from teachers, family, and peers and learning strategies in elementary and secondary school students. This relationship has been interpreted in terms of perceptions generated in close relationships, of being accepted and cared for; this feeling would lessen school concerns and increase self-esteem (Patrick et al., 2007). Social integration, on the other hand, is thought to manifest in the perception of psychosocial inclusion and belonging, which is assumed to favor internalization of educational goals and values (Danielsen et al., 2011; Perry et al., 2018). At the same time, as suggested by the findings of Schuitema et al. (2016), self-regulated learners might prompt a higher level of emotional support.

4.1. Research implications, limitations, and future directions

In summary, the present review highlights the existence of a consistent positive relationship between PSS and SRL. Moreover, it enabled interpretation of the relative relevance of different sources of support (teachers, family, and peers), as well as of different types of provisions (reassurance of worth, guidance, attachment, and social integration). Current findings suggest that perceived social support may serve as a marker of vulnerability/protection regarding the academic difficulties faced by students and may lay the foundations for outlining guidelines and intervention programs aimed at favoring adjustment of adolescents in the educational system. Based on the study findings, the

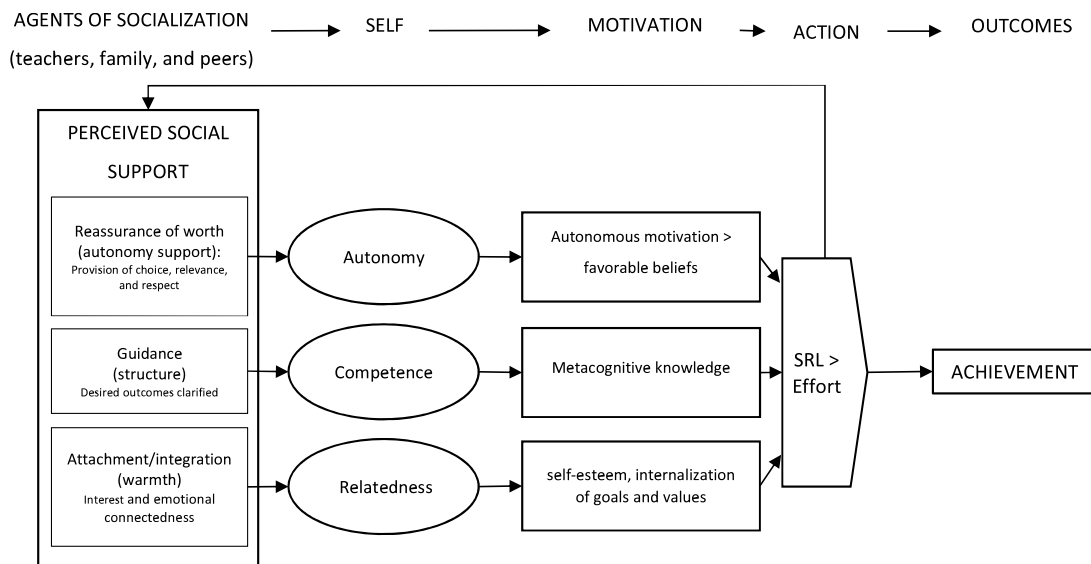


Fig. 4. Theoretical model based on data obtained in the systematic review.

inclusion of social support as a dimension of programs aimed at training learning skills is expected to enhance the effectiveness of such programs. Improvement of perceived social support and self-regulation skills is contemplated a priori as an adequate strategy favoring academic progress.

Some limitations of the studies conducted to date should be noted. First, most of the studies involved cross-sectional designs, which do not enable causal relationships or the direction of these to be established. Aspects regarding measurement should also be considered, as self-report measures are predominant; although reliable, this type of instrument may be subject to response bias. Finally, provisions of reliable alliance and opportunity for nurturance and declarative metacognition were identified as major investigation gaps in the present review and remain to be explored. Future studies should further explore the role of moderating and mediating factors in the relationships between PSP and AAR, considering specific sources and provisions of support. Tentative interpretations suggested throughout the Discussion should also be explored in future investigations.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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3. OBJETIVOS E HIPÓTESIS DE INVESTIGACIÓN

El objetivo general planteado para la presente tesis doctoral era contribuir a esclarecer el papel del apoyo social y las destrezas de autorregulación del aprendizaje en el rendimiento académico durante la adolescencia. Este se concretó mediante la formulación de los siguientes objetivos específicos:

Objetivos teóricos:

1. Obtener una imagen actual y comprensiva de los modelos teóricos de AAR.
2. Aunar las definiciones y principales supuestos sobre el constructo de ASP.
3. Delimitar el tipo de estrategias de autorregulación afectivo-motivacional que utilizan los individuos en entornos de educación formal, sus posibles antecedentes y repercusiones educativas.
4. Recopilar y sistematizar la evidencia empírica disponible sobre las interconexiones entre el ASP y el AAR.

Objetivos empíricos:

5. Plantear modelos explicativos sobre las interconexiones entre las provisiones de ASP, el conocimiento metacognitivo, las estrategias de aprendizaje (cognitivas, metacognitivas y motivacionales) y el rendimiento académico durante la educación secundaria y someterlos a comprobación estadística.
6. Explorar los efectos de mediación de las estrategias de autorregulación motivacional en la relación del ASP con el rendimiento escolar en adolescentes.

En la Tabla 1 se presenta la correspondencia entre los objetivos específicos y los artículos derivados del trabajo de tesis:

Tabla 1*Relación entre los objetivos de investigación y los artículos incluidos en la tesis.*

Estudio	Objetivo(s)	Apartado
1	1	2.1.2 Modelización del aprendizaje autorregulado
2	2 y 4	2.2.3 El apoyo social percibido y el aprendizaje autorregulado
3	3	5.1. Artículo 3
4	3	5.2. Artículo 4
5	5 y 6	5.3. Artículo 5
6	5 y 6	5.4. Artículo 6

En línea con los objetivos 5 y 6, se plantearon las siguientes hipótesis:

- H1. Las provisiones de apoyo social percibido de familia, profesorado e iguales predicen el rendimiento académico de los/as adolescentes.
- H2. Las estrategias de aprendizaje median la asociación entre el apoyo social percibido y el rendimiento escolar.
- H3. Las estrategias de autorregulación afectivo-motivacional median la relación del conocimiento metacognitivo y las estrategias de aprendizaje cognitivas y metacognitivas con el rendimiento escolar.

4. METODOLOGÍA

Para alcanzar los objetivos descritos, se emplearon diversas estrategias y herramientas metodológicas. A continuación, se presentan comenzando por las vinculadas con los objetivos teóricos enunciados y finalizando con las utilizadas para la consecución de los objetivos empíricos.

4.1 *Herramientas y Procedimientos Empleados para Alcanzar los Objetivos Teóricos*

Durante el trabajo de tesis, nos planteamos algunas preguntas de investigación de índole teórica. Para responderlas utilizamos distintas estrategias y herramientas de revisión bibliográfica, que se describen a continuación.

4.1.1 **Revisión crítica**

Se entiende por revisión crítica aquella que busca identificar y comparar las aproximaciones teóricas más destacadas sobre un tema de investigación. En ella se sintetizan las propuestas conceptuales nucleares y se integran en un cuerpo teórico nuevo o ya existente (Grant y Booth, 2009; Paré et al., 2015). El procedimiento que se ha de seguir se ajusta al marco SALSA (*Search, Appraisal, Synthesis, and Analysis*), considerado como garante de precisión, sistematicidad, exhaustividad y reproductibilidad metodológicas (Mengist et al., 2020).

Este procedimiento metodológico resultó idóneo para analizar las características, componentes esenciales y evolución de los modelos teóricos sobre el AAR (objetivo específico 1). Los detalles y resultados de su aplicación se recogen en el Artículo 1, inserto en el apartado 2.1.2. Modelización del aprendizaje autorregulado.

La revisión crítica realizada fue guiada por las siguientes preguntas de investigación:

- ¿Cuáles son las características y componentes esenciales de los modelos teóricos existentes sobre AAR?
- ¿Cómo han evolucionado dichos modelos teóricos?

4.1.2 Revisión sistemática

Una revisión sistemática se define como aquella que utiliza, de manera explícita, métodos sistemáticos para recolectar y sintetizar los hallazgos de estudios que responden a una pregunta de investigación claramente formulada (Grant y Booth, 2009; Paré et al., 2015). Este tipo de revisión se consideró adecuado para abordar los objetivos teóricos 2, 3 y 4, a los que dedicamos distintos estudios que dieron lugar al Artículo 2 (inserto en el apartado 1.2.3 El apoyo social percibido y el aprendizaje autorregulado), el Artículo 3 (que conforma el cuerpo del apartado 4.1) y el Artículo 4 (apartado 4.2). Las preguntas de investigación planteadas eran las siguientes:

Artículo 2:

- ¿Cómo afecta el ASP al AAR?
- ¿El efecto del ASP sobre el AAR varía dependiendo del tipo de fuente y/o provisión de apoyo?

Artículo 3:

- ¿Cuáles son los diferentes tipos de estrategias de autorregulación emocional empleadas por el alumnado de educación primaria, secundaria y superior?
- ¿Cuáles son las condiciones situacionales en las que estas estrategias son aplicadas?
- ¿Cuáles son las dimensiones de diferencias individuales en su uso?
- ¿Cuáles son los correlatos de la utilización de estrategias de regulación emocional por parte de los estudiantes?

Artículo 4:

- ¿Cuáles son las estrategias de autorregulación motivacional más utilizadas por los estudiantes?
- ¿Qué procesos psicológicos están implicados en la activación de las estrategias de regulación motivacional?
- ¿Cuáles son las estrategias de autorregulación motivacional más efectivas para el éxito académico?

Para dar respuesta a estas preguntas, se consultaron diversas bases de datos, realizando búsquedas con los términos de búsqueda y operadores booleanos indicados en la Tabla 2. Los resultados de este procedimiento de búsqueda fueron filtrados atendiendo a los criterios de inclusión y exclusión pertinentes en cada revisión, a los que se añadieron informes localizados mediante búsqueda manual, dando como resultado el número final de estudios seleccionados para cada revisión. A continuación, pueden consultarse tanto el número de los estudios revisados, así como de participantes de cada revisión sistemática realizada (ver Tabla 2).

Tabla 2

Bases de datos consultadas, expresiones de búsqueda y estudios seleccionados en las revisiones sistemáticas realizadas.

Artículo	Bases	Expresiones de búsqueda	N ES	N RS
2	Scopus WoS PsycInfo ERIC	("Self-regulated learning" AND ("Social support", "Family support" OR "Parent* support" OR "Peer* support" OR "Friend* support", OR "Teacher support")) OR ("Learning strategies" AND ("Social support", "Family support" OR "Parent* support" OR "Peer* support" OR "Friend* support", OR "Teacher support")) OR ("Metacognition" AND ("Social support", "Family support" OR "Parent* support" OR "Peer* support" OR "Friend* support", OR "Teacher support"))	37	42.792
3	Scopus WoS	"self-regulated learning" AND ("emotion*" OR "emotional regulation" OR "emotional control")	29	4.071
4	Scopus WoS PsycInfo ERIC	("self-regulated learning" AND "academic motivation") OR ("self-regulated motivation" AND (university OR college OR school)) OR ("motivation* self-regulation" AND (university OR college OR school)) OR ("regulation of motivation" AND (university OR college OR school)) OR (metamotivation* AND (university OR college OR school))	64	35.258

Nota. N ES = número de estudios, N RS = número de participantes de cada revisión sistemática realizada

Con el fin de asegurar la calidad metodológica de las revisiones sistemáticas realizadas, se siguieron las directrices PRISMA (Page et al., 2021) y Cochrane (Higgins et al., 2022). Se utilizó el software de Covidence (Babineau, 2014) para la gestión de referencias, detección de duplicados y cribado de informes. Fue evaluada la calidad de los artículos incluidos en cada revisión, atendiendo a los requisitos particulares de cada investigación, tomando como referencia los siguientes instrumentos: NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, JBI Checklist for Analytical Cross-Sectional Studies, JBI Checklist for Qualitative Research y la plantilla de Cochrane para la evaluación de la calidad.

Durante su realización y con anterioridad a su publicación, los trabajos de revisión se registraron en PROSPERO (<https://www.crd.york.ac.uk/prospero>).

4.1.3 Metaanálisis

Un metaanálisis es la integración estadística de evidencia proveniente de múltiples estudios para dar respuesta a una pregunta de investigación común (Borenstein et al., 2009; Quintana, 2015). Atendiendo a los objetivos específicos 3 y 4, se realizaron una serie de metaanálisis en los estudios recogidos en los Artículos 2 y 4. En concreto, a través de esta aproximación cuantitativa a la síntesis de la literatura existente, se trató de dar respuesta a las siguientes preguntas de investigación:

Artículo 2:

- ¿Cuál es el tamaño del efecto de la relación entre el ASP y el AAR, considerando ambos constructos de manera global?
- En caso de existir, ¿está dicha relación moderada por el sexo, el nivel educativo, la fuente de apoyo y/o la provisión de apoyo?

Artículo 4:

- ¿Cuál es el tamaño del efecto de la relación entre las dimensiones consideradas teóricamente como antecedentes (i.e., autoeficacia, valor de la tarea y orientación a meta) y el uso de estrategias de autorregulación motivacional?
- ¿Cuál es el tamaño del efecto de la relación entre el uso de estrategias de autorregulación motivacional y las variables consideradas teóricamente como consecuentes de dicha utilización (i.e., estrategias de aprendizaje, esfuerzo, rendimiento y procrastinación)?
- En caso de existir, ¿está alguna de las anteriores relaciones moderadas por el sexo, el nivel educativo de los participantes y/o el instrumento de medida utilizado?

Para dar respuesta a estas preguntas de investigación, se seleccionaron aquellos estudios cuantitativos que incluyesen información correlacional (i.e., r de Pearson). En el caso de las

publicaciones que informaban de dos o más estudios, se comprobó que cada uno cumpliera con los criterios de elegibilidad previamente descritos.

En cuanto a los análisis estadísticos realizados, para examinar el tamaño de las muestras y los tamaños de los efectos, se siguió el procedimiento propuesto por Hedges y Olkin (1985): Q-test para homogeneidad, Q_b para moderadores categóricos y Q_r para moderadores continuos. Una vez identificadas las correlaciones pertinentes, estas fueron transformadas a Z de Fisher para estimar el tamaño del efecto. Cabe destacar que los metaanálisis fueron realizados asumiendo un modelo de efectos aleatorios, en tanto que este procedimiento permite la generalización de los resultados más allá del conjunto específico de estudios incluidos y se considera más conservador que el modelo de efectos fijos en términos de inferencia estadística (Botella y Gambara, 2006; Quintana, 2015). Por último, para estimar el riesgo de sesgo de publicación, se analizaron las desviaciones de simetría en el funnel plot y se aplicaron las pruebas de regresión de Egger y de correlación de Rank (Quintana, 2015).

Los análisis estadísticos y la elaboración de los *funnel plots* y *forest plots* resultantes fueron efectuados en R, con el paquete estadístico METAFOR (Viechtbauer, 2010).

4.2 Herramientas y Procedimientos Empleados para Alcanzar los Objetivos Empíricos

4.2.1 Procedimiento de recogida de datos

4.2.1.1 Herramientas de medida

Para cuantificar las dimensiones psicológicas objeto de estudio en la presente tesis, se aplicaron test autoinformados, elaborados *ad hoc* o bien previamente validados. Así, se obtuvieron los datos sociodemográficos de los/as participantes en los estudios empíricos realizados mediante un cuestionario confeccionado al efecto. De igual manera, se procedió a evaluar la posible afectación por la pandemia de Covid-19. Por otra parte, se aplicaron pruebas originales y adaptadas para evaluar el ASP y las estrategias de aprendizaje, y se registraron las calificaciones académicas de los/as participantes.

4.2.1.2 Procedimiento y consideraciones éticas

Las herramientas descritas fueron administradas a sendas muestras de adolescentes durante dos cursos académicos (i.e., pre y post COVID-19). En ambos momentos de recogida, los centros educativos participantes fueron escogidos a partir de un muestreo por conveniencia. A la hora de realizar dicho muestreo, se consideró el grado de urbanización de la localidad en la que se ubicaba cada centro, pues este indicador es frecuentemente empleado como representación del nivel socioeconómico territorial (Calvo et al., 2013). Tras convenir con los centros participantes los aspectos básicos de la investigación, se obtuvo el consentimiento informado pertinente por parte de las familias en el caso del alumnado menor de 14 años, así como el consentimiento informado de los propios participantes, con independencia de la edad. Los datos fueron recogidos en horario de clases, con el permiso y la asistencia del profesorado del aula. En el momento de la recogida, el alumnado fue nuevamente informado de la finalidad de la investigación, así como de que su participación era libre, voluntaria y altruista, pudiendo

abandonar el estudio en cualquier momento si así lo quisieran. El tiempo necesario para cumplimentar el cuestionario fue de aproximadamente 40 minutos. Por otra parte, los datos sobre rendimiento académico fueron obtenidos al inicio del segundo trimestre del curso académico previo a la pandemia por COVID-19 y al inicio del tercer trimestre del curso académico posterior a la pandemia.

Las líneas directrices de la investigación desarrollada cuentan con la aprobación del Comité de Bioética de la Universidad de Santiago de Compostela (USC 29/2020) (ver Anexo II). En cualquier caso, se realizaron de conformidad con el Código de Ética de la APA (APA, 2017) y la Declaración de Helsinki, respetándose en todo momento los derechos de los/as participantes, tanto al inicio como durante el transcurso de la investigación. Por otra parte, el tratamiento de los datos obtenidos se llevó a cabo atendiendo a lo expuesto en la Ley Orgánica 3/2018, del 5 de diciembre, de Protección de Datos Personales y Garantía de los Derechos Digitales y en el Reglamento 2016/679 del Parlamento Europeo y del Consejo, del 27 de abril de 2016, relativo a la protección de las personas físicas en lo que respecta al tratamiento de datos personales y a la libre circulación de estos datos. Así, los datos recogidos fueron pseudoanonimizados y almacenados en archivos .sav protegidos con contraseña. El acceso a estos archivos está restringido a los miembros del equipo de investigación.

4.2.2 Técnicas de análisis estadístico

En cuanto al análisis estadístico, se emplearon las técnicas que se detallan a continuación.

4.2.2.1 Ecuaciones estructurales

El modelado de ecuaciones estructurales nos permitió confirmar y explicar el modelo conceptual planteado para las interconexiones entre el ASP, el AAR y el rendimiento académico. El ajuste del modelo analizado fue evaluado empleando varios criterios, entre los que se incluyen la prueba chi-cuadrado, el valor cuadrático medio del error de aproximación

(RMSEA), la media cuadrática estandarizada del residuo (SRMR), el Índice de Ajuste Comparativo (CFI), y el Índice de Bondad de Ajuste (GFI). Se empleó el método Bootstrap para calcular los intervalos de confianza de los coeficientes del modelo.

El software estadístico utilizado para llevar a cabo estos análisis fue IBM AMOS 21 (Arbuckle, 2012).

4.2.2.2. *Análisis de mediación*

Con el objetivo de analizar la capacidad mediadora de las estrategias de autorregulación motivacional en la relación entre el ASP y el rendimiento se llevaron a cabo una serie de análisis de mediación, siguiendo el procedimiento descrito por Hayes (2013). Para analizar la bondad de ajuste de los distintos modelos se consideraron el coeficiente de determinación (r^2), el nivel de significatividad del coeficiente β , el error estándar y los límites superiores e inferiores del intervalo de confianza (95%). Cabe destacar que este intervalo de confianza fue calculado a través de un remuestreo siguiendo el método Bootstrapping con 5.000 vueltas. Los efectos de mediación analizados fueron considerados significativos cuando dicho intervalo no incluía el cero (Preacher et al., 2007).

Con el objetivo de controlar el efecto del sexo y la edad de los/as participantes, así como la presencia de necesidades específicas de apoyo educativo, asistencia a clases particulares, cursos repetidos y el impacto percibido de la pandemia por COVID-19, estas variables fueron introducidas como covariables en cada uno de los modelos analizados.

Los análisis descritos fueron realizados en la versión 27.0 del paquete estadístico IBM SPSS Statistics para Windows (IBM Corp., 2020) y el macro PROCESS (Hayes, 2013).

5. RESULTADOS

Los resultados que se presentan a continuación fueron obtenidos en los estudios realizados para abordar los objetivos específicos 3, 4, 5 y 6, que derivaron en 4 artículos (3 publicados y 1 enviado). En los dos primeros, se reúnen argumentos teóricos y la evidencia empírica disponible en torno a la faceta afectivo-motivacional del AAR. En los otros dos se presentan estudios empíricos en los que se explora de la relación entre el uso de estrategias motivacionales, el apoyo social percibido y el rendimiento, en estudiantes de educación secundaria.

5.1 Artículo 3

Martínez-López, Z., Villar, E., Castro, M. y Tinajero, C. (2021). Self-regulation of academic emotions: recent research and prospective view. *Anales de Psicología*, 37 (3), 529-540. <http://orcid.org/0000-0001-9499-7179>

En este estudio se pretendía indagar en la naturaleza, condicionantes personales y situacionales y posibles implicaciones educativas del uso de las estrategias de autorregulación de las emociones académicas. Cabe destacar, entre sus principales aportaciones, una clasificación y definición integrada de las estrategias descritas en la literatura científica hasta la fecha. Se reunieron datos relativos a su frecuencia de uso y la fluctuación de esta según las emociones manejadas, el tipo de tarea en ejecución y los contenidos abordados. También se encontró evidencia del efecto moderador del sexo, la edad y las creencias motivacionales de los/as estudiantes (metas y valor de la tarea), así como de la asociación del uso de estrategias de autorregulación emocional con el de estrategias cognitivas y metacognitivas y con el ajuste y rendimiento académicos.



Self-regulation of academic emotions: recent research and prospective view

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Título: Autorregulación de las emociones académicas: investigaciones recientes y prospectiva.

Resumen: En el presente trabajo, se ofrece una revisión de la literatura científica sobre la autorregulación de las emociones académicas. Se realizó una búsqueda sistematizada de documentos en las bases de datos Scopus y Web of Science. Se seleccionaron 29 artículos y capítulos de libro, que cumplieran los criterios de elegibilidad previamente establecidos. Se reunieron datos e interpretaciones teóricas que nos han permitido obtener una visión global del estado del conocimiento en torno a los núcleos de interés prioritarios: tipos y frecuencia de uso de las estrategias de autorregulación emocional, condiciones situacionales en las que se aplican, correlatos de su utilización y diferencias individuales moderadoras.

Palabras clave: Aprendizaje autorregulado. Autorregulación afectiva. Estrategias de aprendizaje. Educación secundaria. Universidad.

Abstract: This paper provides a review of the scientific literature on the self-regulation of academic emotions. A systematic search for documents in the Scopus and Web of Science databases was carried out. A total of 29 articles and book chapters which met the previously established eligibility criteria were selected for review. The data and theoretical interpretations considered have enabled us to obtain a global view of the current state of knowledge on the main focuses of interest: types and frequency of use of emotional self-regulation strategies, the situational conditions in which these are applied, correlates of their use and individual differences as moderators.

Keywords: Self-regulated learning. Affective self-regulation. Learning strategies. Secondary education. University.

Introduction

Emotions constitute an essential component of subjective well-being and psychological health (Kemeny & Shestyuk, 2008). In particular, they are considered critical factors in the teaching-learning process (Ben-Eliyahu, 2019b; Burić & Sorić, 2012; Muis et al., 2015). However, in the field of education, scarce attention was given to emotions in theoretical or empirical research until around 1980-1990 (Ben-Eliyahu, 2019b; Op't Eynde et al., 2007). Increasing numbers of researchers have gradually become interested in the impact of different emotions associated with academic activities and the way in which students manage these emotions (Pekrun & Linnenbrink-Garcia, 2014).

The effects of emotions are expected to vary depending on the nature of the emotion (Pekrun & Perry, 2014). In this respect, particular importance is given to the dimensions valence and activation (Yik et al., 2011). The former refers to the extent to which an emotion is experienced as agreeable (positive valence) or disagreeable (negative valence). On the other hand, the activation dimension of emotion determines the state of physiological excitation and distinguishes between activating and deactivating emotions. The so-called circumplex model combines both dimensions in order to establish different categories of emotions, which are assumed to have different effects on motivation, learning strategies and academic achievement (González et al., 2013; Pekrun & Linnenbrink-Garcia, 2014; Pekrun et al., 2002). Positive, activating emotions (e.g. enjoyment) generally favour concentration and motivation, as well as the use of flexible and cre-

ative learning strategies, such as organization and elaboration, all of which will lead to better execution of academic tasks. By contrast, negative, deactivating emotions (e.g. boredom) have an unfavourable effect on motivation and concentration and are associated with the use of superficial learning strategies. The effects of positive deactivating emotions (e.g. relief) and negative activating emotions (e.g. anxiety) are rather more ambiguous (Pekrun & Linnenbrink-Garcia, 2014; Pekrun et al., 2002).

The effects of emotions on learning also vary depending on the component of the learning process and on the situational conditions considered (Pekrun & Linnenbrink-Garcia, 2014). Thus, emotions associated with the academic activity itself can be distinguished from those associated with academic success/failure (Muis et al., 2015). Researchers have also begun to take an interest in epistemic emotions (related to metacognitive experiences associated with the learning process) (Muis et al., 2015). Regarding the learning conditions, we can highlight emotions generated by the social context (Boekaerts & Cascallar, 2006; Burić & Sorić, 2012) and by different subjects (Ben-Eliyahu & Linnenbrink-Garcia, 2013, 2015; Goetz et al., 2006).

As well as findings on the effects of emotions in the academic field being reported, theoretical models that clarify the role of affective dimensions in learning have also been proposed. All of these refer to the self-regulated learning (SRL) construct. SRL is defined as a process in which thoughts, feelings and actions are self-generated and systematically and deliberately aimed at achieving goals (Pintrich, 2000; Zimmerman & Schunk, 1989). More specifically, regulation of emotions is suggested to consist of becoming aware, monitoring, evaluating and modifying the occurrence, intensity and duration of particular emotional experiences that affect the learning process (Wolters, 2003). This exposes the purposeful and guided role of the learner, which determines when and how the strategic resources available for achieving

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personal goals should be applied in carrying out academic tasks (Panadero & Alonso-Tapia, 2004).

One of the most frequently cited models of self-regulation is the dual processing self-regulation model (Boekaerts, 2006). In this model, emotions are considered determinant factors in regard to which of two possible pathways of self-regulation will be selected in learning situations. The first pathway centres on personal well-being and the second on the learning itself. Adoption of one or other of these pathways or changing between them will depend on the appraisals and emotions generated in response to the approach and execution of academic tasks, which indicate to the students whether these are consistent with their needs and goals.

According to the control-value theory (Pekrun, 2006), appraisals associated with self-regulation and the interest or value of the task play an essential role in learning. Favourable appraisals regarding competence will be associated with positive emotions (enjoyment, hope and pride); while unfavourable appraisals will be linked to negative emotions (anger, anxiety, hopelessness and shame). On the other hand, granting an intrinsic value to a task will produce higher levels of enjoyment, while the valence of emotions associated with the extrinsic value will be variable.

The metacognitive and affective model of self-regulated learning (MASRL) (Efklides, 2011) distinguishes two levels of processing. At the macro level, the affective substrate required for carrying out the task is produced and general decisions are made for task processing. The individual acts in response to stable personal characteristics corresponding to metacognitive knowledge and emotional experiences accumulated in prior learning situations. The author of the theory proposed self-esteem and attitude towards the subject as examples of stable affective dimensions that contribute to the student's disposition towards a task. These factors may act explicitly (when the individual is conscious of them) or implicitly. Processing at the micro level occurs during specific tasks and involves prioritizing the information obtained by monitoring execution of the task. This type of processing may involve automatic processes based on task familiarity or analytical processes guided by the explicit information that the individual has about e.g. themselves, the task and the context. Both of the levels of processing described interact with mutual feedback and generate emotions that are manifested during execution of the task, such as e.g. surprise due to an unexpected or discrepant event or curiosity in response to the lack of necessary information. These events will determine motivational willingness and regulation of effort. In general terms, positive affect will increase the perceived relationship between the expectation of success, effort and probable achievement. On the other hand, negative affect may interfere with the attempt to shape the task representation and must be regulated with the aim of persisting in the task execution. On completion of the task, self-reflection on the metacognitive and affective experiences, together with external feedback, will also generate emotions (such as pride

or shame) and attributions that form the basis for posterior processing of other similar tasks.

By adopting a dynamic perspective, more closely focused on the affective component of self-regulated learning, Yeo et al. (2014) suggested interdependence and continuous feedback between the emotions contemplated as characteristics and emotional states. Thus, emotional characteristics will be shaped by distal processes corresponding to the macro level of processing referred to in the MASRL, while the emotional states will correspond to proximal processes analogous to the micro level of processing. In addition to providing a complementary image of the different processes involved in emotional self-regulation (ESR), this model highlights the importance of taking into account the consistency between personal affective characteristics and the transitory emotions that arise under specific academic circumstances, when predicting the effect that emotions have on academic performance; the authors also highlight the level of demand of the specific task as a contextual moderating dimension.

Finally, we will consider the recent study of Ben-Eliyahu (2019b), who details and illustrates, by means of the Academic Emotional Learning cycle (AEL), the role of emotions in the different phases of self-regulated learning differentiated by Pintrich (2004). In the forethought, planning and activation phase, the affective inclination (notion similar to the emotions as characteristics) is activated and the student can establish emotional challenges (e.g. feeling pride). In the monitoring phase, the valence and activation of the emotions experienced are recognised and their adaptation evaluated according to the student's aspirations. The control phase consists of selecting strategies for handling emotions of affective, behavioural, cognitive, somatic or motivational nature. In the fourth and final phase, reaction and reflection, the student evaluates their emotional experiences and motivations, thus contributing to shaping the affective inclination for a later learning episode.

Overall, self-regulation of emotions is of particular importance in light of the richness and complexity of the experiences and affective processes linked to academic activity and their possible effects. Emotions can potentially be regulated in a huge variety of ways, as any factor that affects emotions is theoretically a target for regulation. Determining some underlying order in these strategies therefore remains a great scientific challenge; none of the classifications proposed to date has obtained the necessary theoretical or empirical backing (Koole, 2009). However, diverse ESR strategies have been investigated. The strategies included in the documents reviewed here are included in Table 2 (results section). Research, although incipient, on these forms of ESR, the antecedents and the consequences for academic progress may provide valuable guidance for educational professionals. The present study reviewed and summarised the data and interpretations on this aspect of SRL reported in specialized journals in recent years. The specific objectives of this study were as follows: (1) to analyse the different types of ESR strategies that primary school, secondary school,

technical college and/or university students use and the frequency of use of the strategies; (2) to examine the situational conditions in which these strategies are applied; (3) to explore possible dimensions of individual differences in regard to their use; and (4) to gather information on the correlates of strategies of emotional regulation used by students.

Method

A literature search of the Scopus and Web of Science databases was conducted. The search queries included the term “self regulated learning” followed by the Boolean operator AND and the alternative terms “emotions”, “emotional regulation” and “emotional control”. The search included the period between 2009 and the time when the search was carried out (November 2019).

A total of 240 items were recorded, 138 in the Scopus database and 102 in the Web of Science database; after elimination of duplicates, 171 items remained. A further 10 references, extracted after reading the documents selected (manual search), were added.

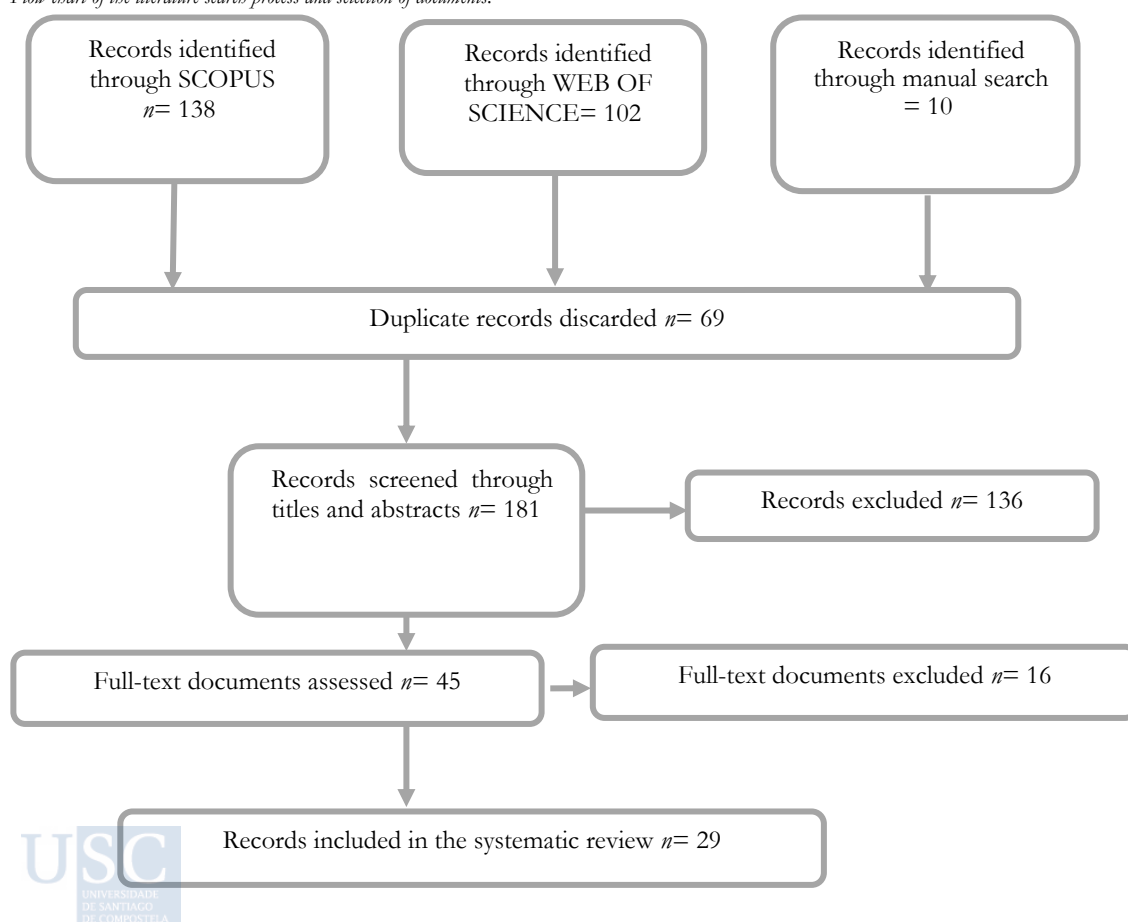
After completion of the search, the documents were ex-

amined and relevant texts were preselected on the basis of different eligibility criteria adjusted to the objectives of the review study.

The inclusion criteria were as follows: the study should involve academic emotional self-regulation; the sample should comprise primary, secondary, college and/or university students; and the language of publication should be Spanish, English, French or Portuguese. Studies focusing on the following aspects/types of sample were excluded: emotional intelligence; remote teaching methods; subjects not included in study plans (extracurricular activities) or external activities; students with mental disorders, disabilities, physical illnesses or high abilities; and students of ages that do not correspond to the study level. The documents were screened by reading the titles and abstracts and the most relevant were preselected. A total of 45 documents were read in full, with the aim of finally discarding or selecting them.

After critical reading of the preselected articles, 16 were discarded. The selection process finally identified a total of 29 documents for inclusion in the qualitative summary (15 empirical, 13 theoretical and 1 meta-analysis). The procedure used is summarised in a flow chart (Figure 1).

Figure 1.
Flow chart of the literature search process and selection of documents.



During the final phase, critical reading stage, the documents were examined by considering conceptual details, historical background, theoretical basis and methods, among other aspects. In addition, the data were extracted from the empirical studies considered. For this purpose, a summary table including the following criteria was constructed: author/s, sample (number of participants, age range, character-

istics etc.), dimensions of interest and evaluation instruments and results (applied statistical tests and data obtained) (see Table 1). The results of a meta-analysis by Panadero et al. (2017) are included in the results section of the present review. The inputs from theoretically-based documents selected are included in the introduction and discussion sections.

Table 1.
Summary of the empirical studies selected in the literature search.

Authors	Sample	Instruments	Results
Järvenoja & Järvelä (2009)	63 first-year university students (mean age=23 years; 44 women) in Finland.	<i>Adaptive instrument for regulation of emotions (AIRE).</i>	<ul style="list-style-type: none"> - Equal use of ESR strategies in different challenges and tasks. - Greater use of self-regulation and shared regulation strategies than regulation of others.
De Corte et al. (2011)	393 secondary school students (14 and 16 years) following different educational routes (general, technical and vocational) in Belgium.	COPE questionnaire, for academic situation of exams, homework and difficult lessons in mathematics. Ad hoc question: degree of familiarity with the proposed academic situations. Grade obtained in most recent mathematics exam.	<ul style="list-style-type: none"> - Most frequently used strategies: active coping, jokes and acceptance (avoidance), less frequent strategies: religious worship and alcohol and drug use (avoidance). - Equal use of ESR strategies in all three academic situations. - Greater use of avoidance strategies in students who consider the academic situations evaluated as normal. - Greater use of less active strategies in students on vocational courses. - Greater use of socio-emotional support seeking and religious worship (avoidance). Greater use of jokes, acceptance and drug and alcohol use (avoidance) in older students. - Greater use of support seeking in girls. - Use of ESR strategies does not vary in relation to grades obtained.
Burić & Sorić (2012)	365 secondary school students (mean age=16 years; 235 women) in Croatia.	<i>Academic volitional strategy inventory-AVSI.</i> <i>Components of Self-regulated learning questionnaire-CSRL.</i> <i>Perceived academic control scale-PACS.</i> <i>Academic emotions questionnaire-mathematics-AEQ.</i> Average grade in mathematics.	<ul style="list-style-type: none"> - Positive self-consequating + self-efficacy enhancement positively predict experiencing hope as an emotion and academic achievement. - Positive self-consequating + self-efficacy enhancement negatively predict experiencing desperation as an emotion and academic achievement. - Negative self-consequating negatively predicts experiencing hope as an emotion and academic achievement. - Negative self-consequating positively predicts experiencing desperation as an emotion and academic achievement.
Fried & Chapman (2012)	212 secondary school students (11 and 15 years; 112 girls) in Australia.	<i>Regulation strategies questionnaire-RSQ.</i> <i>Individual Protective Factors Index-IPFI.</i> Teacher's evaluation of student's academic and social involvement.	<ul style="list-style-type: none"> - Protective strategies and self-talk positively predict personal and social competence and social bonding. - Stress release strategies negatively predict social bonding and academic and social involvement.
Ben-Eliyahu & Linnenbrink-García (2013)	250 university students (mean age=18.99 years; 60% women) in the USA.	<i>Emotion regulation questionnaire-ERQ.</i> <i>Daily emotion report positive and negative affect schedule-PANAS.</i>	<ul style="list-style-type: none"> - More positive emotions and greater use of suppression and re-evaluation for favourite subjects. - More negative emotions and rumination, particularly in girls, for least favourite subjects. - Higher scores for suppression in girls. - Re-evaluation positively predicts positive emotions (activating and deactivating), both for favourite and least favourite subjects (with a greater effect for least favourite subjects). - Re-evaluation negatively predicts negative emotions (activating and deactivating), only for favourite subjects. - Suppression negatively predicts activating positive emotions (for favourite subjects) and positively predicts deactivating positive emotions (least favourite subjects).
Tze et al. (2013)	151 university students (mean age=23.29 years; 118 women) in	<i>Boredom Coping Scale.</i> <i>Achievement Emotions Questionnaire-AEQ.</i>	<ul style="list-style-type: none"> - Five groups of university students were established: Canadian reevaluators (cognitive approach) and criticizers (behavioural approach and

Authors	Sample	Instruments	Results
	Canada and 254 (mean age=21.03 years; 218 women) in China.	<i>Academic Motivation Scale-AMS</i> . <i>Self-efficacy for self-regulated learning</i> . Final grades obtained.	avoidance) and Chinese infrequent copers (behavioural and cognitive approaches), reformers (cognitive approach and avoidance and behavioural approach) and evaders (cognitive and behavioural avoidance). - Greater intrinsic motivation in criticizers than in reevaluators. - Greater motivation in reformers than in evaders and less boredom in infrequent copers than in evaders. - The use of self-regulation strategies did not vary in relation to self-efficacy or achievement.
Ben-Eliyahu & Linnenbrink-García (2015)	280 university students (mean age=19.49 years; 46% women) and 178 secondary school students (mean age=15.88 years; 64% women) in the USA.	<i>Emotion Regulation Questionnaire-ERQ</i> . Ad hoc question: behavioural and cognitive regulation. <i>Motivated Strategies for Learning Questionnaire-MSLQ</i> . Ad hoc question: behavioural academic involvement.	- Greater reappraisal in secondary school students and for favourite subjects. - Greater suppression in university students for least favourite subjects. - In secondary school students, reappraisal positively predicts deeper learning strategies in favourite and least favourite subjects and suppression negatively predicts deeper learning. - In university students, suppression negatively predicts organization of materials and involvement in favourite subjects.
Kalenda (2015)	112 university students (21 and 25 years; 43 men) in the Czech Republic.	Semi-structured interviews in 16 focal groups: seven facets of self-regulated learning, including management of emotions.	- Academic success is associated with dealing with negative emotions. - Four types of strategies for dealing with academic emotions were considered: support seeking, self-efficacy enhancement, reappraisal and self-consequating. - Support seeking and self-efficacy enhancement are related to exam situations. - Reappraisal is related to exam preparation. - Self-consequating is related to study.
Panadero et al. (2015)	103 university students (mean age=24.2 years; 84.5% women) in Finland.	<i>Academic Emotion-Regulation Strategies-AERS</i> . <i>Computer Supported Collaborative learning-CSCL</i> (6 items).	Individual scores for self-regulation of academic emotions predict group regulation of objectives and potential challenges.
Webster & Hadwin (2015)	111 university students (mean age=19.5 years; 72 women) in Canada	<i>Personal Planning Tool</i> .	- Task management was the most frequently reported strategy, and environmental management, the least reported strategy. - Use of different ESR strategies greater than stable use of specific strategies. - Negative emotions negatively predict self-regulatory self-efficacy. Positive emotions have the opposite, but more marked, effect.
Teng & Zhang (2016)	Study 1: 359 university students (mean age=19.78 years; 43% women) in China. Study 2: 373 university students (mean age=19.89 years; 42% women) in China.	<i>Writing Strategies for Motivational Regulation Questionnaire-WSMRQ</i> .	Study 1 - Five factors considered, including emotional control. Study 2 - Emotional control was correlated with the other affective-motivational self-regulation strategies.
Ben-Eliyahu (2017)	277 university students (mean age=19.49 years; 46% women) and 178 secondary school students (mean age=15.88; 64% women) in the USA.	Unspecified test: re-evaluation, rumination and suppression strategies. Ad hoc question: self-report of high capacity.	- Equal use of ESR strategies in talented and ordinary students. - Use of ESR strategies does not vary in relation to sex.
Tzohar-Rozen & Kramarski (2017)	170 5th year primary school pupils (53 control, 63 given metacognition training and 54 given metacognition training) in Israel.	Protocol of registering the process of resolving a problem expressed out loud. Academic performance of mathematical tasks.	Higher achievement in trained groups than in the control group. - Constancy of use consistent with the learned self-regulation processes.
Ben-Eliyahu	Study 1: 188 university	Study 1: <i>Emotion Regulation</i>	Study 1:

Authors	Sample	Instruments	Results
(2019b)	students (70% high capacity, 46% men). Study 2: 271 university students (69% high capacity, 48% men).	<i>Questionnaire-ERQ</i> . Ad hoc question: behavioural regulation. Study 2: <i>Emotion Regulation Questionnaire-ERQ</i> . <i>Patterns of Adaptive Learning Scales-PALS</i> .	- 3 groups of talented students were established: highly regulated (cognitively and behaviourally), behaviourally regulated and unregulated. - Equal use of SRL strategies in talented and ordinary university students. Study 2: - In talented students, orientation of the approach to achievement negatively predicted suppression; orientation of avoidance positively predicted suppression; orientation of dominance positively predicted reappraisal (in favourite subjects). In ordinary students, orientation of avoidance positively predicted suppression (in favourite and least favourite subjects).
Stiller et al. (2019)	61 university students (mean age = 24.3 years; 45 women) distributed in three groups (control given training in SRL; re-evaluation and suppression) in Germany.	Ad hoc question: difficulty and success in following the steps of SRL training Ad hoc scale: emotional experience (16 emotions). Ad hoc visual item: availability of self-control resources. Heart rate and electrodermal activity monitoring.	- Greater self-perceived efficacy in inducing self-regulation in the suppression group than in the reappraisal group. Higher electrodermal activity in the reappraisal group than in the controls. Greater availability of self control resources in the reappraisal group than in the expressive suppression group. - SLR-induced increase in positive emotions positively predicted perceived self-control resources, independently of the type of strategy learned (reappraisal or suppression). - Increase in negative emotions negatively associated with a decrease in self-control resources. In response to intense negative emotions, the decrease is lower in the reappraisal group than in the suppression group.

Results

The results reported in the studies reviewed here are summarised in the following sections, ordered by topics related to the observed four main fields of interest: types and of frequency of use of ESR strategies; situational conditions of use; individual differences; and correlates.

Types and frequency of use of emotional self-regulation strategies

The data provided in the articles reviewed provide a tentative idea of the types of strategies that students use to manage their academic emotions (see description in Table 2).

The findings of a study by Webster and Hadwin (2015) are particularly illustrative in this respect. In this study, the participants (university students) were asked to identify the emotions they experienced while carrying out academic tasks for which they had previously established personal goals. They were asked to select the emotions from a list including both agreeable (relief, hope, pride and enjoyment) and disagreeable (anger, desperation and shame) emotions and then to describe how they managed these emotions. Among the nine strategies identified, behavioural strategies were the most commonly mentioned, followed by cognitive approaches and self-consequating, while stress release and environmental management were the least frequent strategies.

Table 2.

Self-regulation strategies evaluated and examples of items, statements and questions used in the studies reviewed.

Reappraisal ^{1,2} (cognitive change³, experience with a successful learning cycle⁴): reinterpreting potentially emotional situations.

"When I want to feel more positive emotion, I change the way I'm thinking about the situation."¹

"Re-appraising the situation to increase positive emotions"²

What did you try to do to change that feeling? "...Altering one's thinking or perceptions related to the task ... made me force myself to think realistically about my schoolwork"³

How do students regulate their emotions? "...It's one small step for a seminar paper, but a giant leap for the entire study"⁴

Support seeking^{2,3} (...for instrumental reasons⁵, ...for emotional reasons⁵, support group⁴, expressing emotions²): turning to other people in search of instrumental or emotional help.

What did you try to do to change that feeling? "...I tried to get help from my peers and my lab instructor"³

"Asking for social support (peers, teachers, parents) when I have negative emotions"²

"I ask people who have had similar experiences what they did."⁵

"I talk to someone about how I feel."⁵

How students regulate their emotions? "...using close friends to share negative emotions"⁴

"Expressing my emotions so that anyone can notice how I feel when I have positive emotions"²

<p>Self-consequating³ (inner speech⁴, projection⁶, stress-reduction⁷, negative-based incentives⁷): generating thoughts about the consequences of completing or not completing the task, or self-administering rewards.</p> <p>What did you try to do to change that feeling? "...try to think about how proud I would be if I could achieve my goal"³</p> <p>How do students regulate their emotions? "...saying to my parents: Sorry, mom, I know it costed you hundreds"⁴</p> <p>"I think about how I will feel when I have completed the task"⁶</p> <p>"I promise myself something I want when I complete a specific amount of studying..."⁷</p> <p>"I think how disappointed others (family/friends) will be if I do poorly."⁷</p>
<p>Cognitive approach⁸ (Active coping⁵, task focus³, task enactment³): concentrating on the task instead of the on the problematic emotion.</p> <p>"I try to pay attention to the lesson more"⁸</p> <p>"I concentrate my efforts on doing something about the problem"⁵</p> <p>What did you try to do to change that feeling? "...I tried to ignore it and just get on with my work"³</p> <p>What did you try to do to change that feeling? "...I tried to brainstorm personal...emotions that I could relate to the image I was responding to..."³</p>
<p>Avoidance³ (Mental disengagement⁵, cognitive-avoidance⁸, behavioural-avoidance⁶): avoiding the task or a specific part of it affecting the emotional experience.</p> <p>What did you try to do to change that feeling? "...I changed the subject I was studying"³</p> <p>"I daydream about things other than this."⁵</p> <p>"I think about my homework or something I have to study"⁸</p> <p>"I talk to the person sitting next to me"⁸</p>
<p>Suppression^{1,2}: intentionally avoiding expression of the emotions experienced.</p> <p>"I keep my emotions to myself".¹</p> <p>"Suppressing or hiding my emotions when I have positive emotions"²</p>
<p>Self-efficacy enhancement⁷ (enhancing competence³, self-talk⁶): encouraging oneself by thinking about ones own strengths and skills.</p> <p>"I remind myself that I usually do fine in exams and/or other assignments when I stick to my schedule"⁷</p> <p>What did you try to do to change that feeling? "...I overcame the anger by trying to learn from each question so as to avoid future mistakes"³</p> <p>"I tell myself 'You can do it!'"⁶</p>
<p>Behavioral-approach⁸ (task/goal management³): directly facing up to the stressful situation by dealing with some aspect of the task or academic approach.</p> <p>"I ask my instructor for more interesting tasks"⁸</p> <p>What did you try to do to change that feeling? "...spread out my studying into smaller chunks over the week rather than a long study period"³</p>
<p>Stress release⁶ (relaxation⁴, response modulation³): directly affecting an emotion by deep breathing.</p> <p>"...including deep breathing and counting to ten are included"⁶</p> <p>How do students regulate their emotions? "...including a wide range of activities from yoga and relaxation exercise to sports"⁴</p> <p>What did you try to do to change that feeling? "...I attempted to calm myself by taking a deep breath and literally telling myself to calm down"³</p>
<p>Environmental management³: changing the surrounding environment.</p> <p>What did you try to do to change that feeling? "...closed the door and tried to ignore what was going on outside"³</p>
<p>Denying²: negating or ignoring a disturbing emotion.</p> <p>"Denying or ignoring my negative emotions or what may trigger them working in a group"²</p>
<p>Rumination¹: generating reiterative thoughts in response to disagreeable affective states.</p> <p>"Why do I always react this way?" about tasks in my (least) favourite class"¹</p>
<p><i>Notes:</i>¹ Ben-Eliyahu (2017), Ben-Eliyahu & Linnenbrink-García (2013, 2015); ² Panadero et al. (2015); ³ Webster & Hadwin (2015); ⁴ Kalenda (2015); ⁵ De Corte et al. (2011); ⁶ Fried & Chapman (2012); ⁷ Burić & Sorić (2012); ⁸ Tze, et al. (2013)</p>

Tze et al. (2013) differentiated different groups of students attending universities in Canada and China according to their use of cognitive-approach and cognitive-avoidance strategies and behavioural-approach and behavioural-avoidance strategies, specifically in relation to dealing with boredom. In the Canadian sample, most students were categorized as *reappraisers* (85% of the sample), who mainly used a cognitive approach to cope with the emotion cited, in contrast to a second group of *criticizers* (13%), who preferentially endorsed a behavioural approach. In the Chinese sample, most of the students were classified as *evaders* (65%), who prioritized the use of cognitive and behavioural avoidance, while the others were classified as *infrequent copers* (11%) (who

used cognitive and behavioural approaches) and *reformers* (low level of behavioural avoidance) (24%).

Situational conditions and emotional self-regulation

The use of emotional regulation strategies may vary depending on the situational conditions, as explored in some of the studies considered in the present review. More specifically, we have collected data corresponding to the following conditions: collaborative learning, favourite and least favourite subjects and academic tasks. Thus, Järvenoja and Järvelä (2009) explored the strategies used by university students in collaborative learning situations in response to different tasks and problems of a social nature. They tested the extent

to which the students resorted to self-regulation, in comparison with regulation of their classmates' emotions and with mutual regulation. According to the participants, the frequency of use of these strategic approaches did not vary according to the tasks or difficulties faced; in general, the participants tended to prioritize self-regulation and mutual regulation over regulation of others.

In a later study, also involving collaborative learning in university students, Panadero et al. (2015) found that the individual scores for ESR (frequency of use of reappraisal, seeking support, negation and suppression) predicted mutual regulation of objectives and potential challenges.

Ben-Eliyahu Linnenbrink-García (2013, 2015) considered whether the ESR strategies used by secondary school and university students varied depending on the subject considered (favourite and least favourite subjects). They found that in particular reappraisal strategies may be more frequently used for favourite subjects than for least favourite subjects, while the opposite occurred with suppression and rumination.

Adopting a focus even closer to the learning process, Kalenda (2015) asked third year university students about the ESR strategies associated with different academic activities (ordinary study, exam preparation and sitting exams). According to the replies received, the students tended to manage the emotions aroused by ordinary study by self-consequating. In response to emotions experienced during exam preparation, the students preferentially used reappraisal, and in exam situations they mainly opted for support seeking and stress release.

Finally, Webster and Hadwin (2015) focused on the emotional experiences that students have to deal with; they asked the study participants (university students) to evaluate the intensity of certain emotions and to identify those which particularly interfered in the execution of academic tasks (reading, homework, study, etc.). The mean intensity was higher for positive emotions than for negative emotions, although the scores given to anxiety and boredom were very similar to those given to enjoyment (the agreeable emotion least frequently experienced). These negative emotions were recognised as a great hindrance to academic work, and a behavioural approach was preferred for coping with both. Cognitive coping strategies were predominantly used to deal with the emotions identified (e.g. desperation), followed by behavioural approach and self-consequating.

Individual dimensions and emotional self-regulation

The following different individual dimensions that may affect how students deal with academic emotions were examined: sex, age/educational level, perceived frequency of difficult academic tasks, talent and goal orientation. In regard to sex differences, in a study involving secondary school students, De Corte et al. (2011) demonstrated that girls tended to seek support more frequently than boys. The boys, by contrast, tended to suppress emotions more often than the

girls, as Ben-Eliyahu and Linnenbrink-Garcia (2013) also initially observed in university students. However, in a later study, Ben-Eliyahu (2017) did not observe any sex-related differences in the use of suppression, or reappraisal and rumination. As the sample examined in the later study comprised both secondary school and university students, it is possible that the modulating effect of sex varies with age. In fact, age/educational level appears to moderate ESR. The findings reported by De Corte et al. (2011) indicate that the students tended to apply avoidance strategies more frequently as they progressed to higher levels of secondary education, while seeking support became less frequent. However, the latter type of strategy increased again during the first year at university (Webster & Hadwin, 2015). On the other hand, secondary school students resorted to reappraisal more frequently than university students (Ben-Eliyahu & Linnenbrink-Garcia, 2015).

In the previously mentioned study involving secondary school students and mathematics, De Corte et al. (2011) analysed the ESR strategies that the students used during activities that they considered difficult (exams, homework, classes). The students who perceived these types of activities as frequent showed a greater tendency than their classmates to use avoidance and resorted significantly less often to using cognitive approaches. Interestingly, no differences were observed in relation to seeking support. The same study also showed that students who had chosen vocational training used cognitive approaches significantly less often than their classmates.

Finally, Ben-Eliyahu, (2017, 2019a) explored differences in regard to strategies of reappraisal, rumination and suppression among students previously identified as talented and their ordinary classmates and did not observe any significant differences. However, when they classified the students according to their motivational goals (directed at achievement, mastery or avoidance) they found that among the ordinary students, goal avoidance positively predicted the use of suppression. The same effect was observed in the talented students, although only for favourite subjects. For these subjects, the researchers observed a positive effect of mastery goal orientation on reappraisal and a negative effect of avoidance orientation on suppression (Ben-Eliyahu, 2019b).

Correlates of emotional self-regulation

Regarding the correlates explored in the studies reviewed, the relationships between ESR and self-evaluation of achievement, motivational self-regulation, emotions, motivation, self-efficacy and academic adjustment and performance have been investigated. We will begin by highlighting the meta-analysis carried out by Panadero et al. (2017) on the relationship between self-evaluation of performance in learning tasks and the self-regulation of negative academic emotions. The data obtained in the study, which involved primary and secondary school and university students, indicate that self-evaluation negatively predicts ESR.

In a previous study involving a sample of university students Teng and Zhang (2016) found that the use of emotional control strategies was significantly correlated with other affective-motivational self-regulation strategies (such as self-talk centred on academic goals or management of the study environment).

The association between self-regulation and emotional experiences themselves varies depending on the type of strategy considered. Reappraisal positively predicts a wide range of positive academic emotions (e.g. enjoyment and enthusiasm) and is negatively associated with negative emotions (e.g. disgust and anger), at least in university students (Ben-Eliyahu & Linnenbrink-Garcia, 2013). The opposite occurs with suppression, a strategy that negatively predicts positive emotions and positively predicts negative emotions (Ben-Eliyahu & Linnenbrink-Garcia, 2013).

In secondary school students, different effects of self-consequating have been observed depending on whether positive or negative events are anticipated. Thinking about negative consequences positively predicts desperation, while thinking about positive consequences, together with improvement in self-sufficiency, positively predicts hope (Burić & Sorić, 2012).

Data suggesting an association between ESR and academic motivation have also been reported. Specifically, in the previously described study by Tze et al. (2013), the Canadian university students characterized by using behavioural approaches and avoidance (criticizers) scored significantly higher for intrinsic motivation than re-evaluators (who preferentially used cognitive approaches). In the sample of Chinese students included in the same study, the reformers (cognitive approach and avoidance and behavioural approach) displayed greater motivation than their classmates classified as evaders (cognitive and behavioural avoidance) or infrequent copers (cognitive and behavioural approaches).

In addition, in the study with secondary school students, Burić and Sorić (2012), found that self-efficacy enhancement, together with positive self-consequating, predicted appraisal of control and task value, unlike what was observed in students who negative self-consequating, which negatively predicted the aforementioned motivational dimensions.

The effects of applying ESR strategies on other facets of SRL may be particularly important. This was suggested by Ben-Eliyahu and Linnenbrink-Garcia (2015), who found that reappraisal was positively associated with the use of cognitive strategies involving elaboration and organization in secondary school students, while suppression was negatively associated with the same. Similarly, the findings reported by Stiller et al. (2019) for university students distributed in two groups (trained in reappraisal and suppression strategies) and a control group. The students trained in reappraisal strategies perceived themselves as having greater self-control resources than perceived by the group trained in suppression.

Finally, some studies have been carried out to investigate the relationship between ESR and different indicators of student adjustment. Thus, it has been shown that strategies

of handling consequences and improvement of self-sufficiency positively predict personal and social competence and social links in secondary school students, while stress release strategies negatively predict social bonding and academic and social involvement (Fried & Chapman, 2012).

The relationship between ESR and academic achievement has also been explored. More specifically, positive self-consequating may have a positive effect on grades obtained in mathematics in secondary education, in contrast to when students think about negative consequences (Burić & Sorić, 2012). It has also been shown that training in emotional regulation strategies leads to improvement of achievements in mathematics in primary education (Tzohar-Rozen & Kravarski, 2017).

Discussion

The present review study aimed to obtain an idea of the most recent theoretical elaborations and data available regarding the emotional facet of SRL, an emerging, increasingly popular, field of research. The specific aims of the review were to analyse the type of strategies that students use to regulate academic emotions and to determine the personal and situational conditions that modulate the application of these strategies. The repercussions of ESR on learning were also of interest. The lack of an established integrated classification of the strategies (Koole, 2009) does not appear to have discouraged such studies; indeed, in the present review study, we have identified data on a total of eleven different types of strategies. Those that have aroused greatest interest among researchers are reappraisal and seeking support, which may be due to the connections between studies on emotional regulation and those concerning coping styles and skills (Pekrun & Stephens, 2009). However, the ESR strategies most commonly used by students, at least at university level, appear to be cognitive and behavioural approaches and self-consequating, as reappraisal and seeking support occupy an intermediate position in regard to frequency of use (Webster & Hadwin, 2015). However, the findings of the comparative study of Tze et al. (2013) indicate that the strategies that students tend to use vary between different cultures. In the absence of further research, we can assume that the diversity and frequency of use of SRL strategies will be facilitated or hampered by the action of agents of socialization, which will provide the necessary support and framework for the development of self-regulation (Ben-Eliyahu & Bernacki, 2015).

On the other hand, in consonance with the flexible nature of SRL, the data examined indicate that the same ESR strategies are used for different ends and under different conditions and that different strategies can be used for the same aim or under the same conditions. However, how students deal with negative emotions has attracted particular attention from researchers, coinciding with the concerns of the students, who recognise that negative emotional experiences strongly interfere with learning (Webster & Hadwin,

2015) and associate emotional self-regulation with highly demanding situations that will probably generate these emotions (e.g. undertaking exams, difficult tasks) (De Corte et al., 2011; Kalenda, 2015). In these situations, the strategies most commonly used, at least by secondary school students, are cognitive approach, reappraisal and seeking support (De Corte et al., 2011; Kalenda, 2015). On the other hand, in university students, anxiety and boredom are highlighted for their intensity; both are usually dealt with by behavioural approaches (Webster & Hadwin, 2015).

The trends in strategies described may be moderated by different dimensions of individual differences. More specifically, the use of some strategies may increase with age, such as e.g. the use of avoidance strategies (De Corte et al., 2011), or they may decrease, as occurs with reappraisal (Ben-Eliyahu & Linnenbrink-Garcia, 2015) and self-consequating (Webster & Hadwin, 2015). However, seeking support becomes less common throughout secondary education (De Corte et al., 2011) but may increase again during the transition to university (Webster & Hadwin, 2015). The gradual acquisition of self-regulation skills throughout individual development and educational transitions that individuals face (e.g. incorporation into secondary education and university) may both account for the variations in use of the different types of strategies.

Differences between the sexes have also been observed in regard to seeking support (De Corte et al., 2011). Female students use this strategy more often than their male classmates, in accordance with the general trends observed in men and women regarding seeking support in diverse situations, which may or may not involve academic demands. These have been attributed to different types of experiences related to socialization, determined in relation to sex; in general, women are encouraged to share their feelings and confide in others regarding personal problems, while these types of behaviour are generally not considered appropriate in men (Tinajero et al., 2015).

Regarding the possible proximal antecedents of ESR strategies, according to the interpretation of Panadero et al. (2017) of the results of their own study, use of reappraisal may increase awareness of the objectives of the learning tasks and their execution. This effect will contribute, in turn, to diminishing negative academic emotions, thus decreasing the need for students to regulate this type of emotion. Given that ESR strategies are correlated with other motivational self-regulation strategies (Teng & Zhang, 2016), we can expect that some type of intervention, such as that suggested by Panadero et al. (2017), will generally be beneficial for affective-motivational self-regulation in learning situations.

We have not collected data in the present review regarding the efficacy of the different types of self-regulation of academic emotions, except for those reported by Ben-Eliyahu and Linnenbrink-Garcia (2013) in a study with university students. In the cited study, reappraisal was found to positively predict a wide range of positive emotions (both activating and deactivating) in favourite and least favourite sub-

jects. By contrast, the silencing effect of this type of strategy on negative emotions (activating and deactivating) was only manifested in regard to favourite subjects. These results encourage a more detailed examination of the nature and diversity of emotional self-regulation strategies in general and of reappraisal in particular.

In agreement with the arguments posed by Pekrun and colleagues (Pekrun et al., 2002; Pekrun & Perry, 2014), the effects of emotions on learning vary depending on the dimensions valence and activation. The most effective type of emotional self-regulation will therefore be the one that addresses different types of emotions. The data reported by Burić and Sorić (2012) indicate, as expected, that self-regulation of hope (considered an activating positive emotion), specifically by strategies involving self-consequating and self-efficacy enhancement, will have favourable effects on the value attributed to the task, the perceived control and academic performance in secondary school students. The opposite effects will be obtained for dealing with hopelessness (a deactivating negative emotion) by using the same strategies.

Independently of the target emotion, favourable or unfavourable effects of some strategies can be expected. In this respect, judging by the data reported by Tze et al. (2013), both cognitive and behavioural approaches will favour intrinsic motivation. By contrast, releasing stress may negatively affect social competence and bonding and academic and social involvement (Fried & Chapman, 2012). Finally, the results of the reviewed studies addressing the learning process itself suggest that emotional self-regulation may affect the development/manifestation of self-regulated learning skills overall (Ben-Eliyahu & Linnenbrink-Garcia, 2015; Stiller et al., 2019). Further studies are required to clarify the processes involved in these effects. The theoretical models developed to date regarding the role of affective dimensions in learning represent a valuable source of inspiration.

Conclusions

In summary, although research on emotional self-regulation (ESR) is scarce to date, the present review study enabled us to discern the main focuses of research interest, to compile preliminary data and identify aspects that require further attention. In particular, we identified a lack of studies on the efficacy of different ESR strategies and the effects on learning. In this respect, exploring the strategies that students most frequently use is a priority research line. Other possible lines of research involve the self-regulation of positive academic emotions and the dimensions that determine individual differences relative to the use of ESR strategies in general. Finally, some of the findings indicate the need to explore ESR in collaborative learning situations, widening the focus from individual self-regulation to co-regulation and shared regulation. The heuristic value of recent ESR models will very probably drive future research on the above-mentioned aspects.

The summary provided in this paper should be considered with caution until further relevant research is conducted. The general approach used was determined by the scarce studies available. In future review studies, a finer focus may

be able to be placed on some of the aspects of interest identified, and the meta-analysis of a group of studies should enable more precise estimates of the effects of different ESR strategies.

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5.2 Artículo 4

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La regulación de la motivación académica se considera una faceta nuclear del AAR, en la medida que se asume que la motivación es un prerequisite para la implicación, esfuerzo y persistencia en las tareas académicas. La investigación sobre esta faceta se ha venido incrementando paulatinamente en los últimos años, dando pie a la elaboración de modelos teóricos específicos y la obtención de datos relativos a sus manifestaciones en forma de destrezas de autorregulación. El estudio expuesto en el artículo proporciona un compendio de las diferentes estrategias que los/as estudiantes utilizan para regular su motivación académica. Se describen sus características y los distintos criterios que se han propuesto para su clasificación. Por otro lado, se reúne la evidencia disponible sobre la frecuencia de uso y eficiencia de las estrategias, lo que puede servir de base a los/as educadores para anticiparse y adaptarse al estatus de las distintas facetas motivacionales de los/as estudiantes.

Partiendo de los modelos teóricos más recientes sobre la autorregulación de la motivación académica, se exploran las interconexiones entre el uso de las estrategias y sus supuestos antecedentes. También se reúnen y discuten los datos disponibles acerca de la asociación del uso de estrategias motivacionales con distintas manifestaciones del progreso académico: uso de estrategias cognitivas y metacognitivas de aprendizaje, esfuerzo, procrastinación, rendimiento académico y abandono escolar. Se proporciona así, un marco interpretativo en el que fundamentar la valoración de la compatibilidad de prácticas instruccionales destinadas a

promover el AAR, así como la adaptación de la enseñanza en función de la diversidad discente con relación al uso de estrategias de aprendizaje.



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What are the principal and most effective strategies for motivational self-regulation? A systematic review and meta-analyses[☆]

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A B S T R A C T

The regulation of motivation is considered a key aspect of self-regulated learning (SRL) as it is presumed that maintaining an adequate level of motivation is essential for engagement, effort and persistence in academic tasks. In this review, we aimed to improve our understanding of motivational regulation strategies, their supposed antecedents and the educational implications. A search was conducted in Web of Science, Scopus, PsycInfo, and ERIC databases. Of 4027 records identified, 64 (75 studies) were deemed eligible after inclusion and exclusion criteria were applied and studies with low methodological quality were discarded. Data on 18 different motivational regulation strategies were available. Extrinsic/controlling types of strategies were reported to be used more frequently than intrinsic/autonomous strategies. Motivational regulation strategies were significantly associated with metamotivational beliefs, academic skills and adjustment. Available evidence supports assumptions of theoretical models on antecedents and academic implications of motivational self-regulation. *Educational impact and implications statement:* The present study provides a compendium of the different motivational self-regulation strategies studied to date, describes the nature of these and unifies the different denominations used. The available evidence on the frequency of use of the different strategies that has been collected may be useful for educators, enabling them to anticipate and adapt to the status of the different motivational facets in students. Drawing on theoretical models of motivational self-regulation, the interconnections between the use of the strategies and their supposed antecedents and the expected educational implications were explored. This will provide researchers and educators with an interpretive framework to draw upon when adapting to interindividual diversity in strategy use and when assessing the compatibility between educational practices and the efficient use and training of motivational strategies.

1. Introduction

Learners can both regulate their cognition and manage their motivation. In fact, regulation of motivation is nowadays considered a key aspect of self-regulated learning (SRL) as it is presumed that maintaining an adequate level of motivation is essential for engagement, effort and persistence in academic tasks (Wolters, 2011; Zimmerman & Schunk, 2012). Self-regulation of motivation is conceived as monitoring one's level or state of motivation and implementing measures aimed at activating, maintaining or increasing one's own motivation, including dealing with motivational challenges and setbacks (Grunschel et al., 2016; Wolters, 2003).

The number of studies examining this area of SRL has been increasing in recent years, and theoretical models focused on motivational regulation have been proposed. Thus, in her Dual Processing Model (see Fig. 1), Boekaerts (2006) considers two alternative processing paths, which correspond to the preponderance of one or other type of the principal motives of the student when confronted with a learning task.

The aspiration to expand personal knowledge and skills establishes the basis for a mastery mode and entails activation of cognitive and metacognitive learning strategies. On the other hand, the desire to preserve well-being and thus prevent any possible loss, damage or distortion of this state gives rise to a coping path, which involves

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activating self-defence strategies that may actually hamper learning. The balance between these paths depends on the appraisal based on an internal model of the learning situation (working model, WM), conformed according to three sources of information: (1) perception of the characteristics of the task in question (demands and conditions in which it is presented); (2) the domain knowledge and cognitive and meta- cognitive strategies activated by the task, and (3) motivational beliefs held in relation to the task. Perceived congruence between the value attributed to and the resources available for conducting the task will direct the student towards the mastery path. On the other hand, appreciation of incongruencies, which may threaten personal well-being, will direct the individual towards the coping path. The individual's actions linked to a task may be initiated by either of these routes and then vary depending on successive appraisals of the task being undertaken.

Considering assumptions of more recent models on self-regulated motivation, the coping mode may appear to correspond to a deficient motivational drive for the execution of the task at hand. In this context, the Motivational Regulation Model presented by Schwinger and Stiensmeier-Pelster (2012) directs our attention towards the role of

awareness of motivational deficit when facing an academic task (see Fig. 2).

Perception of low motivation gives rise to a search for the possible reasons for this state (e.g. low expectancy of success), which may be situational (transitory) or fundamental (stable). Taking these aspects into account, the student will select suitable motivational regulation strategies (MRSs), i.e. procedures used to initiate, maintain or increase their own motivation in order to accomplish their goals (Wolters, 2003). Contextual (e.g. school subject or domain and school/home setting) and individual factors (e.g. motivational beliefs -motivational dispositions in Fig. 2- or prior declarative and procedural knowledge) are considered in the model as potential moderators of the frequency and effectiveness of use of different types of MRSs. Thus, for example, personal disinterest in a task may be addressed by interest-enhancing strategies. Motivational self-regulation is assumed to determine the effectiveness of cognitive and metacognitive learning strategies and ultimately promote effort and persistence.

More recently, Miele and Scholer (2016, 2018) posited the Meta-motivational Model of Motivation Regulation in which they delimited self-efficacy and subjective task value (interest or potential outcome) as

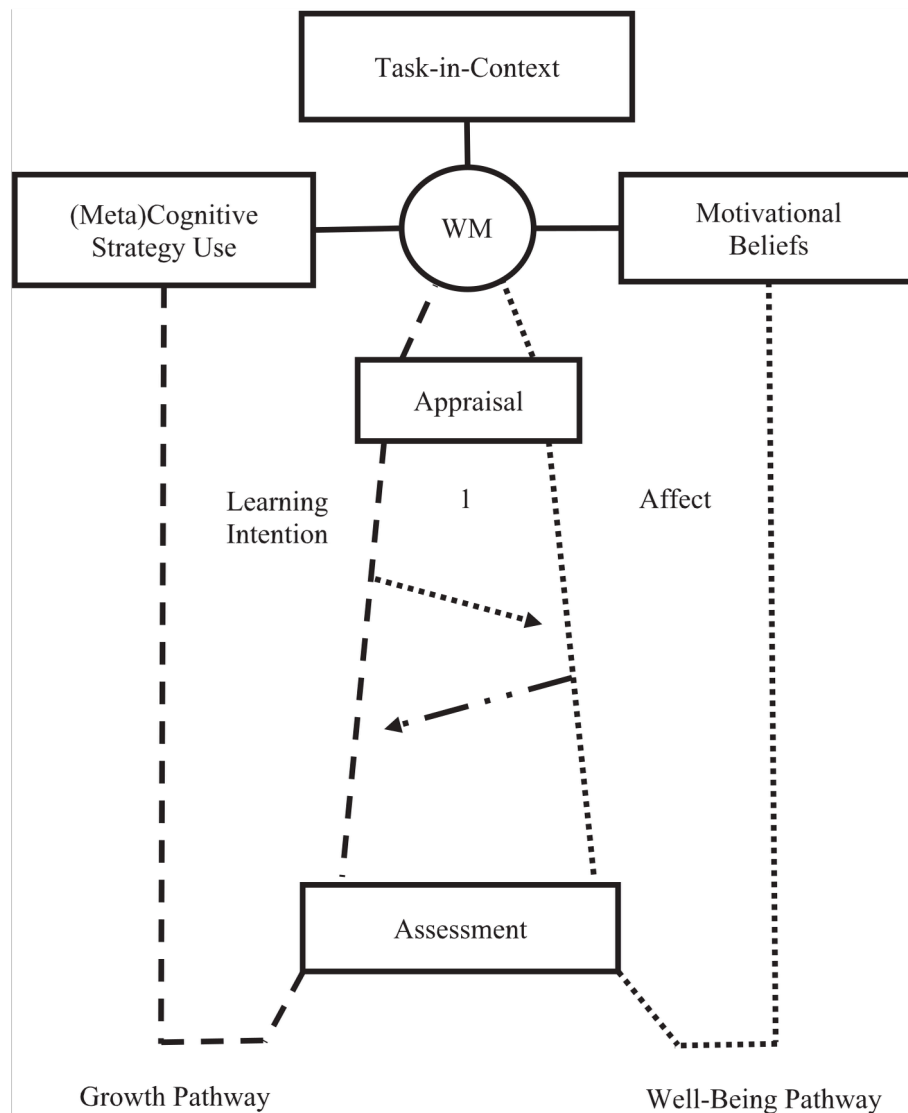


Fig. 1. Boekaerts' dual processing model. Note. WM =working model. From "Self-Regulation and Effort Investment" by M. Boekaerts, in K.A. Renninger, I.E. Sigel, W. Damon and R.M. Lerner (Eds.), Handbook of child psychology: Child psychology in practice (5th ed., vol. 4, p. 350), 2006, John Wiley & Sons, Inc. (doi:10.1002/9780470147658.chpsy0409). Copyright 2006 John Wiley & Sons, Inc. Reprinted with permission.

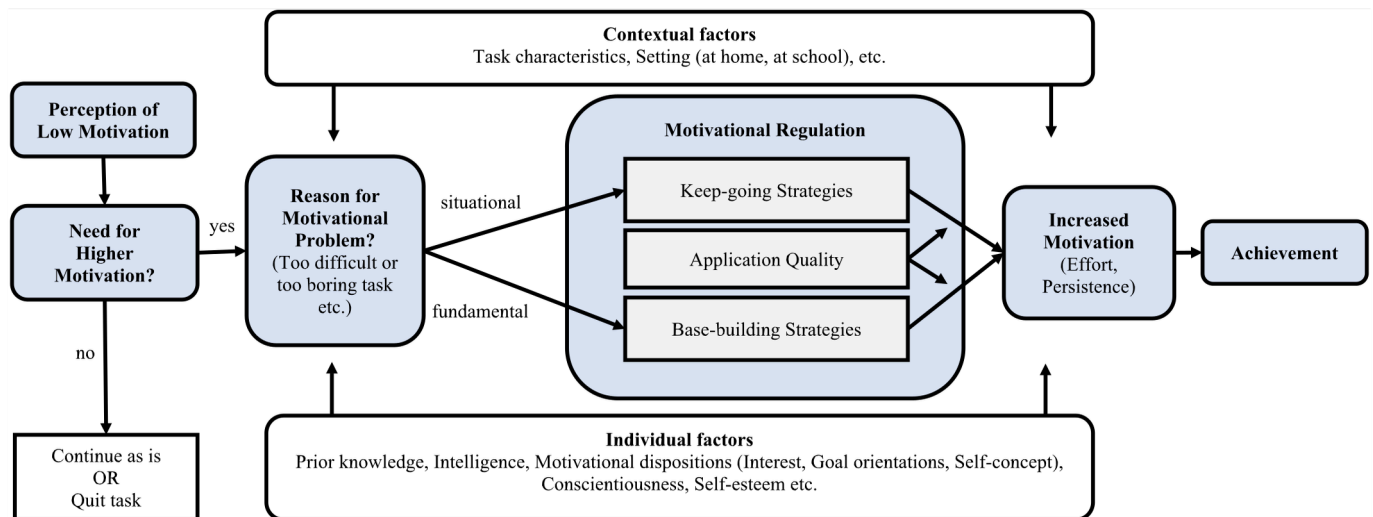


Fig. 2. Schwinger and Stiensmeier-Pelster's model of motivational regulation.

Note. From "Effects of motivational regulation on effort and achievement: A mediation model" by M. Schwinger and J. Stiensmeier-Pelster, *International Journal of Educational Research*, 56, p.38, 2012, Elsevier Academic Press (doi:10.1016/j.ijer.2012.07.005). Copyright 2012 Elsevier Inc. Reprinted with permission.

specific components of motivation that are likely to be the target of monitoring and control (see box B1, in Fig. 3) once the task goal has been established (oval G) and its execution is in progress. In this model, a superordinate goal (e.g. doing well in a course) is assumed to determine the initial motivation, guiding the adoption of the subordinate/task goal (e.g. passing an exam).

The model also includes perceived costs (box A) and exogenous obstacles that can undermine motivational components. Metamotivational feelings (i.e. phenomenological experiences like enjoyment or frustration, oval C1) evoked by appraisal of these components serve as indicators of motivational status, eventually leading the learner, in the case of deficient motivation, to abandon the activity or to switch to another goal. On the other hand, the learner can use metamotivational feelings and metamotivational knowledge (i.e. personal beliefs, ideas or theories, oval H) to identify the source of the motivational problem and select the appropriate MRSs (oval E) to increase task motivation and engagement (Oval B). For example, a low level of confidence in being able to perform a task could lead to frustration or hopelessness and could be targeted by self-talk focused on personal potential. Engagement is assumed to be manifested in the adjustment of quantity and quality of students' motivation to processing demands of the academic task, in terms of cognitive and metacognitive strategies.

In summary, theoretical models of self-regulated motivation concur in considering personal appraisals of both personal and contextual factors related to the ongoing learning episode as antecedents of the adoption of strategies for regulating one's own motivation. Among personal factors, special prominence is given to motivational beliefs, i.e. contents of the self-system such as self-efficacy, goal orientation and task value. Regarding contextual factors, both demands and conditions in which the task at hand is presented were considered. Awareness and monitoring of the phenomenological experiences evoked by the appraisals of these factors are thought to inform the individual about their motivational status at the beginning or during the execution of the task and the possible reason for a motivational deficit, if any. MRSs can be used to solve this deficit, boosting personal motivation and thus favouring a mastery mode for dealing with the task, as well as effort and persistence during its execution.

Researchers in motivational regulation have identified a variety of strategies aimed at controlling one's own academic motivation. The work by Wolters (1998) is central in this regard. This author used an open-ended questionnaire to ask university students how they maintained motivation in different academic situations. After two follow-up

studies (Wolters, 1999; Wolters & Rosenthal, 2000), the findings led to the elaboration of an instrument including subscales for a group of principal MRSs (Wolters & Benzon, 2013). The contribution by Schwinger et al. (2009, 2007) is also widely recognized as important, leading to the delineation of additional strategies and an alternative evaluation scale.

Three main criteria have been proposed to differentiate between types of strategies (Fried & Chapman, 2012). First, the task completion phase (pre-actional, actional and post-actional) (Pintrich, 2000; Schmitz & Wiese, 2006), with some strategies being more appropriate for defining the task profile (i.e. considering demands, personal and context resources and setting goals and the action plan, establishing the necessary motivation to start the learning task), during its execution (when the motivational state is monitored and motivational interferences are addressed) or once completed (when subjective evaluation of results is generated and motivation for subsequent tasks is formed) (Miele & Scholer, 2016; Schwinger & Otterpohl, 2017). Second, the motivational dimension to which strategies may be more or less attuned, in particular those highlighted in the most commonly cited theories of academic motivation (e.g. goal orientations or attributions) (Urhahne & Wijnia, 2023). Third, the position in the continuum ranging from intrinsic/autonomous to extrinsic/controlling styles of motivational regulation, as described in the Self-Determination Theory by Deci and Ryan (2000), has led to differentiating between strategies that emphasize the task itself and its connection with personal values and those strategies focused on external incentives or pressures (Miele & Scholer, 2016; Wolters, 1998).

To our knowledge, no review has previously been conducted to provide an overview of the available empirical support regarding the motivational components and processes represented in models of motivational self-regulation. The interrelationship between the use of MRSs and both factors considered antecedents of this use and its expected consequences should be analysed in addition to the role of possible moderating or mediating factors. A tendency to a more frequent and adequate use of MRSs throughout the different educational levels may be expected. The possible moderation effect of gender also deserves attention, since this has previously been demonstrated in studies on self-regulated learning, indicating that women are more likely to use learning strategies (Meece & Painter, 2012).

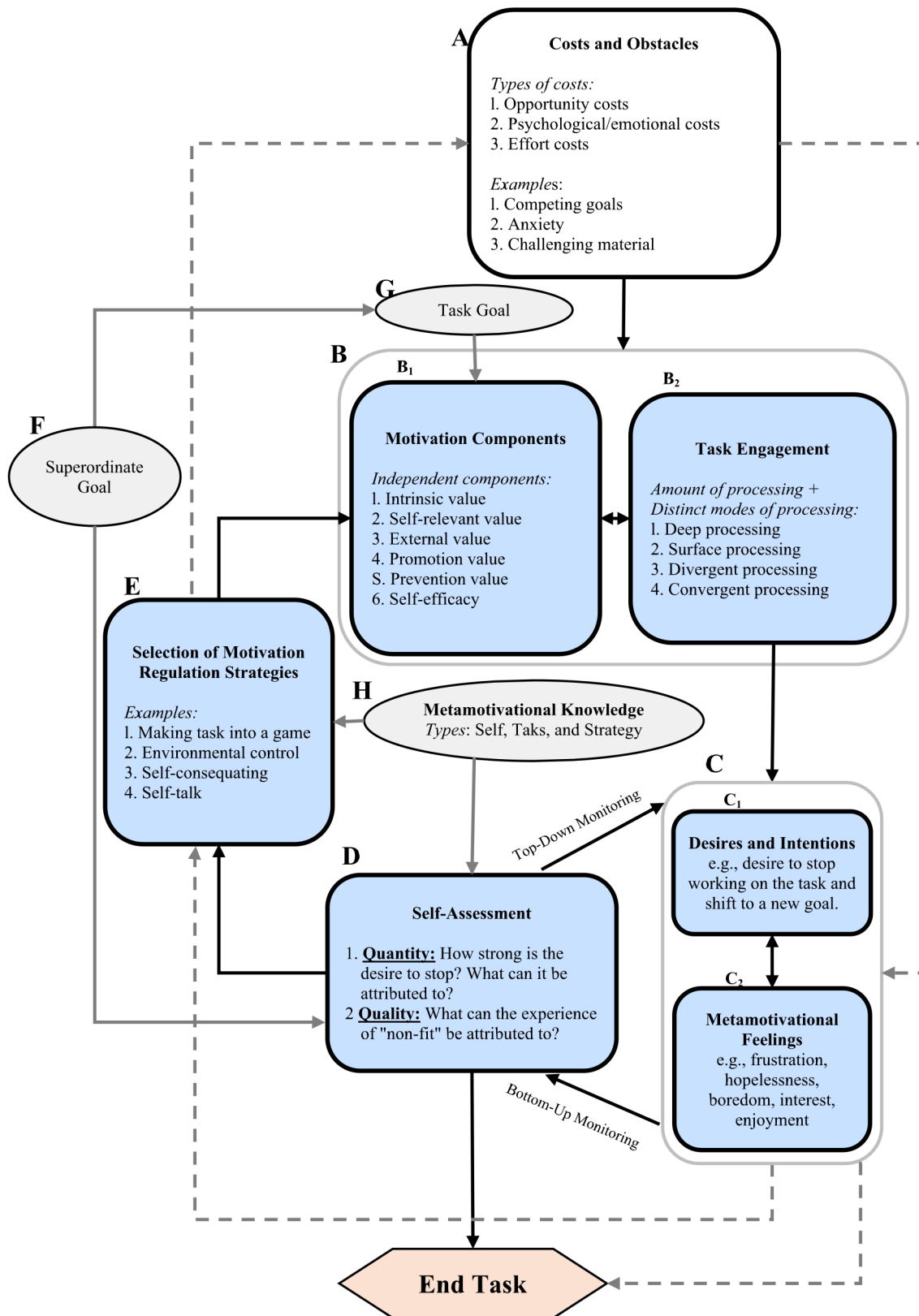


Fig. 3. Miele and Scholer's metamotivational model of motivation regulation. Note. From "The role of metamotivational monitoring in motivation regulation" by D.B. Miele and A.A. Scholer, *Educational Psychologist*, 53(1), p. 2, 2018, Routledge/Taylor & Francis Group (doi:10.1080/00461520.2017.1371601). Copyright © 2017 Division 15, American Psychological Association. Reprinted with permission.

1.1. Purpose and objectives of this review

The present study aimed to improve our understanding of self-regulated motivation and its effects on the academic progress of ordinary students. Three research questions were posed: (1) what types of MRSs do students use most frequently?; (2) what psychological processes are involved in the activation of MRSs?; and (3) what are the most effective MRSs for academic success? The specific objectives intended to answer these research questions were as follows: (1) to analyse the types and frequency of use of MRSs, both under specific conditions and considered cross-sectionally; (2) to explore and evaluate the strength of the relationship between the individual and contextual dimensions theoretically proposed as antecedents of the MRSs and the use of these strategies; (3) to examine the possible effect of MRSs on indexes of academic skills, engagement, effort and adjustment, as well as the strength of the relationship when demonstrated; (4) to identify moderating and mediating factors in the frequency of use of MRSs and in the relationships between individual/contextual factors and MRSs, and also between MRSs and academic skills, engagement, effort and adjustment. Based on the theoretical background described above, we hypothesized that (1) personal and contextual dimensions concerned in academic tasks are associated with the use of MRSs; (2) MRSs are positively associated with indicators of good academic progress; (3) both sex and educational level moderate these associations as well as the frequency of use of MRSs. No hypothesis was formulated regarding the types and frequency of use of MRSs.

2. Method

2.1. Literature search

The systematic review process followed the PRISMA (Page et al., 2021) and Cochrane (Higgins et al., 2022) guidelines for the elaboration of systematic reviews. A literature search of four databases, namely Web of Science, Scopus, PsycInfo, and ERIC, was performed in November 2021, and it was regularly updated through search alerts created in the databases. The latest update was completed in October 2023. The search phrase used was: (“self-regulated learning” AND “academic motivation”) OR (“self-regulated motivation” AND (university OR college OR school)) OR (“motivation* self-regulation” AND (university OR college OR school)) OR (“regulation of motivation” AND (university OR college OR school)) OR (metamotivation* AND (university OR college OR school)). No temporal restrictions or filters for document type were applied in the search strategy. Databases consulted included a wide range of formats (e.g. doctoral dissertations, conference papers and letters). In order to avoid overlooking relevant research and to minimize bias, the reference lists of the reports selected were also screened, and 13 eligible documents were identified.

2.2. Eligibility criteria and selection

The inclusion criteria were as follows: the study should involve MRSs; the sample should comprise primary, secondary and/or university students; and the language of publication should be Spanish, English, French or Portuguese. Studies focusing on remote teaching methods, specific innovative teaching methods or subjects not included in study plans (extracurricular activities) were excluded, as well as those whose samples were composed of students with mental disorders, disabilities, physical illnesses or high abilities or students of ages that did not correspond to their educational level.

Two team members independently screened titles and abstracts of the records and discarded those that did not match the eligibility criteria. The same team members then examined the full texts of the pre-selected reports to determine their eligibility for definite inclusion in the review. All disagreements during the pre-selection and selection phases were resolved by discussion until consensus was reached by all authors

The main reason for exclusion of records and reports was that they did not concern the topic of interest of the present review. Our comprehensive search strategy produced a substantial number of papers focused on different motivational dimensions (e.g. self-efficacy, goal orientations) rather than on their regulation. On the other hand, a large number of the studies on motivational self-regulation did not deal with strategies per se but focused on the degree of motivational regulatory autonomy. In total, 64 reports (75 studies) were finally selected for inclusion in the review. The details of this process are depicted in a flow diagram (Fig. 4).

Inter-rater reliability, measured using Cohen’s Kappa coefficient, was intermediate ($k = 0.58$) during the preselection stage and high ($k = 0.87$) during the selection stage. The methodological quality of the studies was examined prior to their inclusion in the review, and low-quality studies were excluded. The NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (National Heart, Lung and Blood Institute, 2014), JBI Checklist for Analytical Cross-Sectional Studies (Joanna Briggs Institute, 2020), as well as Cochrane template for quality assessment were used as references, as appropriate. These tools include items on how well the studies meet methodological standards (e.g. “Was the study population clearly specified and defined?”, “Were objective, standard criteria used for measurement of the condition?”) The studies were categorised as of low quality (7.44 %), intermediate quality (23.85 %) and high quality (68.71 %).

2.3. Analysis

The characteristics and data of each study reviewed were extracted and summarized in a table, to enable analysis and integration of the findings of the studies. The table is included in Supplementary Material (see Table S1). Various meta-analyses were performed considering the correlational association between MRSs, as well as the global score for strategy use, and dimensions theoretically considered as antecedents (i.e. self-efficacy, task value, goal orientation) and academic implications (i.e. learning strategies, effort, achievement, and procrastination) of motivational self-regulation. A total of 43 studies on 8 MRSs were included in the meta-analyses. Following the guidelines outlined by Borenstein et al. (2009), 10 of the strategies identified could not be included in the meta-analyses, given the small number of studies (<5) that provided correlational data. This resulted in the exclusion of 17 of the selected reports containing correlational data (18 samples) in the meta-analyses; 14 additional studies were excluded because they did not provide correlational data. Several reports included more than one study, yielding a total of 43 samples (34 reports) to be included in the meta-analyses.

Statistical analyses, funnel plots and forest plots were constructed with the R package METAFOR (Viechtbauer, 2010). The procedures described by Hedges and Olkin (1985) were used to analyse the sample of effect size values: Q test for homogeneity and Qb for categorical moderators. Pearson’s product moment correlations were identified in the studies and then transformed to Fisher’s Z value, to estimate the effect size. The degree of heterogeneity (τ^2) was calculated using a restricted maximum-likelihood estimator. The meta-analyses were performed assuming a random-effects model, as this allows generalization of the results beyond the specific set of studies included and is considered more conservative than fixed effects models regarding statistical inference (Botella & Gambaro, 2006; Quintana, 2015). As an estimate of the risk of publication bias, deviations from symmetry in the funnel plot were analysed (Light & Pillemer, 1984), and Egger’s regression and Rank correlation tests (Quintana, 2015) were applied. The results of these tests are reported together with the respective meta-analysis.

Pairwise comparisons of the effect sizes were performed using the Z test, to explore potential differences in the strength of the correlation between strategies and the other variables of interest. Sex (60.3 % of females across all samples), educational level (high school and

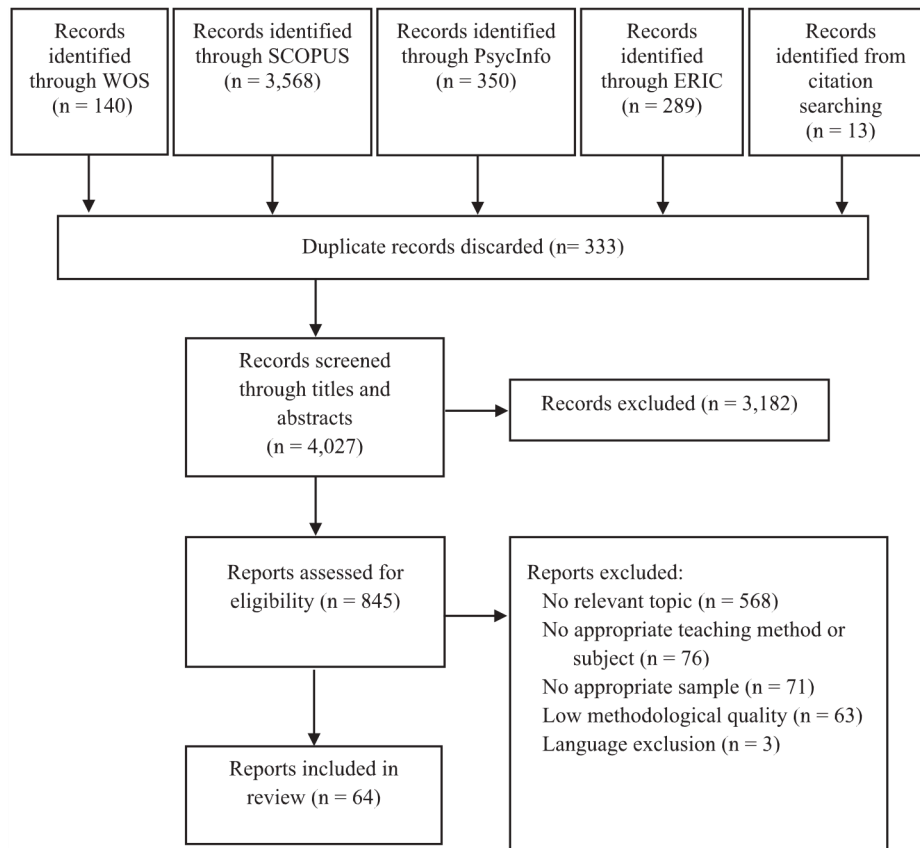


Fig. 4.Flow chart of the literature search process and selection of document.

university) and the type of instrument used to measure MRSs (i.e. whether they raised generic academic scenarios or specific motivational challenging situations) were considered potential moderators, in accordance with the characteristics and assumptions of the studies reviewed.

A narrative synthesis of the principal results was also elaborated and included complementary information on less well studied strategies.

2.4. Transparency and openness

In line with APA journal article reporting standards (Kazak, 2018), we report the inclusion/exclusion criteria and procedures used in this meta-analysis. The data analysis procedure has been described. Supplementary material for this article is available at <https://doi.org/10.1016/j.lindif.2024.102480>. Data are available from the authors upon request. The complete protocol was registered in PROSPERO (ID number CRD42023391598; <http://www.crd.york.ac.uk/prospero/>). The research complied with the APA ethical standards, and it was approved by the Bioethics Committee of the University of Santiago de Compostela (registration USC-29/2020).

3. Results

3.1. Study characteristics

The main characteristics and results from the selected studies are presented in Table 1 (a more detailed version of this table is included in Supplementary Material see Table S1).

Most (93.7 %) of the studies were published during the last decade, and only 4 of them were published in or before 2000, thus reflecting the recent and increasing attention the topic has received.

The study samples were quite heterogeneous in terms of size,

educational level, and country of origin. The sample size ranged between 38 (Zhang et al., 2022) and 3602 (Smit et al., 2017) students. The samples were almost evenly distributed across secondary (42.6 %) and university educational levels (54.7 %); only three studies with primary school students were identified. Regarding the origin of the samples, around 64 % of the studies were conducted in Europe (mainly Germany and Spain), 16 % in Asia, 16 % in the USA, 2.6 % in Latin America, and 1.4 % in Australia. This diversity of origins highlights the general interest attracted by the theme of the present review, at an international level.

In most of the studies, motivational regulation was measured in questionnaires composed by groups of items representing diverse strategies, which were rated on a Likert scale with statements on level of agreement or frequency of use. The Motivational Regulation Questionnaire (MRQ; Schwinger et al., 2009, 2007) deserves special mention, as it was used in 24 of the 75 studies reviewed. This questionnaire was derived from the initial work on MRSs by Wolters (1998, 1999, 2003) and includes eight subscales that measure different strategies: environmental control, enhancement of personal significance, enhancement of situational interest, mastery self-talk, performance-approach self-talk, performance-avoidance self-talk, proximal goal setting and self-consequating. The *Escala de Estrategias Motivacionales del Aprendizaje* [Scale of Motivational Strategies for Learning] (EEMA; Suárez-Riveiro & Fernández-Suárez, 2011) is also worthy of mention. This scale includes cost appraisal and generation of external attributions, as well as a variety of ego-protective strategies, specifically annihilation of others, deception, defensive pessimism, enhancement of others, self-efficacy enhancement and self-handicapping.

We have observed some heterogeneity in the denominations used to identify MRSs in these and the other measures. With the intention of favouring the comparability and narrative description of the results of the reviewed studies, we elaborated a list of the motivational strategies

Table 1

Synthesis of characteristics and key findings of studies included in this review.

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Studies included in the meta-analyses		
Wolters (1999)	88 high school students (Mage =15.1, 48.5 % female) from the USA	<ul style="list-style-type: none"> - MST, PapST, EPS/ESI, SC and EC (+) effort and achievement. - MST predicted planning, monitoring and effort. - PapST predicted rehearsal, regulation and achievement. - SC predicted rehearsal and regulation. - EPS/ESI and EC were not significant predictors.
Wolters and Rosenthal (2000)	114 middle school students (Mage =13.8, 60.5 % female) from the USA	<ul style="list-style-type: none"> - MST, PapST, EPS/ESI and EC (+) task value, task orientation, performance orientation and self-efficacy. - Task value predicted EPS/ESI, MST and SC. - Task orientation predicted EC, EPS/ESI, MST, PapST and SC. - Ego orientation predicted EPS/ESI, PapST and SC. - Achievement predicted SC.
Schwinger et al. (2009)	231 high school students (Mage =16.8, 60.2 % female) from Germany	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC, EPS, ESI and EC (+) effort. PapST, PavST and ESI (+) achievement. - MRSsG directly predicted effort and indirectly (via effort) academic achievement.
Samadi and Davaii (2012)	245 middle school students (Mage =13.1) from Iran	<ul style="list-style-type: none"> - MRSsG (+) achievement. - MRSsG predicted achievement.
Schwinger and Stiensmeier-Pelster (2012)	Study 1 231 high school students (Mage =16.8, 60.2 % female) from Germany	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC and EC (+) effort. - 5 motivational latent profiles were identified regarding frequency of strategies use: (1) high (rather frequent use of each MRSs), (2) medium (average frequency of use of MRSs), (3) low (infrequent use of MRSs), (4) interest-focused (preference for interest enhancement) and (5) goal-focused (preference for goal oriented self-talk). - Profiles 1 and 5 obtained the highest scores on effort. Profile 3 obtained the lowest scores on effort. - No differences in academic achievement among groups were observed.
	Study 2 600 university students (Mage =23.9, 80 % female) from Germany	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC, EPS, ESI and EC (+) effort. - 5 motivational latent profiles were identified: (1) high, (2) low, (3) interest-focused, (4) goal-focused and (5) performance self-talk. - Profiles 1 and 4 showed the highest scores in effort. Profiles 2 and 5 showed the lowest scores on effort. - Academic achievement was significantly higher in profile 1 students than in profile 2 and 5 students. Academic achievement was

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Schwinger and Stiensmeier-Pelster (2012)	301 high school students (Mage =17.6, 56.5 % female) from Germany	<ul style="list-style-type: none"> - intermediate in the remaining profiles. - MST, PapST, PavST, PGS, SC, EPS, ESI and EC (+) effort. - Effort was predicted by EC, EPS, ESI, MST, PapST, PGS and SC. - Achievement was predicted by MST and PavST.
Fritea and Fritea (2013)	187 middle school students from Romania	<ul style="list-style-type: none"> - PapST (+) achievement. ESI (-) achievement. - PapST predicted achievement and moderated the relationship between boredom and achievement.
Wang (2013)	1096 middle school students (Mage =16.8, 57 % female) from China	<ul style="list-style-type: none"> - MST, PapST, EPS and SEE (+) rehearsal and elaboration and (-) withdrawal and avoidance of challenge. - MST predicted rehearsal. - PapST predicted withdrawal and avoidance of challenge. - EPS predicted withdrawal, avoidance of challenge, rehearsal and elaboration. - SEE predicted withdrawal, avoidance of challenge and elaboration. - MRSs mediate the relation between goal orientations and the dependent variables.
Wolters and Benzon (2013)	215 university students (Mage =20.3, 54 % female) from the USA	<ul style="list-style-type: none"> - Girls used PapST more frequently than boys. - MST, SC EPS, ESI and EC (+) task value, task orientation, academic self-efficacy and cognitive and metacognitive strategies, and (-) ego orientation and procrastination. - Task orientation predicted EC, EPS, ESI, MST and SC. - Ego orientation predicted EC and PapST. - Academic self-efficacy predicted EC, ESI and PapST. - Task value predicted EPS, MST, PapST and SC. - Metacognitive strategies considered globally predicted EC, EPS, ESI, MST, PapST and SC.
Cetin (2015)	166 university students (95.2 % female) from Turkey 316 middle school students	<ul style="list-style-type: none"> - EC (+) achievement. - EC did not significantly predict achievement.
Paulino et al. (2015)	(Mage =13.3, 49 % female) from Portugal	<ul style="list-style-type: none"> - MST, PapST, SC, EPS and ESI (+) task value, self-efficacy, task orientation, self-enhancing and self-defeating. - Self-enhancing predicted EPS, ESI and SC. - Self-defeating positively predicted PapST and SC. - Academic self-efficacy positively predicted ESI, MST and PapST. - Task value positively predicted EC, EPS, ESI, MST and PapST.
Wolters and Hussain (2015)	213 university students (88 % female) from the USA	<ul style="list-style-type: none"> - MRSsG (+) perseverance of effort, self-efficacy and cognitive and metacognitive strategies.

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Grunschel et al. (2016)	Study 1 419 university students (Mage =24.5, 68 % female) from Germany	<ul style="list-style-type: none"> - Perseverance of effort predicted MRSsG, but consistency of interest did not. - MST, PapST, PGS, SC, ESI and EC (+) achievement and (-) procrastination. - Procrastination was predicted by EC, EPS, ESI, MST, PapST, proximal goal setting and SC. - Achievement was predicted by MST, PapST and PavST. - Procrastination mediated the relationship between all MRSs (except PavST) and achievement.
	Study 2 229 university students (Mage =25.9, 77 % female) from Germany	<ul style="list-style-type: none"> - PapST, PGS and EC (+) achievement. MST, PapST, PGS, SC, EPS, ESI and EC (-) procrastination. - Procrastination was predicted by EC, EPS, ESI, MST, PapST, PavST, proximal goal setting and SC. - Positive emotional activation was predicted by ESI, EPS, MST, PavST, PGS and MRSsG. - Negative emotional activation was predicted by PapST, PavST and PGS. - Satisfaction with life was predicted by PapST and PavST. - Achievement was predicted by PavST. - Procrastination mediated the relationship between all MRSs (except for EC and SC) and well-being.
Paulino et al. (2016)	550 middle school students (12–18 years, 52.7 % female) from Portugal	<ul style="list-style-type: none"> - MST, PapST, SC and ESI (+) task value, self-efficacy, self-enhancing and self-defeating.
Suárez-Riveiro et al. (2016)	1103 secondary students (14–19 years, 46.5 % female) from Spain	<ul style="list-style-type: none"> - MST, PapST, PavST and CA (+) rehearsal, elaboration, organization and metacognitive self-regulation. WavST (-) with rehearsal, elaboration, organization and metacognitive self-regulation. - Rehearsal was predicted by PapST and WavST. - Elaboration was predicted by CA, MST and PapST. - Organization was predicted by CA. - Metacognitive self-regulation was predicted by CA, MST and WavST and it mediated the relationship between MRSs and cognitive strategies.
Engelschalk et al. (2017)	188 university students (Mage =21.8, 56.9 % female) from Germany	<ul style="list-style-type: none"> - Number and quality of MRSs (+) effort, self-efficacy and achievement. - Number of MRSs used predicted effort. - Quality of MRSs used predicted self-efficacy. - Self-efficacy for motivation regulation and effort mediated the relationship

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Schwinger and Otterpohl (2017)	Study 1 513 university students (Mage =24.2, 68 % female) from Germany	<ul style="list-style-type: none"> - between quality of MRSs and achievement. - MST, PapST, PavST, PGS, SC, EPS, ESI and EC (+) effort. - Effort was predicted by EC, MST, PapST, PavST, PGS and SC. - The relative weight of MST was higher for boys, while the relative weight of PavST was higher for girls. - EPS and ESI were not significant predictors.
	Study 2 University students assessed in two waves (Nt1 =613, Mage =23.9, 79.4 % female; Nt2 =386) from Germany	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC, EPS, ESI and EC (+) effort. - Effort at t2 was predicted by effort at t1 and by EC, MST, PapST, PavST and PGS. - Altogether, the MRSs explained 31 % of the variance in current effort, after controlling for initial effort. - EC was relatively more effective for females. - Conscientiousness moderated the relative effectiveness of motivational regulation, but gender did not.
	Study 3 301 high school students (Mage =17.6, 56.5 % female) from Germany	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC, EPS, ESI and EC (+) effort. - Effort at t2 was predicted by MST, PapST and PGS, after controlling for effort at t1. - Altogether, the eight MRSs explained 41 % of the variance in effort at t2, after controlling for effort at t1. - Conscientiousness, dispositional interest and goal orientations were significant moderators.
Smit et al. (2017)	3602 pre-vocational secondary education (M _{age} =14.04) from The Netherlands	<ul style="list-style-type: none"> - MST, PapST, SC, EPS/ESI and EC (+) task value, engagement and effort. - Task value predicted EC, EPS/ESI, MST, PapST, SC and MRSsG. - Academic self-efficacy predicted EC, EPS/ ESI, MST, PapST and MRSsG. - Engagement was predicted by EC, EPS/ ESI, MST, PapST, SC and MRSsG. - Effort was predicted by EC, EPS/ESI, MST, PapST, SC and MRSsG.
Wang et al. (2017)	1096 high school students (Mage =16.8, 53 % female) from a highly selective school in China	<ul style="list-style-type: none"> - MST, PapST and SEE (+) task orientation, ego orientation and involvement. MST, PapST and SEE (-) withdrawal, avoidance of challenge, and disruptive behaviours. - Task orientation predicted MST, PapST and SEE. - Ego orientation predicted PapST and SEE. - MST predicted involvement. - PapST predicted withdrawal, avoidance of challenge and disruptive behaviours. - SEE predicted avoidance of challenge.



Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Kim et al. (2018)	396 university students (Mage =20.4 years, 44 % female) from the USA	<ul style="list-style-type: none"> - MRSs mediated the relationship between task orientation and engagement. - MRSsG (+) persistence, task orientation, self-efficacy for self-regulated learning and cognitive and metacognitive strategies and (-) procrastination and self-defeated. - Motivational regulation was predicted by persistence and self-efficacy for self-regulated learning. Goal orientations and task value were not significant predictors. - Motivational regulation predicted cognitive and metacognitive strategies and procrastination.
Teng and Zhang (2018)	512 English-major students university students (Mage = 21.5, 61 % female) from China	<ul style="list-style-type: none"> - MRSsG (+) cognitive and metacognitive strategies and writing performance. - MRSsG directly predicted cognitive strategies, metacognitive strategies. - MRSsG directly and indirectly (via cognitive and metacognitive strategies) predicted writing performance.
Eckerlein et al. (2019)	115 university students (Mage =23.9, 74.8 % female) from Germany	<ul style="list-style-type: none"> - Number and quality of MRSs (+) effort and achievement; and (-) motivational difficulties. - Number and quality of MRSs used predicted effort. - Quality of motivational regulation moderated the negative effect of motivational difficulties on effort.
Ljubin-Golub et al. (2019)	274 university students (Mage =21, 71 % female) from Croatia	<ul style="list-style-type: none"> - MST, PapST, PGS, SC, EPS, ESI and EC (-) procrastination and (+) intellect, agreeableness, conscientiousness and extraversion. MST, PapST, PavST, PGS, SC, ESI and EC (-) emotional stability. - Agreeableness predicted EC, EPS, ESI, MST, PapST, PGS, SC and MRSsG. - Conscientiousness predicted MST, PapST, PGS, EC and MRSsG. - Extraversion predicted ESI, PapST and MRSsG. - Emotional stability predicted MST, PapST, SC and MRSsG. - Intellect predicted EPS and MST and MRSsG. - EC predicted procrastination and mediated the relationship between personality (conscientiousness, agreeableness and intellect) and procrastination. - MRSsG (+) achievement and autonomous motivation.
Garn and Morin (2021)	193 university students from USA (Mage =20.7, 70 % female) followed every	

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
	two weeks through a semester (7 waves)	<ul style="list-style-type: none"> - Students' initial achievement predicted initial levels of MRSsG. - A general gradual decrease in the use of MRSsG was constated followed by rebound in the last moth of the semester. - Variations in motivational regulation corresponded with variations in autonomous motivation in the same direction.
Kim et al. (2020)	273 university students (Mage =20.5, 46.5 % female) from the USA	<ul style="list-style-type: none"> - MRSsG and EC (-) procrastination and (+) self-efficacy for self-regulated learning, time management and task value. - Self-efficacy for self-regulated learning predicted MRSsG and EC. Task value and time management were not significant predictors. - MRSsG predicted achievement and procrastination.
Kryshko et al. (2020)	Study 1 249 university students (Mage =21.6, 66.3 % female) from Germany	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC, EPS, ESI and EC (+) academic effort and (-) achievement and drop-out intention.
	Study 2 Fist year university students assessed in two times (Nt1 = 210, Mage =20.1, 34.8 % female; Nt2 =194; Nt3 = 187) from Germany	<ul style="list-style-type: none"> - Achievement was predicted by EPS, MST and MRSsG. MRSsG were not significant predictors of drop-out intention. - Effort mediated the relation between motivational regulation (except for EPS and ESI) and achievement. - MST, PapST, PavST, PGS, SC, EPS, ESI and EC (+) academic effort and (-) drop-out intention (except for PavST) and achievement. - Achievement was predicted by EPS. - Drop-out intention was predicted by EC and PapST. - Effort mediated the relationship between MRSs (except for PavST) and achievement.
Reindl et al. (2020)	469 university students (Mage =21.7, 77.4 % female) from Germany	<ul style="list-style-type: none"> - MST (+) metacognition, rehearsal, organization, elaboration, academic self-efficacy, effort, affective adaptivity and action adaptivity and (-) rumination. PapST (+) rumination, metacognition, rehearsal, organization, effort, and action adaptivity and (-) academic self-efficacy, affective adaptivity and elaboration. - Three profiles were identified: (1) goal-directed learners (high motivational regulation and reappraisal), (2) worried performers (low MST and reappraisal and high PapST) and (3) inhibited ruminators (high rumination).

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Trautner and Schwinger (2020)	Study 1 146 university students (Mage =23.4, 76.8 % female) from Germany	<ul style="list-style-type: none"> - Profile 1 scored significantly higher than profile 2 in elaboration, metacognition, academic self-efficacy, effort, affective adaptivity and action adaptivity. - Profile 2 scored significantly higher than profile 3 in rehearsal, effort, academic self-efficacy and affective adaptivity. - Profile 1 scored significantly higher than profile 3 in metacognition, rehearsal, organization, academic self-efficacy, effort, affective adaptivity and action adaptivity.
	Study 2 588 university students (Mage =23, 69.4 % female) from Germany	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC, EPS, ESI, EC and MRSsG (+) effort and self-efficacy motivation regulation. - Self-efficacy motivation regulation predicted MRSsG. - MRSsG predicted effort and mediated the relationship between self-efficacy motivation regulation and effort. - MST, PapST, PavST, PGS, SC, EPS, ESI, EC and MRSsG (+) effort, self-efficacy motivation regulation, positive emotions and achievement (except for PavST). - Self-efficacy for motivation regulation predicted MRSs. - MRSsG predicted effort and positive emotions indirectly predicted achievement via effort and mediated the relationship of self-efficacy with effort.
	Study 3 531 university students (Mage =24.2, 68.6 %) from Germany	<ul style="list-style-type: none"> - MST, PapST, PGS, SC, EPS, ESI, EC and MRSsG (+) effort, self-efficacy motivation regulation (except for PavST), positive emotions and achievement. - MRSsG were predicted by self-efficacy for motivation regulation and self-efficacy for self-regulated learning. - MRSs directly predicted effort and achievement via effort.
B ¨aulke et al. (2021)	Study 1 160 university students (Mage =21.7, 53 % female) from Germany	<ul style="list-style-type: none"> - State strategy fit (-) procrastination. - State strategy use and fit fluctuated across learning situations. - Procrastination was predicted by trait strategy use and state strategy fit. - Trait strategy fit predicted procrastination decrease during one moth in an exam preparation phase.
	Study 2 233 university students (Mage =20.7, 90 % female) from Germany	<ul style="list-style-type: none"> - State strategy use and fit (-) procrastination. - State strategy use and fit fluctuated across learning situations. - Neither trait strategy use, nor state strategy use had a statistically significant effect

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Kim et al. (2021)	365 university students (Mage =19.4, 57.3 % female) from the USA	<ul style="list-style-type: none"> on academic procrastination during seven weeks in the middle of a semester. - Procrastination was predicted by trait strategy fit and state strategy fit, but not procrastination decrease. - MRSsG (-) goal conflict and (+) goal facilitation and achievement. - Goal facilitation predicted MRSsG, while goal conflict did not.
Ilishkina et al. (2022)	716 university students (Mage =22; 77.5 % female) from Russia	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC, EPS, ESI, EC and MRSsG (+) intrinsic and extrinsic (except for EPS) motivational regulation. - Females showed higher use of ESI. - A model of two MRSs factors (intrinsic and extrinsic) reached adequate fit. - Intrinsic MRSs showed stronger correlations with intrinsic motives than with extrinsic motives and extrinsic MRSs showed weaker correlations with intrinsic motives than with extrinsic motives.
Lohbeck and Moschner (2021)	415 university students (78.8 % female, Mage = 22.38) from Germany	<ul style="list-style-type: none"> - MST, PapST, SC, EPS/ESI and EC (+) rehearsal, elaboration and organization. - ESI predicted rehearsal and organization. - SC positively predicted elaboration and organization. - PapST positively predicted rehearsal and organization.
Trautner and Schwinger (2022)	Study 1 376 university students (Mage =22.9) from Germany	<ul style="list-style-type: none"> - MST, PapST, PavST, PGS, SC, EPS, ESI, EC and MRSsG (+) effort, self-efficacy for motivational regulation (except for PavST) and incremental theories about intrinsic (except for PapST and PavST) and extrinsic motivation. - MRSsG were predicted by self-efficacy for motivation regulation and by incremental theories about intrinsic motivation.
	Study 2 365 university students (Mage =22.8) from Germany	<ul style="list-style-type: none"> - Incremental theories about intrinsic motivation predicted EC, EPS and ESI. - MRSs predicted effort. - MST, PapST, PGS, SC, EPS, ESI, EC and MRSsG (+) effort, self-efficacy for motivational regulation and incremental theories about intrinsic and extrinsic motivation. - Models separating general and personal implicit theories did not fit the data acceptably. - Incremental theories about extrinsic motivation directly predicted MRSSG and via



Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
		self-efficacy for motivation regulation. - Incremental theories about extrinsic motivation predicted EC, ESI and PGS. - Incremental theories about intrinsic motivation predicted MST and PGS. - MRSs predicted effort. - MRSsG (+) achievement. - MRSsG predicted achievement.
Xu and Corno (2022)	318 middle school students (Mage =13.7, 45.6 % female) from China	
Studies not included in the meta-analyses		
Wolters (1998)	115 university students from the USA (Mage =19.1, 46 % female)	- Volition (EC) was more frequent than extrinsic (PapST and SC) strategies and intrinsic (EPS, ESI, MST and SEE) strategies in response to difficult material, and more frequent than intrinsic strategies in response to boring material. - Intrinsic regulation predicted task orientation, elaboration, critical thinking and metacognition. - Extrinsic regulation predicted ego orientations and achievement. - Children of authoritative and permissive parenting styles obtained significantly higher scores in SEA than children of neglectful and authoritarian styles.
Aunola et al. (2000)	354 middle school students (Mage =14, 50 % female) from Sweden	
Suá ´ rez-Riveiro et al. (2001)	595 university students (18–28 years old, 69 % female) from Spain	- SH and DP (-) task orientation, and (+) ego orientation. - Three clusters were identified: (1) high self-enhancing/self-defeating/work-avoidance and medium task orientation, (2) high task/self-defeating and medium self-enhancing/work-avoidance goals and (3) high task orientation, medium work-avoidance and low self-enhancing and self-defeating goals. - Proportion of males and females was similar in cluster 3. Proportion of males was higher in cluster 1, while proportion of females was higher in cluster 2. - Students in group (1) reported the highest use of MRSs. - No differences were observed between groups (2) and (3), except for the use of DP, which was higher in group (2). - SC and EC (+) rehearsing and memorizing. - SC predicted intention to continue with further education and achievement.
Nota et al. (2004)	81 high school students (Mage =17.1, 87.7 % female) from Italy 49 of them (85.72 % female) followed to university	
Cooper and Corpus (2009)	16 primary first-grade students (Mage =6.1), 16 primary third-grade	- University students had greater knowledge of the effectiveness of five

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
	students (Mage =9), 16 primary fifth-grade students (Mage =11), and 16 university students (Mage = 20) from the USA	motivation regulation strategies (EC, SC, EPS/ESI, PapST and MST) than fifth grades, who had greater knowledge than did third graders and first graders. - University students had greater understanding of why the motivation regulation strategies were effective than did fifth graders, who had greater understanding than did third graders, who had greater understanding than did first graders.
Xu (2008)	377 rural (51.7 female) and 182 urban middle school (55.3 % female) students from the USA	- High achieving students obtained higher scores in MRSsG and EC than low achievers.
Acee and Weinstein (2010)	82 university students (Mage =21.4, 83 % female) distributed in 2 groups (control and value-reappraisal intervention - VR) from Spain	- VR group showed significant gains on task-value, but not on academic self-efficacy.
Tas and Tekkaya (2010)	1950 high school students (Mage =13.1; 48.8 % female) from Turkey	- SH (-) self-efficacy, task and ego orientations. - SH significantly explained cheating behaviour.
Suá ´ rez-Riveiro and Ferná ´ ndez-Suá ´ rez (2011)	1080 high school students (between 14 and 19 years old, 46 % female) from Spain	- SH and EO (-) cognitive and metacognitive strategies (except for elaboration with EO). SEE, DP and GEA (+) rehearsal, organization, elaboration and metacognitive strategies. - Rehearsal was predicted by DP, EO, GEA and SEE. - Elaboration was predicted by AO, DP, EO, SEE and SH. - Organization was predicted by DP, SEE and SH. - Metacognitive self-regulation was predicted by DP, SEE and SH. - Metacognitive self-regulation partially mediated the relationships between cognitive strategies and DE, SEE and SH.
Ferná ´ ndez-Suá ´ rez et al. (2012)	2387 secondary students (52.9 % female) from Spain	- Three clusters were identified: (1) effort avoiding students, (2) high academic self-efficacy and task orientation students, and (3) high ego orientation students. - Best discriminant MRSs between groups were PavST, SEE and SC.
Gaeta et al. (2012)	604 secondary students (12–17 years, 50 % female) from Spain	- MRSsG (+) task orientation, ego orientation, and metacognitive self-regulation. - Task orientation predicted MRSsG. - MRSsG predicted ego orientation and mediated the relation between task orientation and metacognitive self-regulation.
Metallidou (2012)	160 primary students (55.6 % female) from Greece	- SC and EC (-) ability to learn and speed of learning. - Ability to learn predicted SC.

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Park and Sperling (2012)	41 university students (19–21 years; 60 % female) from the USA	<ul style="list-style-type: none"> - Speed of learning predicted EC and SC. - SH (–) intrinsic goal orientation, self-efficacy, rehearsal, elaboration, time and study environment, and effort regulation and effort. - High procrastinator students obtained significant higher scores in SH than low procrastinators.
Schwinger (2013)	<p>Study 1 105 high school students (Mage =13.9, 53.3 % female) from Germany</p> <p>Study 2 749 high school students (Mage =13.7, 50.4 % female) from Germany</p>	<ul style="list-style-type: none"> - A two-factor model was found to fit the data obtained, representing SH in Math vs. Verbal domains (German and English). - SH factors were differentially related to students' self-concept, interest, and achievement in both math and verbal domains, except for math SH that showed similar associations with self-concept and interest across subjects. - Significantly higher SH was obtained for boys in German, English, and Biology, but not in Math, Physics, and History. - A six-factor model was found to fit the data obtained, representing SH in the six domains evaluated. - Domain specific SH were correlated with their corresponding domain specific ability self-concept, interest and achievement. - Correlations between domain specific SH and domain specific ability and interest were significantly higher than the non-corresponding ones, except for SH and interest in history. - Correlations between domain specific SH and domain specific achievement were significantly higher only for English and Biology.
King and Gaerlan (2015)	385 university students (Mage =17.7, 45.2 % female) from Philippines	<ul style="list-style-type: none"> - Female students used EC, MST, PapST, and SC more frequently. - MST, PapST, SC, EPS/ ESI and EC (+) past-positive and future view. - Past-positive view predicted EC, EPS/ ESI, MST, PapST, and SC. - Past-negative view predicted PapST. - Present hedonistic view predicted EPS/ ESI and SC. - Future view predicted EC, EPS/ ESI, MST, PapST, and SC.
Torrano and Soria (2016)	374 middle school students (13–14 years, 49 % female) from Spain	<ul style="list-style-type: none"> - SH (–) with task orientation, self-efficacy, regulation of effort, elaboration, organization, metacognitive self-regulation and achievement. - Low-achievement students obtained significantly higher scores in SH than their

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
Torrano and Soria (2017)	374 high school students (between 13 and 14 years old, 49 % female) from Spain	<ul style="list-style-type: none"> intermediate and high-achievement peers. - Men obtained significantly higher scores on SH. No significant differences were obtained when controlling for previous performance.
Büchel et al. (2018)	515 university students (Mage =23.2, 58 % female) from Germany	<ul style="list-style-type: none"> - Motivational regulation knowledge (–) procrastination and drop-out intentions. - Motivational regulation knowledge predicted self-efficacy. - Self-efficacy for motivation regulation mediated the relationships between conditional motivational regulation knowledge and both procrastination and drop-out intentions.
Ferradá's et al. (2018)	1028 university students (Mage =21.4, 86.3 % female) from Spain	<ul style="list-style-type: none"> - DP (+) self-esteem, task orientation, self-enhancing, and self-defeating, except work-avoidance. - Four clusters were identified: (1) high self-esteem and a moderate DP, (2) low self-esteem and low DP, (3) high self-esteem and low DP, and (4) low self-esteem and high DP. - Group 2 obtained significantly higher scores than the rest in task orientation, and self-defeating. - Groups 2 and 4 obtained higher scores in self-enhancing. - Group 3 obtained higher scores in work-avoidance.
Ferradá's et al. (2019)	1028 university students (Mage =21.4, 86.3 % female) from Spain	<ul style="list-style-type: none"> - SH (+) self-enhancing and self-defeating. DP (+) self-enhancing, self-defeating and learning goals, except with self-esteem. SH and DP (–) self-esteem. - Four clusters were identified: (1) high self-esteem, self-enhancing and self-defeating, low task orientation, (2) high self-esteem and task orientation, low self-enhancing and self-defeating, (3) low self-esteem and task orientation, high self-enhancing and self-defeating, (4) low self-esteem, moderate self-defeating, high task orientation and self-enhancing. - Group 3 obtained significantly higher scores than the rest in SH. - Group 4 obtained higher scores DH.
Suárez-Riveiro et al. (2019)	Sample 1 613 secondary students (Mage =15.7, 57.1 % female) from Spain	<ul style="list-style-type: none"> - AO (+) task orientation, self-enhancing, self-defeating, work-avoidance, attributions, and academic self-efficacy. EO (–) task orientation, attributions and academic self-efficacy.

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
		<ul style="list-style-type: none"> - No sex differences were obtained regarding motivational regulation. - Three clusters were identified: (1) highest scores in motivational beliefs, and AO, (2) highest scores on self-defeating, work-avoidance orientation, and EO, (3) lowest scores on all dimensions except self-defeating. - Self-enhancing and academic self-efficacy positively predicted the use of AO. - Task orientation, and academic self-efficacy negatively predicted use of the EO strategy, while the other goal orientations positively predicted it. - Attributions negatively predicted EO. - DE (+) self-enhancing, self-defeating, and work avoidance, and (-) task orientation and attributions. - Three clusters were identified: (1) lower scores in motivational beliefs and DE, (2) highest scores on task and self-enhancing, and lower scores on work-avoidance orientation, (3) higher scores on self-defeating, work-avoidance and DE. - Females reported significantly lower scores on DE than boys. - DE was positively predicted by academic self-efficacy and ego and work avoidance orientations, and negatively predicted by task orientation.
	Sample 2 910 secondary students (Mage =15.8, 46.5 % female) from Spain	
Boyle et al. (2020)	395 university students from Thailand (93.4 % female) and 313 from Australia (78 % female)	<ul style="list-style-type: none"> - Thailand students obtained significantly higher scores on NBI and SEE. - Students with lower NBI and higher SEE obtained higher achievement.
Peng and Bai (2020)	41 high school students (Mage =17.5 68.3 % female) and 21 university students (Mage =20.8, 52.4 % female) from Taiwan	<ul style="list-style-type: none"> - High school students reported significantly less use of EC than university students.
Rodríguez-Guardado and Gaeta (2020)	204 high school students (Mage =16.6, 63.7 % female) from Mexico	<ul style="list-style-type: none"> - Four profiles were identified: (1) extrinsic consequences orientation, (2) multiple goals orientation, (3) no orientation, (4) task orientation. - Profile 2 showed higher use of SEE than profile 1, profile 3 and profile 4. - Profile 2 showed lower use of NBI than profile 3 and profile 4. Profile 1 showed lower use of SC than profile 2. - Use of SEE predicted achievement. - MRSs (+) domain-specific science achievement.
Michalsky (2021)	202 high school students (Mage =15.5; 49 % female) from Israel, distributed in 3	

Table 1 (continued)

Authors (year)	Sample educational level (age, sex) home culture	Main findings
		<ul style="list-style-type: none"> - In terms both of domain-specific and general science achievement, the before group outperformed the other three groups, the after group outperformed the during group, and the control group was the lowest. - MST, PapST, SC, EPS/ESI and EC (+) learning strategies. - Female students obtained higher scores in EC, PapST, and SC. - MRSsG (+) self-efficacy for motivational regulation, satisfaction with study content and coping with academic stress. - Self-efficacy for motivational regulation predicted MRSsG. - Higher (lower) levels of self-efficacy in relation with the own expected score were associated with subsequent decrease (increase) in MRSs. - MRSs predicted satisfaction with study content and with coping with academic stress. - MRSs (+) self-regulated writing strategies, writing enjoyment, and (-) writing anxiety. - MST predicted enjoyment in t1 and t2. - PapST predicted enjoyment in t1 and t2. - PapST predicted anxiety in t1 and t2. - No significant differences were obtained between the high- and low-proficiency groups in their use of any of the MRSs. - No statistically significant changes were observed in the use of MRSs along the completion of reflective journals. - EC predicted task orientation, self-enhancing, and self-defeating. - EPS predicted task orientation, self-enhancing, and self-defeating. - ESI predicted task orientation, self-enhancing, and self-defeating. - SC predicted task orientation, self-enhancing, and self-defeating.
Gó'ez and Boruchovitch (2022)	233 high school students (Mage =15.9, 57.1 % female) from Brazil	<ul style="list-style-type: none"> - experimental conditions of metamotivational scaffolding: before (N = 52), during (N =50) and after (N =54) a study unit, and a control group (N = 46)
Kryshko et al. (2022)	4 measurement waves in university students (Nt1 = 445, 56.2 % female; Nt2 = 455, 59.3 % female; Nt3 = 414, 58.2 % female; Nt4 = 386, 57.8 % female; Mage at t1 =22.1) from Germany	
Zhang & Dong (2022)	230 university students from China (Mage =23.4, 39.6 % female) evaluated in 2 times	
Zhang et al. (2022)	38 university students (Mage =18.2, 57.9 % female) from China completing a reflective journal in 3 moments along a semester	
Norouzi et al. (2023)	508 university students (55.7 % female) from Iran	

Note. MRSs =motivational self-regulation strategies; MRSsG =motivational self-regulation strategies (globally considered); AO =annulation of others; CA =cost appraisal; DE =deception; DP: defensive pessimism; EC =environmental control; EO =enhancement of others; EPS =enhancement of personal significance; ESI =enhancement of situational interest; GEA =generation of external attributions; MST =mastery self-talk; NBI =Negative-based incentives; PapST =performance-approach self-talk; PavST =performance-avoidance self-talk; PGS =proximal goal setting; SC =self-consequating; SEA =self-enhancing attributions; SEE =self-efficacy enhancement; SH =self-handicapping; WavST = work avoidance self-talk; (+) =correlated positively with; (-) =correlated negatively with.



measured in these studies (Table 2) and we unified the names and description of coincident strategies. Original denominations used in each measure can also be consulted in the table. Only those strategies directly aimed at managing motivational dimensions were considered, although some of the reviewed studies also covered information processing strategies (Suárez-Riveiro et al., 2016; Wolters, 1998) and/or emotional self-regulation strategies (Gaeta et al., 2012; Reindl et al., 2020; Rodríguez-Guardado & Gaeta, 2020; Suárez-Riveiro et al., 2001, 2019; Suárez-Riveiro & Fernández-Suárez, 2011; Wolters, 1998) as means of influencing motivation (for a review on emotional self-regulation strategies see Martínez-López et al., 2021).

In addition, the wording before items or the items themselves also differed between questionnaires in relation to the conditions raised. Thus, the MRQ (Schwinger et al., 2007, 2009) poses generic academic scenarios, the EEMA (Suárez-Riveiro & Fernández-Suárez, 2011) includes generic and problematic situations, and the other questionnaires focus on motivational challenging situations (i.e. discouragement, difficulties or distractions) (McCann & Turner, 2004; Paulino et al., 2015; Wolters, 1999; Wolters & Benzon, 2013). Vignettes on prototypical learning situations, an on-line think aloud protocol, and a learning diary have also been used as alternatives for situated assessment (Bäulke et al., 2018, 2021; Engelschalk et al., 2017).

3.2. Synthesis of results

3.2.1. Types and frequency of use of motivational regulation strategies

The data provided in the articles reviewed refer to 18 types of strategies, although they are mainly concentrated around the 8 strategies originally identified by Wolters (1998, 1999, 2003) and Schwinger et al. (2007, 2009). We organized this last group according to the frequency of use of each strategy by considering the mean scores for the subscales representing those strategies as reference values (see Table 3). Performance-approach self-talk and self-consequating consistently appeared in the top positions, while enhancement of situational interest and performance-avoidance self-talk always occupied the bottom positions; environmental control and proximal goal setting occupied intermediate positions, with enhancement of personal significance being consistently closer to the least frequent point. Mastery self-talk was also among the least frequent strategies, except in the studies by Smit et al. (2017), with pre-vocational secondary education students, and Wang et al. (2017), with students from highly selective secondary schools in China. In addition, self-efficacy enhancement, another of the strategies originally identified by Wolters (1998), did not show a consistent position when evaluated.

Wolters (1999) demonstrated by means of statistical comparison that performance self-talk was used significantly more frequently than the other strategies evaluated in high school students: self-consequating and environmental control were reported with similar frequency, while interest enhancement was used significantly less frequently than the other strategies. These differences were replicated in a later study by Wolters and Benzon (2013) with university students, although in this case the mean frequency of environmental control was significantly higher than the mean frequency of self-consequating.

Besides the general use of different types of strategies, some authors have drawn attention to the phase and situational specificity of motivational regulation (Bäulke et al., 2021; Eckerlein et al., 2022). In fact, Bäulke et al. (2021) found that self-reported frequency of the use of MRSs by university students, considered globally, fluctuated (21 % of variance within persons) across four out of six situations of a typology proposed by Engelschalk et al. (2016), in which pre-actional, actional and post-actional phases as well as two types of motivational problems were distinguished: (1) low expectancy for success in the face of a difficult/complex task, and (2) low subjective task value due to boring or uninteresting learning material.

As for the validity of the other classification criteria of MRSs described in the Introduction (i.e. the intrinsic/autonomous versus

Table 2

Motivational regulation strategies evaluated, and examples of items from the measures used in the studies reviewed.

Denominations	Definition	Examples of items
Annulment of others ^a	Denying or minimizing classmates' good results to protect self-worth.	"I try to ignore the academic performance of the others and thus see myself as more competent"
Cost appraisal ^f	Students' generation of appreciations to establish the adequacy of the task costs (time, affects, effort). Simulating expectations of being surpassed by peers, lying about the own progress in academic tasks or expressing external attributions for success.	"Before starting a demanding task, I usually think that its accomplishment will compensate the effort I will have to invest" "Although I put a lot of effort into my studies, I try to make others see that my good results are due to luck or to how easy the test or assignment was"
Deception ^a	Creating expectations of failure that should be avoided by effort.	"I imagine the results that I would achieve in the worst possible scenario and use this as motivation for my studies" ^a "Considering what can go wrong helps me to prepare" ^b "Often I think that I am unlucky that my classmates have a high capacity for learning, which prevents me from standing out more" "I try to establish relations between work and my personal interests" ^c "I think up situations where it would be helpful for me to know the material or skills" ^d "I try to see the usefulness of the content/tasks for my life" ^e "I try to relate educational materials to my future profession, remind their importance and value" ^f
Defensive pessimism ^{a,b}	Valuing classmates' capabilities to protect self-worth.	
Enhancement of others ^a	Students' attempts to increase the subjective value of the task by connecting it to one's own personal interests and preferences.	
Enhancement of personal significance ^c (regulation of value ^{d,e,f,g})	Refers to making non-appealing tasks more enjoyable.	"I try to find ways that the material relates to my life" ^g "I make myself look for ways to bring more fun to the tasks" ^b "I make studying more enjoyable by turning it into a game" ^c "To make studying more enjoyable, I try to focus on a fun aspect it might have" ^d "I think of a way to make the work seem enjoyable to complete" ^e "I make sure that distractions occur as seldom as possible" ^c "I try to get rid of any distractions that are around me" ^d "I try to have no distractions around me" ^e "I try to eliminate the factors that distract my concentration in the
Enhancement of situational interest ^{b,c} (regulation of situational interest ^{f,g,h})	Minimizing disruptive factors in the learning environment.	
Environmental control ^c (environmental structuring ^{e,f,g,h,i,j,k})		

Table 2 (continued)

Denominations	Definition	Examples of items
		environment" ^f "I change my surroundings so that it is easy to concentrate on the work" ^g "I keep myself away from distraction in the learning to write process" ^h "I turned off the radio so I can concentrate on what I am doing" ⁱ "I isolate myself from unnecessary noisy places" ^j "I choose the location where I study to avoid too much distraction" ^k "To motivate myself before some tasks, I think that if the teacher is not very demanding I will get a good result" ^a "Sometimes when faced with a task I think that my objective is to learn new things" ^a "I tell to myself that I should keep on learning in order to learn as much as possible for me personally" ^b "I persuade myself to keep at it just to see how much I can learn" ^c "I challenge myself to complete the work and learn as much as possible" ^e "I tell myself that I must study to learn as much as I can" ^d "I plan to do my homework better than others" ^a "I call my attention to the fact of how important it is to do well in tests and exams" ^c "I remind myself how important it is to do well on the tests and assignments in this course." ^d "I think that if I do not study my grades will get worse" ^e "I remind myself about how important it is to get good grades." ^g "I tell myself that it is important to get good grades in writing courses" ^h "I try not to let my classmates notice my mistakes" ^a "I think about that it would be very unpleasant for me to perform worse than the others" ^c "I think that if I do not study my grades will get worse" ^e "I tell myself that I can master the tasks if I set myself subgoals"
Generation of external attributions ^a	Generating external causes that can facilitate positive results.	
Mastery self-talk ^{b,c} (generation of mastery goals ^a , regulation of mastery goals ^e , regulation of learning goals ^{d,e} , Error! Bookmark not defined.)	Students' tendency to focus the aim to enlarge one's competence and knowledge.	
Performance-approach self-talk ^c (generation of self-enhancing goals ^a , regulation of performance goals ^{d,e,g} , performance self-talk ^h)	Reminding to oneself the goal of getting good grades and outperforming others.	
Performance-avoidance self-talk ^c (generation of self-defeating goals ^a , regulation of performance ^e)	Students' attempts to highlight their goal of not performing worse than others.	
Proximal goal settings ^c	Division of distant long-term goals into smaller	

Table 2 (continued)

Denominations	Definition	Examples of items
Self-consequating ^{a,c,d,g} (self-consequences, self-reinforcement ^f) Negative-based incentives ^l	subgoals that are easier to accomplish. Establishing self-provided consequences associated with task completion. ^{a,c,d,g,i,f} Students' self-generated thoughts about potentially negative consequences aimed at increasing effort before performance to avoid failure. ^l	"When faced with a difficult task, I motivate myself by telling myself that I will get positive results" ^a "I make a deal with myself saying that I will do something pleasant after I finish work" ^c "I tell myself I can do something I like later if right now I do the work I have to get done" ^d "I promise myself some kind of a reward if I get the assignment done" ^g "If I do well on a test, I treat myself to a movie" ⁱ "I promise myself that I will receive an award or reward for completing my assignments" ^f "I think about how disappointed my family and friends will be if I fail" ^l "When facing a task or subject, I think that I am capable of exerting sufficient effort to be successful" ^a "I tell myself; you can do this!" ^l "Try to remember a situation in which things went well and which ended up in success. Think about the possible reasons why this happened. How much was this due to you?" "Sometimes I deliberately do not put effort into tasks, so that if my results are not good, I can say that it was due to the fact that I did not make enough effort" ^a "Some students purposely don't try hard in class. Then if they don't do well, they can say it is because they didn't try. How true is this of you?" ⁿ "I try not to get too intensely involved in competitive activities, so it won't hurt too much if I lose or do poorly" ^o "Some students purposely don't try hard in school so that if they don't do well, they can say it is because they didn't try. How true is this of you?" ^p "Some students purposely get involved in a lot of activities. Then if they don't do as well on their schoolwork as they hoped, they can say it is because they are involved with other things. How true is this of you?" ^q
Self-efficacy enhancement ^l (generation of positive expectations ^a)	Involves creating positive thoughts about one's competence or self-efficacy.	
Self-enhancing attributions ^m	Generating self-attributable reasons.	
Self-handicapping ^{a,n,o,p,q}	Creating excuses or obstacles that may be used to justify a potential failure.	

Table 2 (continued)

Denominations	Definition	Examples of items
Work avoidance self-talk ^a	Involves investing the minimum effort in academic tasks.	"I aim to pass, but try to work as little as possible" ^a

Note. Names of the strategies used in the text are highlighted in bold.

^a Escala de Estrategias Motivacionales del Aprendizaje [Scale of Motivational Strategies for Learning] (EEMA; Suárez-Riveiro & Fernández-Suárez, 2011).

^b Defensive Pessimism Questionnaire (Norem, 2002).

^c Motivational Regulation Questionnaire (MRQ; Schwinger et al., 2007, 2009).

^d Motivational Regulation Questionnaire (MRSQ; Wolters & Benzon, 2013).

^e Escala de Autorregulação da Motivação para a Aprendizagem [Self-Regulation of Motivation in Learning Scale] (EAM; Paulino et al., 2015).

^f Metamotivational Strategies in Medical Students Questionnaires (MSMQ; Norouzi et al., 2021).

^g Motivational Regulation Strategies Questionnaire (MRSQ; Wolters, 1999).

^h Second Language Writing Strategies for Motivational Regulation Questionnaire (L2WSMRQ; Teng & Zhang, 2016).

ⁱ Self-regulated Learning Strategies Interview Schedule (SRLIS; Zimmerman & Martínez-Pons, 1990).

^j Academic Self-Regulated Learning Scale (Magno, 2010).

^k Adapted Self-Regulated Learning Questionnaire (SRLQ; Barnard et al., 2009).

^l Academic Volitional Strategies Inventory (AVSI; McCann & Garcia, 1999; McCann & Turner, 2004).

^m Strategy and Attribution Questionnaire (SAQ; Nurmi et al., 1995).

ⁿ Patterns of Adaptive Learning Survey (PALS; Midgley et al., 1996, 2000).

^o Self-Handicapping Scale (SHS; Jones & Rhodewalt, 1982).

^p Adapted Self-handicapping Scale (Urđan et al., 1998).

^q Self-Handicapping Scale (Midgley et al., 1996).

extrinsic/controlling and the adequacy for different motivational dimensions), two of the studies differentiated between strategies for regulating intrinsic and extrinsic motivation and found empirical support for this classification. First, Wolters (1998) combined performance-approach self-talk and self-consequating in an extrinsic category and mastery self-talk, enhancement of personal significance, enhancement of situational interest and self-efficacy enhancement in an intrinsic category. A negative significant correlation between these groups of strategies was observed. Recently, Ilishkina et al. (2022) applied the same classification to the eight principal strategies assessed in the MRQ (Schwinger et al., 2007, 2009). These researchers added performance-avoidance self-talk, proximal goal setting and environmental control to the extrinsic category and restricted intrinsic category to mastery self-talk and interest enhancement. This division was sustained by confirmatory factor analysis, and the MRSs in the intrinsic factor were more closely correlated with intrinsic motives (learn, achieve, self-develop) than with extrinsic motives (self-respect, self-protection, incentives); the opposite was true for the MRSs in the extrinsic factor.

3.2.2. Dimensions of individual differences, contextual factors and motivational self-regulation

Our first hypothesis stated that personal and contextual dimensions involving academic tasks are associated with the use of MRSs. Several personal dimensions that may affect how students deal with academic motivation have been studied. We have gathered the available evidence based on this assumption in this subsection (although the results obtained to date do not allow a causal direction to be established). Meta-

analysis models tested in the current review, confirmed the existence of (1) moderate to high correlations between task value and various MRSs, (2) low to high correlations between both self-efficacy for SRL and task orientation¹ with the use of a series of MRSs, (3) low to moderate correlations between general academic self-efficacy and part of the MRSs, and (4) low positive correlations between self-enhancing and some MRSs (see Table 4).

A forest plot of effect sizes for each of the meta-analyses performed was constructed (included as part of Supplementary Material, see Figs. S1–S46). The results of the pairwise comparisons of the strength of the correlations between dimensions of individual differences and MRSs are indicated by superscripts in Table 4. The strongest effects were found for the relationships between motivational beliefs and mastery self-talk. The relationships between both task orientation and task value and performance-approach self-talk and environmental control were also some of the strongest.

Some other relationships between personal dimensions and the use of MRSs have been noted, although we did not find a sufficient number of studies reporting correlational data to allow us to perform a meta-analysis. Specifically, regarding motivational beliefs a significant predictive positive effect has been found for global motivation regulation from academic self-efficacy (Smit et al., 2017; Suárez-Riveiro et al., 2019); self-efficacy for self-regulated learning (Kim et al., 2018, 2020; Trautner & Schwinger, 2020, 2022); task value (Smit et al., 2017), task and self-enhancing goal orientations (Gaeta et al., 2012; Wolters & Rosenthal, 2000), internal attributions (Suárez-Riveiro et al., 2019), and personal theories about intrinsic motivation (Trautner & Schwinger, 2022).

Complementary to regression data regarding the effect of goal orientations on MRSs, the results obtained by cluster or latent profile analyses suggest that those students who combine different goal orientations use MRSs (globally considered) more often (Rodríguez-Guardado & Gaeta, 2020; Suárez-Riveiro et al., 2001, 2019). Nevertheless, considering other motivational beliefs can help to qualify this observation, as suggested by the results obtained by Ferradás et al. (2019). Clusters of students with low self-esteem and high/moderate task and ego orientations identified in the aforementioned study showed a greater tendency to use deception and self-handicapping. On the other hand, in a more recent study, the compatibility between academic, social and well-being goals was found to facilitate global MRSs use (Kim et al., 2021).

The results obtained regarding the relationship between motivational beliefs and specific MRSs are somewhat more complex. Regression analysis revealed that academic self-efficacy, task value and task orientation show a rather consistent positive effect on the use of different MRSs, while the effect of ego orientation varies between studies. Environmental control, performance-approach self-talk and self-consequating were associated with a greater diversity of motivational beliefs, with performance-approach self-talk being the strategy that was most consistently predicted. A table summarizing regression results on all these relations is included in Supplementary Material (see Table S2).

Some other dimensions of individual differences, in addition to motivational beliefs, have been explored as possible antecedents of MRSs. King and Gaerlan (2015) focused on time perspectives of university students and found that both a positive view of the past and a personal orientation towards future goals and rewards positively predicted all of the MRSs evaluated (environmental control, personal/

¹ To facilitate the distinction between goal orientations and goal-oriented self-talk strategies, the terminology of Skaalvik (1997) for goal orientations is used throughout the text: (1) task orientation refers to the tendency to focus on increasing one's own competences (2) self-enhancing ego orientation refers to the tendency to demonstrate superior abilities than others, and (3) self-defeating ego orientation refers to the tendency to avoid failure.

Table 3 Order of mean scores for the use of motivational regulation strategies.

Study	Order								
	1st	2nd	3rd	4th	5th	6th	7th	8th	
Wolters (1998)c	PapST	EC	EPS	ESI	SC	MST	SEE		
Wolters (1999)b	PapST	EC	SC	MST	EPS/ESI				
Nota et al. (2004)b		EC	SC						
Metallidou (2012)a		EC	SC						
Schwinger et al. (2009)b	PapST	SC	PGS	EC	MST MST	EPS	PavST	ESI	
Schwinger and Stiensmeier-Pelster (2012) study 1b	PapST	SC	PGS	EC	PavST	EPS	PavST	ESI	
Schwinger and Stiensmeier-Pelster (2012) study 2c	PapST	SC	PGS	EPS	MST MST	EC	MST	ESI	
Schwinger and Stiensmeier-Pelster (2012)b	PapST	SC	EC	PGS	SEE	EPS	PavST	ESI	
Fritea and Fritea (2013)b	PapST	SEE	EC	SC	EPS/ESI			ESI	
Wolters and Benzon (2013)c	PapST	EC	SC	MST	EC SEE			ESI	
Wang (2013)b	PapST		SC	MST	SEE EPI	SEE			
King and Gaerlan (2015)c	PapST		SC	MST	EC	MST			
Paulino et al. (2015)b	PapST								
Suá ´ rez-Riveiro et al. (2016)b		EC	PGS	MST	MST	PavST	ESI		
Grunschel et al. (2016) Study 1c	SC		PGS	EC	EC	MST	WavST	PapST	
Grunschel et al. (2016) Study 2c	SC	PapST	PSG	PapST	MST	MST	PavST	ESI	
Paulino et al. (2016)b	SC	EPS	PGS	PapST	EPS +ESI	MST	ESI	PavST	
Schwinger and Otterpohl (2017) Study 1c	PapST	PapST	EC	EC	EPS	EPS	SC	ESI	
Schwinger and Otterpohl (2017) Study 2c	PapST	SC	EC	PGS	EPS	MST	PavST	ESI	
Schwinger and Otterpohl (2017) Study 3b	MST	SC	MST	SC	MST	EPS	ESI	PavST	
Smit et al. (2017) VOCb	PapST	PapST	PGS	PapST	EPI		PavST	ESI	
Wang et al. (2017)b	SC	EST	PGS	EC	EPI				
Ljubin-Golub et al. (2019)c	PapST	EC	EC	PGS	EPI				
Kryshko et al. (2020) Study 1c	PapST	SC	EC	PGS	MST	MST	ESI SIE	PavST	
Kryshko et al. (2020) Study 2c	SC	SC	EC	PGS	EC	MST	ESI	PavST	
Trautner and Schwinger (2020) Study 1c	SC	PapST	PGS	EC	EPS	EPS	PavST	PavST	
Trautner and Schwinger (2020) Study 2c	SC	PapST	EC	EC	SC	MST	ESI ESI	ESI	
Trautner and Schwinger (2020) Study 3c		PapST	PGS	PIE		MST	EPS/ESI	PavST	
Gó ´ es and Boruchovitch (2022)b	SC	PapST	PGS	EC		MST	ESI ESI	PavST	
Trautner and Schwinger (2022) Study 1c	SC	PapST	MST	EC		SC		PavST	
Trautner and Schwinger (2022) Study 2c	EPS +ESI	PapST				MST		PavST	
Lohbeck and Moschner (2021)c		PapST				MST		PavST	

Note. EC =environmental control; EPS =enhancement of personal significance; ESI =enhancement of situational interest; MST =mastery self-talk; PapST =performance-approach self-talk; PavST =performance-avoidance self-talk; PGS =proximal goal setting; SC =self-consequating; SEE =self-efficacy enhancement; WavST =work avoidance self-talk.

- a Primary school student.
- b Secondary school students.
- c University students.

situational interest enhancement, mastery and performance-approach self-talk, and self-consequating).

Personality traits have also attracted attention as possible antecedents of self-regulated motivation. Thus, Ljubin-Golub et al. (2019) explored the association between the Big Five factors and different MRSs in university students and found that students with high scores for agreeableness, extraversion, conscientiousness and intellect, and low scores for emotional stability would be more likely to use various MRSs, with agreeableness predicting a greater number of strategies (7/8) and intellect predicting the lowest number of strategies (3/8); on the other hand, none of the personality traits predicted performance-avoidance self-talk.

Autonomous styles of motivation and academic achievement have also been found to positively predict the global use of MRSs (Garn & Morin, 2021). Along the same line, Wolters and Hussain (2015) also demonstrated a predictive effect of the self-reported tendency of university students to sustain the time and energy necessary for accomplishing long-term tasks on the use of MRSs, globally considered. Unsurprisingly, a positive effect of metamotivational strategy knowledge has also been identified. Thus, in a recent study, Trautner and Schwinger (2022) observed that personal incremental theories (assuming malleability) about intrinsic and extrinsic motivation were associated with both motivational regulation considered globally and diverse MRSs. These findings are consistent with those of a previous study with primary school students (Metallidou, 2012), in which both conceiving learning as a quick process and the ability to learn as innate and fixed were negatively associated with environmental control and

self-consequating.

Finally, although the potential incidence of contextual factors in the use of MRSs remains almost unexplored, the available data indicate moderating effects of culture (Boyle et al., 2020), and parental styles (Aunola et al., 2000), at least regarding the use of negative-based incentives, self-enhancing attributions and self-efficacy enhancement. With respect to the possible incidence of more proximal contextual conditions, we found only one intervention study (Zhang et al., 2022) in which a group of university students (English majors) were required to keep reflective journals on their self-perceived use of self-regulated writing strategies, throughout one semester. An increase in students' strategic awareness was observed, although it did not lead to greater self-perceived use of MRSs.

3.2.3. Effects of motivational self-regulation

As indicated in our second hypothesis, we expected a positive association between the use of MRSs and indicators of good academic progress. Several possible academic implications of motivational self-regulation have been examined. Results of the meta-analyses of the relationship between motivational self-regulation and some expected outcomes (i.e. effort, academic achievement and procrastination) are reported in Table 5, where pairwise comparisons of the strength of the correlations are indicated by superscripts. Forest plots of effect sizes for each of the meta-analyses can be consulted in the Supplementary Material (Figs. S1–S46).

Overall, models were significant, confirming a positive low to high correlation between the use of MRSs and effort, with the correlation

Table 4

Results of the meta-analyses on the relation between interindividual differences dimensions and MRSs.

		No of studies	Sample size	Combined effect size [95 % CI]	Q	p	Tau^2	Egger test	Rank test
Self-efficacy for SRL	MST	5	2006	0.43 [0.39, 0.46]a	0.69	0.95	0.00	-0.39	-0.20
	PGS	5	2006	0.34 [0.27, 0.41]b	11.92*	0.02	0.01	-2.40*	-0.60
	EC	5	2006	0.30 [0.23, 0.37]b	10.76*	0.03	0.01	-0.99	-0.20
	EPS	5	2006	0.26 [0.18, 0.34]c	13.17*	0.01	0.01	2.56*	0.80
	ESI SC	5	2006	0.26 [0.21, 0.31]c	6.56	0.16	0.00	-0.06	0.20
	PapST	5	2006	0.25 [0.21, 0.29]c	1.62	0.81	0.00	-0.60	0.00
	PavST	5	2006	0.25 [0.21, 0.29]c	1.93	0.75	0.00	0.08	0.20
	GS	5	2006	-0.01 [-0.08, 0.07]d	10.74*	0.03	0.00	0.63	0.00
	MST	5	2006	0.47 [0.44, 0.50]	6.64	0.47	0.00	0.84	0.21
Self-efficacy general	PapST	6	5266	0.37 [0.30, 0.44]a	22.13**	<0.001	0.01	-0.70	-0.20
	SC	5	9982	0.29 [0.11, 0.44]b	86.97**	<0.001	0.04	-0.21	-0.40
	MST	5	4797	0.21 [0.15, 0.28]c	12.94*	0.01	0.00	-0.21	-0.40
Task orientation	PapST	7	4103	0.54 [0.44, 0.63]a	61.41**	<0.001	0.03	2.26*	0.50
	EC ESI	6	3553	0.43 [0.34, 0.51]b	26.62**	<0.001	0.01	-0.96	-0.14
	SC	5	1527	0.37 [0.21, 0.50]c	26.03**	<0.001	0.03	0.22	0.20
	PapST	5	2893	0.28 [0.24, 0.31]d	5.63	0.23	0.00	1.55	0.40
	EC	5	1911	0.27 [0.16, 0.37]d	18.30**	<0.001	0.01	0.68	0.40
Self-enhancing	MST	6	3553	0.27 [0.20, 0.33]a	13.25*	0.02	0.05	-3.16*	-0.83*
	MST	5	1527	0.07 [-0.13, 0.28]b	53.63**	<0.001	0.13	-4.67**	-0.80
	PapST	6	3553	0.06 [-0.23, 0.34]b	194.69**	<0.001	0.02	-2.42*	-0.43
	EC SC	6	5513	0.58 [0.49, 0.65]a	96.17**	<0.001	0.06	-0.47	-0.07
Task value		5	4963	0.48 [0.29, 0.63]b	114.13**	<0.001	0.01	-1.42	-0.40
		5	4963	0.42 [0.34, 0.50]c	29.79**	<0.001	0.01	-0.41	-0.20
		6	5513	0.31 [0.21, 0.40]d	86.94**	<0.001	0.01	-0.92	0.20

Note. EC =environmental control; EPS =enhancement of personal significance; ESI =enhancement of situational interest; GS =global score; MST =mastery self-talk; PapST =performance-approach self-talk; PavST =performance-avoidance self-talk; PGS =proximal goal setting; SC =self-consequating. Effect size values with different superscripts are significantly different (*p* values <.05). **p* <.05, ***p* <.01, ****p* <.001.

Table 5

Results of the meta-analyses on the relation between MRSs and academic implications.

		No of studies	Sample size	Combined effect size [95 % CI]	Q	p	Tau^2	Egger test	Rank test
Cognitive learning strategies	MST	6	3386	0.35 [0.20, 0.49] a	107.55**	<0.001	0.04	0.43	0.33
	PAPST	6	3386	0.29 [0.14, 0.44] b	98.92**	<0.001	0.04	0.58	0.33
	GS	5	1639	0.60 [0.40, 0.75]	119.01**	<0.001	0.09	2.29*	0.80
Effort	MST	15	8714	0.45 [0.39, 0.51] a	216.59	<0.001	0.02	-1.46	-0.09
	PapST	15	8714	0.37 [0.31, 0.43] b	216.49	<0.001	0.02	-1.06	0.08
	EC PGS	15	8714	0.34 [0.28, 0.40] c	206.19	<0.001	0.02	-1.21	0.04
	SC ESI	13	5024	0.32 [0.27, 0.37] d	51.32	<0.001	0.01	-2.02*	-0.32
	EPS	15	8714	0.29 [0.22, 0.35] e	371.74	<0.001	0.02	-2.14*	0.15
	PavST	13	5024	0.18 [0.13, 0.22] f	32.61	0.001	0.01	-0.90	-0.12
	GS GS	13	5024	0.17 [0.12, 0.22] f	36.11	0.001	0.01	1.63	0.30
	PapST	13	5024	0.10 [0.06, 0.15] g	27.53	0.01	0.00	2.08*	0.32
	PavST	9	2866	0.48 [0.41, 0.54]	41.82	<0.001	0.01	-0.24	-0.11
	EC SC	5	1336	-0.25 [-0.44, -0.03]	55.96	<0.001	0.06	2.57*	0.60
Procrastination Achievement	ESI	13	3978	0.08 [-0.01, 0.16] a	74.92	<0.001	0.02	0.33	0.06
	EPS	11	4139	0.05 [-0.00, 0.09] c	46.09	<0.001	0.01	-3.33*	-0.44
	MST	14	4144	-0.07 [-0.14, -0.00] b	25.27	0.02	0.00	-0.04	-0.04
	PGS	14	4528	0.04 [-0.01, 0.09] c	29.49	0.005	0.00	-0.51	-0.27
	GS	12	4326	0.04 [-0.01, 0.09] c	61.47	0.005	0.01	-0.51	-0.38
		10	3589	-0.03 [-0.11, 0.05] d	24.02	<0.001	0.01	-3.77*	-0.50
		14	4528	-0.02 [-0.08, 0.04] d	93.41	0.001	0.02	-2.64*	-0.27
		10	3589	0.01 [-0.07, 0.09] d	41.22	<0.001	0.01	-1.77	-0.32
		13	5002	0.01 [-0.06, 0.09] d	358.57	<0.001	0.12	-2.50*	0.05
				0.21 [0.02, 0.38]		<0.001		0.20	

Note. EC =environmental control; EPS =enhancement of personal significance; ESI =enhancement of situational interest; GS =Global score; MST =mastery self-talk; PapST =performance-approach self-talk; PavST =performance-avoidance self-talk; PGS =proximal goal setting; SC =self-consequating. Effect size values with different superscripts are significantly different (*p* values <.05). **p* <.05, ***p* <.01, ****p* <.001.

between mastery self-talk and effort being significantly higher than all the other correlations with which it was compared. The opposite pattern was observed for the correlation between effort and performance-avoidance self-talk, which was significantly weaker than the other correlations.

Mastery self-talking and performance-approach self-talk were found to maintain high and moderate correlations respectively with cognitive learning strategies, globally considered. As observed for MRSs and achievement, the correlations were very low, which is in line with the inconsistent regression results reported for this relationship. A table

summarizing these and the other regression results on the relationships between MRSs and their supposed academic implications has been included as Supplementary Material (see Table S3).

Globally, motivational self-regulation has been found to positively predict positive emotions (Grunschel et al., 2016; Trautner & Schwinger, 2020), cognitive and metacognitive learning strategies (Kim et al., 2018; Teng & Zhang, 2018), effort (Eckerlein et al., 2019; Engelschalk et al., 2017; Schwinger et al., 2009; Schwinger & Otterpohl, 2017; Schwinger & Stiensmeier-Pelster, 2012; Smit et al., 2017; Trautner & Schwinger, 2022; Wolters, 1999), engagement (Smit et al., 2017)

and achievement (Eckerlein et al., 2019; Kim et al., 2020; Kryshko et al., 2020; Michalsky, 2021; Rodríguez-Guardado & Gaeta, 2020; Trautner & Schwinger, 2020) and to negatively predict procrastination (Bäulke et al., 2021; Grunschel et al., 2016; Kim et al., 2018, 2020; Ljubin-Golub et al., 2019) and drop-out intentions (Bäulke et al., 2018; Kryshko et al., 2020). Relative to achievement, the experimental study by Michalsky (2021) confirmed the favourable effect of metamotivational scaffolding on academic performance in science tasks. Nevertheless, the relationship between MRSs and achievement will probably vary depending on the academic subjects considered, and e.g. it has not been verified for writing proficiency (Zhang et al., 2022).

Different specific MRSs have also been found to predict the above-mentioned dimensions, either positively or negatively. In this regard, effort has attracted special interest, and it has been found to be positively predicted by 7 out of the 8 strategies assessed in the MRQ (Schwinger et al., 2007, 2009) and negatively predicted by performance-avoidance self-talk, while the reverse relationship has been found for the same strategies and procrastination. We must also point

out that the results of regression analyses between MRSs and achievement are inconsistent.

Regarding dimensions inherent to self-regulated learning, metacognitive self-regulation, measured both globally and by strategy, have been consistently shown to be predicted by mastery self-talk. Among the strategies occasionally evaluated, cost appraisal, defensive pessimism and self-efficacy enhancement have shown a positive predictive effect on metacognitive self-regulation while self-handicapping and work-avoidance self-talk showed a negative effect. Results on cognitive learning strategies are quite inconsistent, except for the following: (1) self-efficacy enhancement and defensive pessimism, which have a positive effect on rehearsal, elaboration and organization; (2) self-consequating, which has a positive effect on rehearsal and elaboration; (3) cost appraisal with a positive effect, and self-handicapping with a negative effect on elaboration and organization; (4) environmental control, which does not manifest as a significant predictor (see Table 6). Finally, several authors have explored the relationship between MRSs and several adjustment indexes, finding the following: (1)

Table 6

Moderating effects of educational level, sex and measure on the correlations of MRs with dimensions of individual differences and with academic implications.

		Educational level		Sex		Measure	
		Qb	β	Qb	β	Qb	β
Dimensions of individual differences							
Self-efficacy for SRL	EC			0.31	0.01		
	EPS			2.10	0.01		
	ESI			2.09	0.01		
	MST			0.01	-0.00		
	PapST			0.00	0.00		
	PavST			3.04	-0.01		
	PGS			0.34	-0.01		
	SC			0.13	0.00		
General academic self-efficacy	MST	18.94**	-0.18	1.79	-0.01	0.04	-0.02
	PapST	1.68	-0.22	55.32**	-0.02	0.77	-0.17
	SC EC	0.01	-0.01	0.42	-0.01	11.34**	0.11
Task orientation	ESI	3.26	-0.26	4.74*	-0.01	2.86	-0.25
	PapST	0.47	0.04	0.62	-0.00	0.67	-0.04
	MST	4.12*	-0.16	2.64	-0.01	0.70	-0.12
	SC EC	0.11	0.05	0.06	0.00	0.03	-0.04
Self-enhancing	MST	0.66	0.10	0.29	-0.00	0.53	-0.11
	PapST	0.68	0.19	0.27	-0.00	1.75	0.26
	EC	0.16	0.14	0.79	0.02	3.23	0.59
	MST	0.63	-0.06	0.04	0.00	0.24	0.05
Task value	PapST		-0.19	3.39	0.01	0.05	-0.03
	SC	28.12**	-0.24	18.77**	-0.01	0.00	-0.01
	PapST	8.78*	-0.08	0.98	-0.00	0.07	0.07
		0.09	-0.00	0.31	-0.00	0.54	0.09
	0.69	0.15	0.13	-	3.80*	-0.26	
Academic implications							
Cognitive learning strategies	MST	0.03	0.03	0.83	-0.01	13.80**	-0.33
	PapST	0.69	0.15	0.13	-0.00	3.80*	-0.26
Effort	EC	0.05	0.02	0.00	0.00	0.29	0.09
	EPS	2.53	0.10	0.27	0.00		
	ESI	6.35*	0.13	4.41*	0.00		
	MST	0.07	0.02	2.66	0.00	0.02	0.03
	PapST	0.06	0.02	0.04	0.00	0.14	0.06
	PavST	15.17**	-0.15	4.82*	-0.01		
	PGS	4.36*	0.13	0.72	0.00		
	SC EC	0.01	-0.01	1.20	0.00	0.06	0.04
Achievement	EPS	0.24	-0.02	1.49	0.00	0.28	-0.04
	ESI	0.03	-0.01	7.87*	0.01		
	MST	6.12*	0.16	3.13	0.01	0.24	0.05
	PapST	0.04	0.02	2.13	0.01	0.09	0.03
	PGS	0.59	0.07	2.70	0.01	2.74	-0.17
	PavST	2.21	-0.12	8.12*	0.01		
	SC	0.01	0.01	0.68	0.00	1.60	0.14
		0.00	-0.00	0.70	0.00	1.11	-0.07

Note. EC=environmental control; EPS=enhancement of personal significance; ESI=enhancement of situational interest; MST = mastery self-talk; PapST= performance-approach self-talk; PavST=performance-avoidance self-talk; PGS=proximal goal setting; SC=self-consequating; SE = self-efficacy.

* p < .05.
** p < .001.

performance-approach self-talk positively predicts withdrawal and avoidance of challenge and negatively predicts disruptive behaviours, satisfaction with life and drop-out intention; (2) positive emotions are positively predicted by interest enhancement, mastery self-talk and proximal goal setting and negatively predicted by performance-avoidance self-talk; (3) negative emotions are positively predicted by performance-approach and performance-avoidance self-talk and negatively predicted by proximal goal setting; (4) the association between MRSs and achievement has been inconsistently demonstrated.

3.2.4. Moderating and mediating effects

As our third hypothesis contends, both sex and educational level were expected to moderate the frequency of use of MRSs and its relationship with dimensions of individual differences as well as with academic implications. Some of the studies included in the present review explored sex differences regarding frequency of MRSs use, showing that female secondary students obtained higher scores on environmental control, performance-approach self-talk, self-consequating and self-efficacy enhancement (Gó'es & Boruchovitch, 2022; Suá' rez-Riveiro & Ferná' ndez-Su' árez, 2011), male secondary students used annulation and enhancement of others and also deception and self-handicapping more frequently (Suá' rez-Riveiro et al., 2019; Suá' rez-Riveiro & Ferná' ndez-Su' árez, 2011; Torrano & Soria, 2017), while female university students used enhancement of situational interest, environmental control, mastery self-talk, performance-approach self-talk and self-consequating more frequently than their male counterparts (Ilishkina et al., 2022; King & Gaerlan, 2015; Wolters & Benzon, 2013). Regarding the expected effect of educational level, university students have been found to have a more complete understanding of MRSs (Cooper & Corpus, 2009) and more frequent use of environmental control (Peng & Bai, 2020). On the other hand, the study by Schwinger (2013) suggests a domain-linked specificity of the use of self-handicapping that would correspond (showing higher significant correlations) to a domain-specific self-concept of ability, interest and achievement in the students. The moderating effects on the associations between dimensions of individual differences and MRSs and between MRSs and academic implications were also explored in the meta-analyses conducted in this review (see Table 6). The correlation between motivational beliefs (except for self-efficacy for SRL) and several MRSs was moderated by sex and educational level, and in all cases was significantly higher in women than in men and also higher in secondary school students than in university students. The type of measure used for MRSs was found to moderate only the relationship between academic self-efficacy and self-consequating, and it was higher when the latter motivational strategy was measured by instruments that include generic and problematic conditions than those centered on motivationally challenging situations (i.e. discouragement, difficulties or distractions).

Regarding the correlations between MRSs and possible educational implications, a moderating effect of sex was found in the relationship between performance-avoidance self-talk and effort, which was higher in women. However, the relationship between enhancement of situational interest and effort was higher in men. On the other hand, the relationship between personal goal setting and effort and that between enhancement of personal significance and effort were higher in university students than in secondary students, while the relationship between performance-avoidance self-talk and effort was higher in secondary students. The correlations between two of the MRSs (enhancement of personal interest and personal goal setting) and achievement were higher in men. A moderating effect of the type of measure in the relationship between both mastery self-talk and performance-approach self-talk and cognitive learning strategies was also observed. The effect was greater when the strategies were evaluated in a questionnaire focused on motivational challenging situations.

Finally, we did not find any data on possible mediating factors in the relationships between dimensions of individual differences or contextual factors and the use of MRSs. Regarding indirect effects of MRSs,

metacognitive regulation has been found to mediate the relationships between defensive pessimism, self-efficacy enhancement and self-handicapping and the use of learning strategies (Suá' rez-Riveiro et al., 2016; Suá' rez-Riveiro & Ferná' ndez-Suá' rez, 2011), and a mediational effect of effort in the relationship between MRSs, globally or individually considered, and achievement has consistently been reported (Engelschalk et al., 2017; Grunschel et al., 2016; Kryshko et al., 2020; Schwinger et al., 2009; Trautner & Schwinger, 2020).

4. Discussion

The aim of this systematic review was to explore and summarize the available evidence regarding the strategies that students use to self-regulate their academic motivation. The increasing attention given to the topic of the review has been demonstrated in the specialized literature, particularly in Europe, although to date most studies have focused on secondary school and university students. This expansion has been favoured by theoretical models on the dimensions and processes involved in motivational self-regulation and the types of strategies that students tend to use (Miele & Scholer, 2016, 2018; Schwinger & Stiensmeier-Pelster, 2012; Wolters, 2003). Although more investigation is clearly needed to understand the role of MRSs in learning and achievement, particularly regarding the specificity of the antecedents and effects of MRSs, some tentative conclusions can be reached from the evidence accumulated to date, and these may serve to guide future research and interventions.

4.1. The most frequently studied and used motivational regulation strategies

Starting with our first objective, relative to analysing the types and frequency of MRSs used by students, the data gathered in the present review refer to 18 types of strategies. We found disagreements in terms of the denomination and operationalization of strategies and a clear bias towards those strategies delimited by Wolters (1998) and Schwinger et al. (2007, 2009). Examination of the informed use of strategies suggests that both secondary and university students primarily resort to extrinsic/controlling types of strategies such as performance-approach self-talk and self-consequating rather than intrinsic/autonomous strategies (e.g. interest enhancement or mastery self-talk).

Consistent with this observation, when considering the motivational dimension being targeted, and based on the theoretical categorizations of MRSs taking this dimension into account (Miele & Scholer, 2016; Wolters, 2003), those strategies focused on the utility task value (usefulness for achieving long-term goals of external rewards), such as performance self-talk and self-consequating, and task cost (e.g. environmental control) are more frequent than those focused on intrinsic task value, such as interest enhancement, and attainment task value (consistency with self-image), such as mastery self-talk. According to Wolters and Benzon (2013), this preference could be explained by either greater declarative or procedural knowledge about the prioritized strategies or the belief that they are more efficient; students are probably responding to high levels of challenge and competitive pressure, which would lead them to focus on achievement goals and self-discipline (Elliot et al., 2005; Yeo et al., 2009). By contrast, students may be less conscientious about strategies directed to intrinsic/autonomous motivation or they may consider these ineffective in the academic context. These arguments are consistent with the role attributed to both individual and contextual factors as antecedents of the adoption of MRSs in theoretical models of motivational self-regulation (Miele & Scholer, 2016, 2018; Schwinger & Stiensmeier-Pelster, 2012).

However, a more complete picture will be obtained as data on scarcely studied strategies are provided, especially on those considered maladaptive, i.e. those assumed to lead to negative academic consequences, like performance-avoidance self-talk. The adequacy of different strategies in the pre-actional, actional and post-actional phases

of the learning cycle and the motivational situation should be also further explored.

4.2. The presumed antecedents of motivational self-regulation

Our second objective was to explore and evaluate the strength of the relationship between dimensions of individual differences or contextual factors and MRSs. In accordance with models of motivational self-regulation, where metamotivational knowledge (in combination with metamotivational feelings) is conceived as the basis of awareness and control of academic motivational regulation, the findings demonstrate a positive association between different manifestations of motivational beliefs (about tasks, strategies and self) and the use of MRSs, namely self-efficacy, task value, goal orientations, internal attributions and metamotivational knowledge. In this regard, self-efficacy, task value and goal orientations must be highlighted, as they show a rather consistent positive predictive effect on the use of MRSs, suggesting that activating beliefs on personal competence and/or the relevance of academic tasks, as well as focusing on increasing personal competence would lead the subject to what Boekaerts described as *self-driven self-regulation* (Boekaerts, 2006), which means that the subject's high order goals direct the learning process. In accordance, the present review found that the effect of motivational beliefs on mastery self-talk (a strategy centered on attainment task value) was the strongest. The relationships between both task orientation and task value with performance-approach self-talk (focused on utility task value) and environmental control (related to task cost) also had strong effects. Pending further research, the evidence available to date, thus suggests that trying to establish a balance between the cost and the value of the academic task seems to be a strategic guideline for students, which is consistent with expectancy-value models of academic motivation (Eccles & Wigfield, 2002, 2020). On the other hand, our results support the relevance given in the Metamotivational Model of Motivation Regulation (Miele & Scholer, 2016, 2018) to academic goals and task cost as motivational beliefs that may establish the conditions for self-regulation of motivation and also to self-efficacy and task value as components of motivation to be monitored and controlled in relation to academic activities.

Regarding distal and proximal contextual factors that may determine the frequency and effectiveness of MRS use, the scant data available at present suggest a moderator effect of family educational styles and culture and also the effectiveness of training motivational self-regulation. Diverse models have emphasized the importance of an ecological view of self-regulated learning, distinguishing multiple contextual layers that should be considered when exploring learning skills development and execution (see for example Ben-Eliyahu & Bernacki, 2015; Butler et al., 2011). This is clearly a line of development for future research on MRSs.

4.3. The expected repercussion of motivational self-regulation

Both cognitive and metacognitive learning strategies (inherent processes of self-regulated learning), evaluated globally and separately, have been found to be positively predicted by MRs, as assumed in theoretical models focused on motivational regulation (Miele & Scholer, 2016, 2018; Schwinger & Stiensmeier-Pelster, 2012). MRSs considered globally have also been found to predict positive emotional activation (Grunschel et al., 2016; Trautner & Schwinger, 2020) and engagement (Smit et al., 2017). These processes plausibly constitute the means by which academic effort is influenced, which is considered the main purpose of motivational self-regulation (Schwinger & Stiensmeier-Pelster, 2012; Wolters & Benzoni, 2013).

In fact, the data compiled in the present review show significant positive correlations between various MRSs and effort, with the combined effect size of mastery self-talk being high and significantly stronger than for the other MRSs examined. According to their presumed importance for regulation of effort, as indicated by meta-analytical

results, the best strategies seem to be those focused on the utility value (performance-approach self-talk, self-consequating), intrinsic value (enhancement of situational interest) and cost (proximal goal setting, environmental control) of the academic work. Thus, regarding the relative efficiency of MRSs, the findings of the present review suggest progression from intending to persuade oneself of the importance of the academic task, to enlarging one's skill and knowledge, to reminding oneself of the outcomes of the effort and trying to reduce task cost, either by avoiding the salience of disruptors like competing waived activities or by dividing the task into smaller, more manageable objectives. Although a significant effect of enhancing personal significance of the tasks on effort has also been observed, it seems to be less important. To our knowledge, no other studies have compared the strength of the association between different MRSs and effort. Pending further data, the results of the present review may serve to qualify the general assumption

made in theoretical models of motivational self-regulation (Miele & Scholer, 2016, 2018; Schwinger & Stiensmeier-Pelster, 2012) about the association between MRSs and effort, since they suggest differential effect of the diverse strategies as factors conditioning task processing and ultimately volition and achievement.

Regarding meta-analysis results for achievement, combined effect sizes were low, which is consistent with the regression results gathered in the present review, showing an inconsistent positive predictive effect. Medial effects, which are discussed below, may shed some light on those results.

4.4. Moderating and mediating factors

In the present review, we collected data regarding the moderating effect of sex relative to the frequency of use of MRSs and also regarding three different possible moderating factors (educational level, sex, and type of instrument used to measure MRSs) in the associations between MRSs and those dimensions considered antecedents (motivational beliefs) from a theoretical point of view and between MRSs and those dimensions proposed as academic implications of MRSs. Data on the moderating effects of sex on the frequency of use of MRSs suggest that female secondary students use a series of strategies (e.g. self-efficacy enhancement and performance-approach self-talk) more frequently than their male companions, and that male university students make more frequent use of other strategies viewed as ego-protective and academically maladaptive (e.g. annulation of others and self-handicapping). These tendencies may contribute to the demonstrated higher academic achievement of females in secondary school and university courses (Jere et al., 2022; Voyer & Voyer, 2014). In any case, this argument should be considered tentative as data on the moderating effect of sex on the use of MRSs remain scarce.

The relationships between various MRSs and dimensions presumed to be antecedents or repercussions of the strategies have been found to be moderated by educational level and sex, indicating an incidence of the development of metamotivational knowledge and gender-roles on the potential of motivational beliefs to activate forms of strategic motivational self-regulation, as well as in the efficacy of at least some MRSs. Further investigation on these moderating effects could contribute to replicating if feasible and understanding the nature of the effects found in the present review. Based on our data, the type of measure should be also considered, although its moderating effect seems to be more limited. Those measures regarding generic and problematic academic conditions are probably more sensitive to personal preferences or tendencies, while those focused on specific motivationally challenging situations (i.e. discouragement, difficulties or distractions) are more representative of the suitability of MRSs for the specific tasks and/or learning situations.

Finally, regarding the mediation effects explored in the studies analysed in the present review, effort has been consistently found to mediate the relationship between MRSs and achievement (Engelschack et al., 2017; Kryshko et al., 2020; Schwinger et al., 2009; Trautner &

Schwinger, 2020), in accordance with the expected role of activating MRSs (Schwinger & Stiensmeier-Pelster, 2012; Wolters & Benzon, 2013). No other mediation variables in this relationship have been explored. The previously observed mediation effect of metacognitive regulation in how self-efficacy enhancement, defensive pessimism and self-handicapping are related to cognitive learning strategies is also important for disentangling the nature of the processes involved in self-regulated learning (Suárez-Riveiro et al., 2016; Suárez-Riveiro & Fernández-Suárez, 2011), suggesting that some strategies could favour or hinder metacognitive awareness and control, which in turn would determine the activation of conditional knowledge on learning strategies and their use. As illustrated in the Metamotivational Model of Motivation (Miele & Scholer, 2016, 2018) when students process tasks, they often must overcome obstacles (e.g. distractions) and assimilate costs (e.g. psychological discomfort), which would cause metamotivational feelings that would lead them to resume motivational monitoring and control. The interplay between cognitive, metacognitive and motivational learning strategies thus clearly deserves further attention in future research.

5. Limitations and future lines of research

Some limitations of the studies conducted to date on MRSs should be noted. First, although the data collected in the present study give empirical consistency to the theoretical models on motivational self-regulation, there is a lack of experimental research that tests theoretical assumptions regarding antecedents and consequences of MRSs. Most of the studies reviewed involved cross-sectional designs, which prevent us from establishing causal relationships, although the predictive effects demonstrated may guide future longitudinal and intervention studies on motivational regulation. Second, the number of MRSs explored to date is rather limited, and maladaptive MRSs in particular should be studied further. In fact, the results of meta-analysis conducted in this study were restricted to sufficiently large data sets that include similar variables. Some variables of interest and their relationship with MRSs (as suggested by regression data gathered) were not included in the analyses, because of the small number of studies that provided correlational specific data. Third, more investigation is needed about the mediating (e.g. effort, procrastination, metacognitive strategies) and moderator (e.g. culture, education level) factors of supposed antecedents and consequences of MRSs, to enable us to understand the nature of personal and contextual conditions and the psychosocial processes involved.

As a main line of progress, research on the incidence of contextual factors, both distal (e.g. perceived parental support) and proximal (e.g. classroom instructional dynamics), on the use of MRSs should be highlighted. Examining the balance between competitiveness and collaboration in the classroom climate and its effect on the adoption of MRSs focused on the utility value of academic tasks or those focused on their intrinsic value and achievement would be of particular interest. Variations in the use of the strategies as a function of content domain and task completion phase (pre-actional, actional and post-actional) should also be explored. Moreover, longitudinal studies should be conducted to obtain data on the development of the MRSs and on plausible causal links between the MRSs and the dimensions that are assumed to be their antecedents and consequences. The relationship between MRSs and

both cognitive and metacognitive strategies should be given priority

insofar as it could shed light on the nature of the psychological processes involved in self-regulated learning. Finally, conducting studies on possible intervention actions aimed at improving the knowledge and application of MRSs would also be valuable.

6. Conclusion

The following conclusions can be drawn from this study:

- The data provided in the reviewed articles refer to 18 MRSs and indicate the importance of distinguishing between intrinsic/autonomous and extrinsic/controlling forms of motivational self-regulation.
- Meta-analysis of the relationship between the assumed antecedents of motivational self-regulation and MRSs showed consistent correlations between some motivational beliefs (self-efficacy, task orientation and self-enhancing) and the use of diverse MRSs. The strongest effects were found for the relationships between motivational beliefs and mastery self-talk, and between both task orientation and task value and performance-approach self-talk and environmental control.
- Complementarily, the compiled regression analysis data indicated an effect of some other dimensions of individual differences (personal traits, autonomous styles of motivation, metamotivational strategy knowledge) and contextual factors (culture, parental styles).
- Meta-analysis of the relationship between MRSs and indicators of their expected educational implications showed a consistent positive correlation between the use of MRSs and both the use of cognitive learning strategies and effort.
- In addition, the compiled regression analysis data indicated a predictive positive effect of MRSs for positive emotions, cognitive and metacognitive learning strategies, engagement and achievement and a predictive negative effect for procrastination.
- Moderating effects of sex, educational level and type of measure used for strategy use in the relationship between MRSs and their assumed antecedents and consequences were identified.
- The data gathered demonstrated a mediation effect of effort on the relation between MRSs and achievement, as well as a mediation effect of metacognitive strategies in the relation between MRSs and achievement.

CRedit authorship contribution statement

Eva Villar: Writing – original draft, Methodology, Formal analysis, Conceptualization. **M^a. Emma Mayo:** Writing – review & editing, Visualization, Methodology, Investigation. **Zeltia Martínez-López:** Writing – review & editing, Visualization, Methodology. **Carolina Tinajero:** Writing – original draft, Visualization, Supervision, Project administration, Conceptualization.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.lindif.2024.102480>.

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5.3 Artículo 5

Martínez-López, Z., Moran, V. E., Mayo, M. E., **Villar, E.** y Tinajero, C. (2024). Perceived social support and its relationship with self-regulated learning, goal orientation self-management, and academic achievement. *European Journal of Psychology of Education*, 39, 813-835. <https://doi.org/10.1007/s10212-023-00752-y>

El estudio recogido en esta publicación aporta datos que permiten progresar en la comprensión de la naturaleza de las sendas de incidencia del apoyo social. Partiendo del papel esencial que presuponíamos habrían de tener los principales agentes de socialización (familia, profesorado e iguales), exploramos las provisiones de apoyo por estos facilitadas y su relación con las facetas cognoscitiva y de control de la metacognición. Nos interesaban, además, las interconexiones entre estas dimensiones y el modo en que los/as estudiantes gestionan sus metas académicas, así como su repercusión para el rendimiento académico. Así, evaluamos en estudiantes de E.S.O. la disponibilidad percibida de apoyo, el conocimiento metacognitivo y las estrategias cognitivas y metacognitivas de aprendizaje. También se evaluaron las estrategias motivacionales de autohabla de aprendizaje, autoensalzamiento, autoderrota y evitación del trabajo. El modelo sometido a prueba y finalmente respaldado estadísticamente, sugiere que la gestión de las metas académicas media la relación entre el apoyo percibido y la metacognición. Esta última dimensión, a su vez incide en el rendimiento.

El trabajo conecta con una línea emergente en la investigación sobre el AAR, a saber, la dedicada a faceta de regulación motivacional. Si bien fue tradicionalmente relegada, esta toma auge creciente en la actualidad, gracias al aporte heurístico de los más recientes modelos sobre AAR.



Perceived social support and its relationship with self-regulated learning, goal orientation self-management, and academic achievement

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Abstract

Self-regulated learning is recognized as a core competence for academic success and life-long formation. The social context in which self-regulated learning develops and takes place is attracting growing interest. Using cross-sectional data from secondary education students ($n = 561$), we aimed to formulate explanatory arguments regarding the effect of social support on metacognitive knowledge, metacognitive and cognitive learning strategies, and academic achievement, considering the potential mediating role of goal orientation self-management. Structural Equation Modelling yielded a conceptually consistent and statistically satisfactory empirical model, explaining a moderate-high percentage of the variance in self-regulated learning and academic achievement. The results showed that perceived support from teachers and family positively predicted metacognitive knowledge, metacognitive and cognitive learning strategies, and mastery self-talk and negatively predicted work-avoidance self-talk. Moreover, mastery self-talk and work-avoidance self-talk directly and indirectly (through metacognitive knowledge) predicted academic achievement. Perceived social support is proposed as a marker of vulnerability/protection and as a resource for facing challenges in the academic context.

Keywords Perceived social support · Academic achievement · Adolescence · Motivational regulation · Self-regulated learning

Introduction

The construct of self-regulated learning has generated increasing interest over the last three decades due to its heuristic value, enabling academic learning to be modelled and inspiring educators who seek to understand how students become engaged and autonomous (Huang et al., 2023; Schunk & Greene, 2018). Self-regulated learning is defined as a process of activating and sustaining cognitions, affects, and actions, when students address learning objectives in interaction with environmental factors. It is conceived as a self-directed process that is started and sustained by metacognition, which comprises metacognitive

knowledge (MK) and control of one's thinking (Schunk & Zimmerman, 2013; Zeidner & Stoeger, 2019). Metacognitive knowledge consists of ideas and beliefs about the self as a learner (declarative), about how to perform learning strategies (procedural) and about when and why to use them (conditional) (Efklides, 2017). On the other hand, metacognitive control entails self-awareness of and access to learning strategies, which comprise metacognitive (planning, monitoring, reviewing, and evaluating), cognitive (rehearsal, elaboration, and organization), and motivational (focusing attention, and maintaining self-motivation) learning strategies (Zeidner & Stoeger, 2019). These types of skills conform a basic competence which is considered a key to academic success and life-long learning (OECD, 2018). Research studies involving diverse educational levels and situations have consistently found that self-regulated learning is positively associated with academic engagement (Cleary et al., 2020; Li & Lajoie, 2022), adjustment (De la Fuente et al., 2020; García-Ros et al., 2022), and achievement (De la Fuente et al., 2020; Dent & Koenka, 2016; Mega et al., 2014).

Since the earliest theoretical models of self-regulated learning appeared, environmental conditions have been perceived as having a key influence on development and implementation of metacognitive knowledge and skills (Panadero, 2017; Puustinen & Puulkinen, 2001). Special emphasis has been placed on social support, which is considered the basis for enhancement of inner motivational resources (i.e. motivational self-regulation), which will, in turn, favour self-regulated learning (Perry et al., 2018; Skinner et al., 2008). Recent theoretical proposals specifically highlight self-management of academic goals as a manifestation of motivational self-regulation (Miele & Scholer, 2018; Wolters, 2003). The supposed relationships between these dimensions are described in the following sections.

The influence of social support on self-regulated learning

Several theoretical models of self-regulated learning have highlighted the role of social environmental influences. Thus, for instance, Ben-Eliyahu and Bernacki (2015) have drawn attention to the ecology of factors that affect learning. These authors sustain that academic engagement may not only be conditioned by the immediate academic environment of the classroom, but also by other microsystems (i.e. family, teachers, peers) and distal systems (e.g. cultural values, social conditions). In fact, primary socializing contexts are thought to determine the development of self-regulated learning, and in particular motivational self-regulation, through social influence processes such as modelling, scaffolding, and direct instruction (Wolters, 2011; Zimmerman & Schunk, 2012). At the same time, according to the Self-Determination Theory (SDT, Ryan & Deci, 2002), insofar as those contexts fulfil basic psychological needs (competence, autonomy, and relatedness), they will foster or undermine self-regulation by modulating the internalization and integration of interests and goals (Connell & Wellborn, 1991; Stroet et al., 2013).

Supportive relationships with family, teachers, and peers are considered essential, both as a condition to fulfil basic needs and as a guidance resource for the development of learning strategies (Danielsen et al., 2011; Stroet et al., 2013). According to the Self-System Model of Motivational Development (SSMMD; Newman, 2000; Skinner et al., 2008), the need for competence should be fulfilled by a supportive social context that provides structure (i.e. information on desired outcomes), while the need for autonomy should be satisfied by supplying confidence in students' abilities, and the need for relatedness should be met by provision of involvement. In general, perceived social support is thought to moderate the appraisal of situations as threatening and to enhance self-confidence to cope with

new challenges (Cohen et al., 2000; Schwarzer & Knoll, 2007). The effect of peer support, however, is considered to be more uncertain, as it has been associated with both positive and negative manifestations (Rueger et al., 2008; Worley et al., 2023).

Self-regulated learning, motivational self-regulation, and goal oriented self-talk as a principal motivational strategy

As already mentioned, learning strategies are classified into metacognitive, cognitive, and motivational strategies. Metacognitive and cognitive learning strategies (MCLS) have prevailed in research on self-regulated learning, although the motivational facet is increasingly being considered (Bakhtiar & Hadwin, 2021). This facet is now emphasized as a core part of self-regulation, as it may affect the intention to learn and the effort and persistence during the learning process, as well as learning strategies and academic achievement (Wolters, 2003). This entails viewing motivation from an agentic perspective. Thus, although the essential role played by a motivational learning climate is generally recognized, some authors have indicated that teaching students to regulate their own motivation may be more effective for promoting self-regulated learning (Boekaerts & Cascallar, 2006; Miele & Scholer, 2016).

Among the first theoretical approaches to motivational self-regulation, the structural model developed by Boekaerts (1996, 1999) deserves to be highlighted. This author distinguished between two interrelated regulatory systems, one of which was referred to as information processing and the other as emotional-motivational management. Boekaerts and colleagues (Boekaerts & Cascallar, 2006; Boekaerts & Niemivirta, 2000) later developed a dual processing self-regulation model and adopted a dynamic perspective in which two alternative processing paths were proposed (mastery/growth vs. coping/ well-being). The first path would be taken by the student when pursuing self-chosen learning goals, in line with personal interests and values, while the second path implies prioritising ego-protective goals when confronting failure, coercion, or competing goals or when the learner is unwilling to invest energy in a task.

More recently, the metamotivational model of motivation regulation posited by Miele and Scholer (2016, 2018) delimited different procedures that individuals might use to manage one's own motivation. Inner speech aimed at reminding oneself of the reasons for engaging in a task is emphasized in the model. Specifically, *mastery self-talk* focuses on developing one's interests or improving one's personal skills and abilities; on the other hand, *performance self-talk* focuses on gaining/maintain good grades (self-enhancing), demonstrating one's competence or avoiding looking incompetent to others (self-defeating).

Goal setting and striving are central to the self-regulated learning construct, and there is some evidence that mastery goals are generally better attuned to self-regulation than performance goals. Thus, mastery-oriented students are more likely to experience positive academic emotions (Schweder, 2020), to self-monitor (Cellar et al., 2011) and to use MCLS (Merett et al., 2020), ultimately favouring persistence and achievement (Sideridis & Kaplan, 2011; Wood et al., 2013). The relationship between the performance-orientation tendency and self-regulated learning seems to depend on whether the main underlying concern of the student is to demonstrate their capability (self-enhancing) or to avoid being evaluated negatively (self-defeating), with the first option being better adapted to self-regulation (Brdar et al., 2006). On the other hand, work-avoidance orientation, which consists of the intention to invest the minimum effort in academic tasks, has been described (King & McInerney, 2014; Mendoza & Ronnel, 2022).

It is thought to characterize students disaffected with school (bored, passive), and to be caused by feelings of incompetence, low task-value beliefs or low sense of control to meet achievement goals (Jarvis & Seifert, 2002; Ryan & Deci, 2002). It has also been negatively associated with MCLS and academic achievement (Brdar et al., 2006; Suárez-Riveiro et al., 2001; Takashiro, 2016).

Some evidence has already been produced with respect to goal-directed self-talk (GDST) as a strategy for motivational self-regulation, although more investigation is clearly needed. Mastery and performance self-talk strategies have been shown to positively predict academic engagement (Smit et al., 2017; Wang et al., 2017), MCLS (Suárez-Riveiro et al., 2016; Wang, 2013), effort, and academic achievement (Kryshko et al., 2020; Schwinger & Otterpohl, 2017; Smit et al., 2017), while work-avoidance self-talk has been negatively related to MCLS (Suárez-Riveiro et al., 2016).

Perceived social support, at least from parents and teachers, may be expected to affect the balance between growth and well-being paths described in the dual processing self-regulation model and also the adoption of motivational strategies focused on reinforcing mastery or performance orientation. The motivational inclination of an individual may, in turn, affect cognitive and metacognitive self-regulation. However, the relationship between perceived social support and self-regulated learning remains unexplored, and the interplay between metacognitive, cognitive, and motivational areas of self-regulated learning should also be analysed further. In this respect, exploring a normative, age-related transitional period such as early adolescence deserves special attention, given that self-regulated learning skills and social support resources may help adolescents to cope better with the stress produced by new challenges faced at school (Anderson et al., 2000; Evans et al., 2018).

The present study

The present study considers the role of perceived social support from teachers, family, and friends on self-regulated learning (MK, MCLS, and GDST) and academic achievement and the relationships between MK, MCLS, and GDST. These relationships are addressed at a global level, i.e. in terms of tendencies manifested across learning episodes. The conceptual model is illustrated in Fig. 1, and the following hypotheses were established:

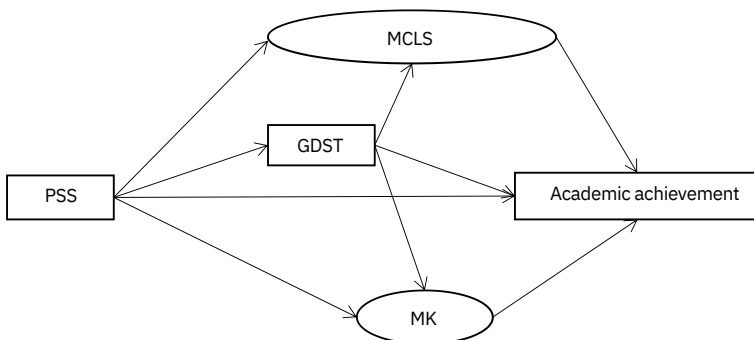


Fig. 1 Conceptual model. PSS, perceived social support (teachers, family, and friends); GDST, goal directed self-talk (mastery, self-enhancement, self-defeating, and work-avoidance); MCLS, metacognitive and cognitive learning strategies; MK, metacognitive knowledge

H1. Perceived social support from teachers, family, and friends is associated with academic achievement, and a mediational effect of self-regulated learning (metacognitive knowledge and metacognitive, cognitive, and motivational learning strategies) on this association is also expected.

H2. Goal-directed self-talk predicts metacognitive knowledge and metacognitive and cognitive learning strategies.

Method

Participants

The study sample consisted of 561 students (56.1% females), aged between 12 and 15 years ($M = 13.46$; $SD = 1.08$), enrolled in secondary school academic courses (Grade 7, 25.8%; Grade 8, 21.2%; Grade 9, 33.3%; Grade 10, 19.6%) and recruited from various state schools in Galicia (Spain), situated in regions characterized by different degrees of urbanization (European Commission, 2014).

Measures

Perceived support from teachers was evaluated by several items of the Spanish version of Health Behaviour in School-aged Children (HBSC; Moreno et al., 2014). HBSC is a collaborative international World Health Organization survey that collects data on the health and well-being of students aged 11, 13, and 15 years. The questionnaire has seven items, with a 5-point Likert-type scale response format, designed to assess the student's perception that teachers care for and value them (e.g. "My teachers are interested in me as a person" and "My teachers give me extra help when I need it"). The HBSC has demonstrated reliability and validity across diverse adolescent samples (Bi et al., 2021; Currie & Morgan, 2020; Danielsen et al., 2011). In the current study, the Cronbach's alpha for the scale was 0.86.

Perceived support from family and friends was assessed with the Spanish version of The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) adapted by Landeta and Calvete (2002). The scale includes eight items, with 6 Likert-type points, which explore the extent to which students perceive that family (4 items) or friends (4 items) would be available to them when needed (e.g. "I can talk about my problems with my family" and "My friends really try to help me"). The MSPSS has shown good reliability and validity with adolescent students (Bi et al., 2021). The Cronbach's alphas in the current study were high for both scales ($\alpha = 0.89$).

Goal-directed self-talk was evaluated with the self-Regulation of Achievement Goals subscale of the *Escalas de Estrategias Motivacionales del Aprendizaje-Versión Secundaria* (EEMA-VS; Suárez-Riveiro & Fernández-Suárez, 2011). This subscale consists of 18 items, with 5 Likert-type points, designed to measure four types of strategies aimed at regulating achievement goals: mastery self-talk (5 items, e.g. "Before starting a complicated task, I usually think about how interesting it might be"), self-enhancement (5 items, e.g. "I set myself the goal to do my homework better than anyone else"), self-defeating (4 items, e.g. "When I participate in class, I consider avoiding to appear not capable to my classmates"), and work-avoidance (4 items, e.g. "I

usually plan to work as little as possible in class or at home”). The reliability and validity of the scale have been established in previous studies (Suárez-Riveiro et al., 2016; Suárez-Riveiro & Fernández-Suárez, 2011). The Cronbach’s alpha for the subscales ranged between 0.82 and 0.89.

Metacognitive knowledge and metacognitive and cognitive learning strategies were assessed with the Spanish version of the Metacognitive Awareness Inventory (MAI; Schraw & Dennison, 1994) adapted by Huertas et al. (2014). The scale has fifty-two items, with 5 Likert-type points, distributed in two categories: MK (17 items) and MCLS (35 items). The first includes declarative knowledge (e.g. “I learn more when I am interested in the topic”), procedural knowledge (e.g. “I am aware of what strategies I use when I study”), and conditional knowledge (e.g. “I can motivate myself to learn when I need to”). The second includes five subprocesses: planning (e.g. “I think of several ways to solve a problem and choose the best one”), monitoring (e.g. “I find myself analysing the usefulness of strategies while I study”), reviewing (e.g. “I stop and go back over new information that is not clear”), evaluating (e.g. “I ask myself if I learned as much as I could have once I finish a task”), and cognitive strategies (e.g. “I use the organizational structure of the text to help me learn”). Huertas et al. (2014) showed that MAI is a reliable, valid instrument for measuring adolescents’ MK and MCLS. The Cronbach’s alpha values for subscales were 0.88 and 0.92, respectively.

Students’ academic achievement was measured by the grade-point average (GPA), obtained from official school records. Official grades in Spanish schools are scored from 0 to 10, with a pass mark of 5.

An academic and sociodemographic questionnaire was administered to collect information about students’ sex, age, academic courses, school, repeated courses, additional educational needs, and parental education level.

Procedure

An ex post facto prospective design with more than a causal link was applied. This type of design enables the assessment of the direct and indirect influences of a set of independent variables on a dependent variable, for a unique group of participants.

The university’s Institutional Review Board approved the study and the data collection procedure. The participating educational centres were selected by convenience sampling. All accessible subjects in the sample were surveyed. As the participants were minors, their family or legal tutors were informed about the purpose of the study and were asked to sign an informed consent permitting their children to participate in the study. Data were collected by two members of the research team during the first trimester of the school year, with the prior permission and consent of students, families, teachers, and schools, according to the APA Ethics Code Standards (APA, 2017) and the Declaration of Helsinki. The students were informed that participation in the study was voluntary, and the data was treated confidentially. Questionnaires about perceived social support and self-regulated learning were administered collectively by researchers in the classrooms during the normal academic schedule; assessments lasted approximately 30 min. Students’ academic grades were obtained from school records at the end of the first trimester of the school year.

Data analysis

The hypothesised relationships between perceived social support, self-regulated learning, and academic achievement were analysed by Structural Equation Modelling (SEM), implemented with IBM AMOS 21. Model fit was evaluated using various criteria including the chi-square test, the root mean square error of approximation (RMSEA), the standardized root mean residual (SRMR), the Comparative Fit Index (CFI), and the Goodness of Fit Index (GFI). The fit was considered good when it fulfilled the following criteria: RMSEA and SRMR both < 0.08 , CFI and GFI both > 0.90 (Hu & Bentler, 1995). Bootstrapping was used to calculate the 90% confidence intervals of path coefficients. There were no missing data for the variables included in the model.

Results

Preliminary analysis

The first step in handling the data was to perform descriptive analysis. The mean values, standard deviations, skewness, kurtosis, and Cronbach alpha coefficients of the measurements used in this research are shown in Table 1. Appropriate asymmetry indexes and kurtosis and acceptable coefficients of reliability were obtained for all of the variables. The Mardia's Kurtosis Index was 24.21, indicating that the distance from multivariate normality was not critical for the analysis (Rodríguez-Ayán & Ruiz, 2008).

The next step was to carry out bivariate correlation analysis (Pearson's r) to verify the magnitude of the relationship between the variables included in the conceptual model (Fig. 1). Significant correlations between variables varied from -0.42 to 0.73 , at significance levels of $p \leq .05$ and $p \leq .01$ (Table 1).

Hierarchical regression analysis was then performed to assess the relative contribution of each source of support to self-regulated learning and academic achievement, as well as possible mediational effects. Therefore, the assumptions for multivariate analysis were first assessed by checking the linearity, collinearity, homoscedasticity, normality, and interdependence between residues. The hierarchical regression analysis ($R^2 = 0.19$, $F(15,545) = 9.53$, $p \leq .000$) showed that support from family and friends did not significantly affect academic achievement. Nevertheless, on the basis of the theoretical framework described in the introduction and the observed correlations between family support and dimensions of self-regulated learning, only support from friends was omitted from the model tested.

Structural models

The model of the relationships between perceived support from family and teachers, self-regulated learning, and academic achievement was examined using path analysis, by applying the maximum likelihood estimation method.

Goodness-of-fit measures showed that the proposed model produced a poor fit to the data ($\chi^2(df) = 809.37(69)$, $p \leq .000$; GFI = 0.83; CFI = 0.85; RMSEA = 0.14; SRMR = 0.15). Several of the model path coefficients were low and non-significant ($p > .05$). Additionally, modification indices suggested covariance between perceived support from family and teachers and an effect of MK on MCLS. Considering these data, and in accordance with the underlying theoretical framework, a decision was therefore taken to re-specify

Table 1 Mean values, standard deviations, skewness, kurtosis, α , and Pearson correlations for the variables included in the conceptual model

	<i>M</i>	<i>SD</i>	<i>S</i>	<i>K</i>	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PSS																				
1. Teachers	3.57	(0.82)	-0.53	0.13	0.86															
2. Family	5.19	(1.03)	-1.78	3.18	0.89	0.42**														
3. Friends	5.37	(0.87)	-2.09	5.09	0.89	0.30**	0.37**													
GDS-15																				
4. Mastery	3.16	(0.92)	-0.16	-0.29	0.84	0.43**	0.29**	0.09*												
5. Self-enhancement	2.85	(1.15)	0.12	-0.92	0.89	0.07	0.03	-0.04	0.30**											
6. Self-defeating	2.95	(1.13)	-0.02	-0.88	0.82	-0.11**	-0.16**	-0.018*	0.11**	0.44**										
7. Work avoidance	2.40	(1.09)	0.53	-0.55	0.83	-0.42**	-0.35**	-0.23**	-0.32**	0.09*	0.28**									
MK																				
8. Declarative	4.10	(0.57)	-0.91	1.13	0.74	0.50**	0.39**	0.27**	0.40**	0.19**	-0.04	-0.34**								
9. Procedural	3.88	(0.79)	-0.83	0.88	0.74	0.45**	0.40**	0.31**	0.42**	0.12**	-0.01	-0.37**	0.62**							
10. Conditional	3.97	(0.68)	-0.66	0.24	0.68	0.41**	0.39**	0.22*	0.48**	0.13**	0.01	-0.32**	0.68**	0.71**						
MCLS																				
11. Planning	3.51	(0.77)	-0.35	-0.19	0.77	0.47**	0.41**	0.18**	0.53**	0.05	-0.06	-0.41**	0.52**	0.57**	0.59**					
12. Monitoring	3.68	(0.69)	-0.48	0.03	0.74	0.48**	0.42**	0.25**	0.53**	0.11*	0.01	-0.40**	0.57**	0.66**	0.67**	0.73**				
13. Reviewing	3.96	(0.66)	-0.62	0.23	0.64	0.45**	0.39**	0.22**	0.47**	0.09*	-0.03	-0.38**	0.57**	0.61**	0.62**	0.59**	0.66**			
14. Evaluating	3.29	(0.78)	-0.29	-0.15	0.68	0.43**	0.38**	0.17**	0.54**	0.14**	0.01	-0.33**	0.49**	0.58**	0.58**	0.67**	0.72**	0.58**		

Table 1 (continued)

	<i>M</i> (<i>SD</i>)	<i>S</i>	<i>K</i>	<i>a</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
IS Cognitive strategies	3.69 (0.61)	-0.52	0.44	0.70	0.39**	0.31**	0.25**	0.49**	0.09*	0.03	-0.31**	0.59**	0.64**	0.63**	0.63**	0.63**	0.69**	0.66**	0.69**
GPA	6.71 (1.41)	-0.28	-0.35	0.28**	0.20**	0.20**	0.10*	0.16**	0.08	-0.13**	-0.35**	0.33**	0.27**	0.22**	0.19**	0.18**	0.26**	0.18**	0.22**

PSS perceived social support, *GDST* goal directed self-talk, *MK* metacognitive knowledge, *MCLS* metacognitive and cognitive learning strategies

* $p < .05$, ** $p < .01$, *** $p < .001$

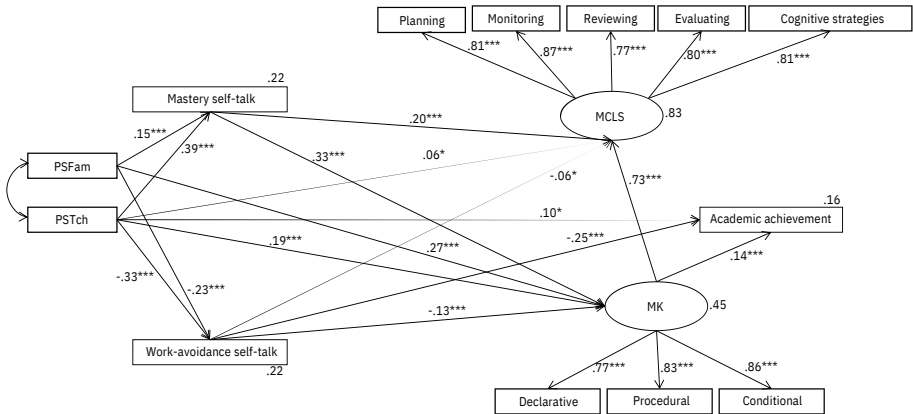


Fig. 2 Standardized regression coefficients of the final model. PS, perceived support; Fam, family; Tch, teachers; MCLS, metacognitive and cognitive learning strategies; MK, metacognitive knowledge. Only statistically significant results are included in the figure. * $p < .05$, ** $p < .01$, *** $p < .001$

the model, removing all non-significant paths and including the perceived social support covariance and the effect of MK on MCLS. The final model is shown in Fig. 2.

After modification of the model, the goodness-of-fit measures indicated a satisfactory fit to the data ($\chi^2(df) = 183.4 (54)$, $p \leq .000$; GFI = 0.95; CFI = 0.97; RMSEA = 0.07 (CI 90% = 0.06–0.08); SRMR = 0.03). All of the model path coefficients were statistically significant (Table 2). The effect size of the determination coefficients was obtained using Cohen's f^2 coefficient (Cohen, 1992), taking into account the following critical values: $f^2 = 0.02$ small; $f^2 = 0.15$ medium; and $f^2 = 0.35$ high. The effect size for personal variables of mastery self-talk ($f^2 = 0.28$), word-avoidance self-talk ($f^2 = 0.28$), MK ($f^2 = 0.82$), MCLS ($f^2 = 4.88$), and academic achievement ($f^2 = 0.19$) was medium to high. These results show that the relationships between perceived support from family and teachers and mastery and work-avoidance self-talk explained 16% of the variance in academic achievement, 83% of the variance in MCLS, and 45% of the variance in MK.

The total, direct, and indirect effects of the variables included in the model were analysed. The bootstrap method (Efron & Tibshirani, 1993) was used to determine confidence intervals (CIs) and the significance of total, direct, and indirect effects, by estimating confidence intervals corrected to 90% and with 2000 samples chosen at random from the data. The results of these analysis are shown in Table 2.

Discussion

The main goal of the present study was to develop an explanatory model of the influence of significant others as sources of support in self-regulated learning, and ultimately in academic achievement in secondary school students. On the basis of the theoretical framework and preliminary statistical analysis, an empirical model that included support from teachers and from family as independent variables was tested. This model presented adequate fit indexes and significant direct and indirect relationships, with medium to high size effects.

In general terms, we observed the expected relationships between perceived social support, self-regulated learning, and academic achievement. In line with hypothesis 1, a

Table 2 Direct, indirect, and total standardized effects of the variables included in the model, as well as confidence intervals and statistical significance (bootstrap)

Variable	Direct effect			Indirect effect			Total effect		
	Coef.	CI 90%		Coef.	CI 90%		Coef.	CI 90%	
		L	H		L	H		L	H
MST									
PSFam	0.15**	0.08	0.22	0.00	0.00	0.00	0.15***	0.08	0.22
PSTch	0.45***	0.32	0.46	0.00	0.00	0.00	0.39***	0.32	0.46
WST									
PSFam	-0.23***	-0.31	-0.16	0.00	0.00	0.00	-0.23***	-0.31	-0.16
PSTch	-0.33***	-0.40	-0.26	0.00	0.00	0.00	-0.33***	-0.40	-0.26
MK									
PSFam	0.27***	0.21	0.34	0.08***	0.05	0.12	0.35***	0.29	0.42
PSTch	0.19***	0.11	0.27	0.16***	0.13	0.21	0.36***	0.29	0.43
MST	0.33***	0.26	0.39	0.00	0.00	0.00	0.33***	0.26	0.39
WST	-0.13**	-0.20	-0.06	0.00	0.00	0.00	-0.13**	-0.20	-0.06
MCLS									
PSFam	0.00	0.00	0.00	0.30***	0.24	0.36	0.30***	0.24	0.36
PSTch	0.06	0.00	0.12	0.36***	0.29	0.43	0.42***	0.35	0.49
MST	0.20***	0.14	0.26	0.24***	0.18	0.29	0.44***	0.38	0.50
WST	-0.06	-0.11	-0.01	-0.10**	-0.15	-0.04	-0.16***	-0.22	0.09
MK	0.73***	0.67	0.79	0.00	0.00	0.00	0.73***	0.67	0.62
Academic achievement									
PSFam	0.00	0.00	0.00	0.11***	0.08	0.14	0.11***	0.08	0.14
PSTch	0.10*	0.03	0.18	0.13***	0.10	0.18	0.24***	0.17	0.30
MST	0.00	0.00	0.00	0.05***	0.02	0.07	0.05***	0.02	0.07
WST	-0.25***	-0.32	-0.18	-0.02**	-0.03	-0.01	-0.27***	-0.33	-0.20
MK	0.14***	0.07	0.22	0.00	0.00	0.00	0.14***	0.07	0.22

MST mastery self-talk, WST work-avoidance self-talk, PS perceived support, Fam family, Tch teachers, MK metacognitive knowledge, MCLS metacognitive and cognitive learning strategies, CI confidence interval, H higher limit, L lower limit

* $p < .05$, ** $p < .01$, *** $p < .001$

significant direct effect of support from teachers on academic achievement was observed, a finding that is consistent with those of previous studies (An et al., 2022; Lee & Simpkins, 2021). As already indicated by Stiller and Ryan (1992), support from teachers, as principal representatives of the academic context, unsurprisingly affected learning outcomes. Teachers are the main providers of information and opportunities for the students to acquire necessary disciplinary knowledge and skills to adapt to a changing world, particularly in relation to learning-to-learn and self-regulation (OECD, 2018). This commitment should lead to pupil's perceived structure (i.e. expectations, feedback), which would be expected to fulfil their need for competence, one of the basic psychological needs, as regarded by the Self-Determination Theory (Connell & Wellborn, 1991; Newman, 2000; Stroet et al., 2013). Through supplying clear information about how to effectively achieve desired outcomes, teachers can improve metacognitive knowledge and awareness regarding learning strategies and oneself as a learner. In accordance with this assumption, we have demonstrated

a positive predictive effect of perceived support from teachers on MK and MCLS and a mediating effect of MK on the relationship between support and MCLS and the relationship between perceived social support and academic achievement. Studies carried out to date on the relationship between perceived social support and self-regulated learning have concentrated on MCLS, consistently confirming that support from teachers positively predicts strategic learning (McEown & McEown, 2018; Yildirim, 2012) and that this effect mediates the relationship between perceived support and achievement (Jelas et al., 2016; King & Ganotice, 2014). Our data suggest that, as expected, MK plays a central role in the variability in achievement explained by MCLS.

Teachers can also fulfil students' need for autonomy and relatedness (the other basic psychological needs), as long as they enable personal choices and interests and foster feelings of emotional security and closeness (Connell & Wellborn, 1991; Marchand & Skinner, 2007). Students who perceive autonomy support from their teachers are expected to exhibit more internalized motivation, so that the student's behaviour will comply with personal interests or values, and will have an internal perceived locus of causality and will be experienced as volitional (Reeve et al., 2008). On the other hand, perceived involvement support from teachers is expected to contribute to students' general feelings of self-worth, favouring adoption of a mastery processing path and affecting both self-regulation of achievement goals, MK, and MCLS, as assumed in the dual processing self-regulation model (Boekaerts & Cascallar, 2006; Boekaerts & Niemivirta, 2000) and the metacognitive model of motivation regulation (Miele & Scholer, 2016, 2018). Our findings are consistent with these ideas, showing that perceived support from teachers positively predicted mastery self-talk and negatively predicted work-avoidance self-talk; moreover, these effects mediated the relationship between perceived support from teachers and MK and MCLS. Nevertheless, no relationship between perceived support from teachers and performance self-talk was observed, which suggests that student's use of this type of strategy may vary depending on the level of challenge, competitive pressure, and perceived support in particular learning episodes; such variation has previously been demonstrated in relation to goal orientations (Elliot et al., 2005; Yeo et al., 2009).

Regarding family support, its direct predictive value of family support on achievement was not significant, although indirect effects were observed through GDST and MK. Previous studies have reported a significant direct effect of parental support on the academic achievement of secondary school students (Ferraces et al., 2020; Jiang et al., 2011; Lam et al., 2012). In the present study, asking participants globally about the family as a source of support and jointly assessing the MCLS of participants may have blurred the principal and multifaceted role of family in promoting and monitoring academic outcomes. More investigation is clearly needed on this issue.

We found that the effect of perceived support from family on self-regulated learning was also in the expected direction. We observed a positive effect of this source of support for MCLS, which is consistent with previous observations (Choe, 2020; Monroy et al., 2019; Won & Yu, 2018). We also demonstrated a positive effect of perceived support from family on MK and mastery self-talk and a negative effect on work-avoidance self-talk. No previous data are available on these effects. From a theoretical perspective, diverse functions performed by the family may favour self-regulated learning by fulfilling basic psychological needs. Indeed, regarding the structure facet of support, parental modelling, reinforcement, and instruction about student homework is consistently recognized (Hoover-Dempsey et al., 2001). Family are also assumed to provide support for autonomy by tailoring a suitable general environment in which their children can feel responsible for their own actions,

fostering autonomous self-regulation in general (Soenens et al., 2007) as well as involvement support by responding sensitively, with warmth and acceptance (La Guardia et al., 2000). In the light of our results, replicate studies considering the role of different parental support resources would be valuable to clarify processes underlying the adoption of different forms of goal-directed self-talk as strategy for regulating motivation, as well as the effect of this and other types of motivational strategies on MK and MCLS.

Finally, the effect of perceived support from friends on academic achievement was not statistically significant, although the correlations indicated the expected direction of the relationship. Perceived support from peers has previously been shown to predict academic achievement, both directly and through MCLS (Jelas et al., 2016; King & Ganotice, 2014; Song et al., 2015). Perhaps, as suggested by Rueger et al. (2008), we may expect different levels and outcomes of perceived support when close relationships such as friendships are considered, as in the present study. Furthermore, friendship is particularly important during adolescence, probably determining increased attention to social goals (intimacy, complicity, sharing joy), while support from classmates may be perceived as being more closely connected to academic goals.

Regarding the role of motivational self-regulation on the proposed model, the trends in the data obtained in the present study are also as expected from the proposed hypothesis. More precisely, mastery self-talk directly and positively predicted MK and MCLS and indirectly predicted academic achievement through MK. On the other hand, work-avoidance self-talk directly and indirectly (through MK) negatively predicted academic achievement. Neither self-enhancing nor self-defeating strategies contributed to the model tested, although the latter strategy was significantly negatively correlated with academic achievement. Thus, our results are consistent with the assumption that mastery self-talk activates MK and gives rise to MCLS, which in turn would favour academic achievement, while work-avoidance self-talk would hinder academic engagement and achievement. The relationships between self-enhancing and self-defeating strategies and self-regulated learning and achievement should be further analysed. Previous data on the relationship between GDST and MCLS suggest that it depends on the specific type of strategy being examined (Suárez-Riveiro et al., 2016); this also seems to apply to the relationships between MCLS and academic achievement (Dent & Koenka, 2016).

In summary, our results highlight the importance of perceived social support both from teachers and family as regards adoption of adaptive/maladaptive forms of motivational self-regulation, as well as a mediating effect of motivational strategies being prioritised by the student on MK and MCLS, with repercussions for academic achievement. A global image of the interplay between perceived social support, self-regulated learning, and achievement is provided that may serve as basis for a more domain-specific or state-dependent exploration of learning in context.

Some limitations of the study must be considered. First, all variables—except academic achievement—were measured through self-reports. Although these variables are considered reliable and suitable for measuring self-regulated learning and perceived social support, they are not exempt from subjective bias (e.g. social desirability). Second, our analysis was based on cross-sectional data, and therefore neither definitive causal nor directional conclusions should be drawn. Longitudinal studies should be conducted to establish causal relationships and their direction. Future research should also explore further the effect of different sources (e.g. family and teachers), as well as specific types of support resources, on the knowledge and use of specific learning strategies.

Conclusion

The study findings add to current scientific knowledge by establishing explanatory links between social support from family and teachers, self-regulated learning, and academic achievement, considering the moderating role of MK and GDST in secondary students. Current findings suggest that perceived social support may serve as a marker of vulnerability/protection in regard to the challenges typically faced by adolescents in their transition to secondary school as well as of the difficulties/potential for self-regulation and academic achievement. Moreover, the findings may lay the foundations for outlining guidelines and intervention programs aimed at favouring adjustment of adolescents in the educational system, providing them with the skills to respond to the growing training demands of the so-called “knowledge and lifelong learning society” and helping to mitigate the difficulties that may hinder vocational development and social integration. Based on the study findings, the inclusion of social support as a dimension of programs aimed at training learning skills is expected to enhance the effectiveness of such programs; this is, in fact, indicated by some intervention studies that have focused on the way in which support contributes to the individual’s basic needs and fosters social integration. Improvement of perceived social support and self-regulation skills is contemplated a priori as an adequate strategy favouring academic progress.

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Declarations

Ethics approval and consent to participate The research was approved by the Bioethics Committee of the University of Santiago de Compostela (registration USC-29/2020).

Conflict of interest The authors declare no competing interests. Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

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Current Themes of Research

Academic and psychosocial adjustment. Adolescence. Perceived social support. Self-regulated learning.

Relevant publications in the field of Psychology of Education Villar, E., Martínez-López, Z., Mayo, M. E., Braña, T., Rodríguez, M., & Tinajero, C. (2022). A Systematic Review and Narrative Synthesis of the Relationship between Social Support and Binge Drinking among Adolescents and Emerging Adults. *Youth*, 2(4), 570–586. <https://doi.org/10.3390/youth2040041>

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Current Themes of Research:

Adolescence. Adults. Educational measurement.

Relevant publications in the field of Psychology of Education:

Azpilicueta, A. E., Cupani, M., Ghio, F. B., Morán, V. E., Garrido, S. J., & Bruzzone, M. (2022). Career decision self-efficacy Item Bank: A Simulation study. *Current Psychology*, 1-12. <https://doi.org/10.1007/s12144-022-03749-w>

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Current Themes of Research

Academic and psychosocial adjustment. Adolescence. Perceived social support. Self-regulated learning.

Relevant publications in the field of Psychology of Education

Villar, E., Martínez-López, Z., Mayo, M. E., Braña, T., Rodríguez, M., & Tinajero, C. (2022). A Systematic Review and Narrative Synthesis of the Relationship between Social Support and Binge Drinking among Adolescents and Emerging Adults. *Youth*, 2(4), 570-586. <https://doi.org/10.3390/youth2040041>

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Current Themes of Research

Psychosocial adjustment. Learning disabilities. Children, young adults and families.

Perceived social support.

Relevant publications in the field of Psychology of Education

Villar, E., Martínez-López, Z., Mayo, M. E., Braña, T., Rodríguez, M., & Tinajero, C. (2022). A Systematic Review and Narrative Synthesis of the Relationship between Social Support and Binge Drinking among Adolescents and Emerging Adults. *Youth, 2*(4), 570-586. <https://doi.org/10.3390/youth2040041> Mayo, M. E., Iglesias-Souto, P. M., Martínez-López, Z., & Taboada-Ares, E. M. (2021). Do medical students feel trained enough to communicate bad news? *Educación Médica, 22*(3), 135-138. <https://doi.org/10.1016/j.edumed.2020.07.007>

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Current Themes of Research

Academic and psychosocial adjustment. Adolescence. Perceived social support. Self-regulated learning.

Relevant publications in the field of Psychology of Education

Villar, E., Martínez-López, Z., Mayo, M. E., Braña, T., Rodríguez, M., & Tinajero, C. (2022). A Systematic Review and Narrative Synthesis of the Relationship between Social Support and Binge Drinking among Adolescents and Emerging Adults. *Youth, 2*(4), 570-586. <https://doi.org/10.3390/youth2040041> Martínez-López, Z., Villar, E., Castro, M., & Tinajero, C. (2021). Self-regulation of academic emotions: recent research and prospective view. *Anales de Psicología, 37*(3), 529-540. <https://doi.org/10.6018/analesps.415651> Páramo, M.F., Cadaveira, F., Tinajero, C., & Rodríguez, M.S. (2020). Binge drinking, cannabis consumption and academic achievement in first year university students in Spain: Academic adjustment as a mediator. *International Journal of Environmental Research and Public Health, 17* (542), 1-14. <https://doi.org/10.3390/ijerph17020542>

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5.4 Artículo 6

Villar, E., Real, E., Martínez-López, Z., Mayo, M. E. y Tinajero, C. (Enviado). Perceived support from peers, motivational self-regulation and academic achievement in adolescents. *British Journal of Educational Psychology*,

El estudio presentado en este artículo aporta evidencia acerca de las interconexiones entre el apoyo social percibido de los iguales, las destrezas de autorregulación motivacional y el rendimiento académico durante la adolescencia. Considerando la relevancia de los iguales en el contexto académico, se buscó analizar el potencial mediador de un amplio conjunto de estrategias para la autorregulación de la faceta motivacional en la relación entre diferentes provisiones de apoyo y el rendimiento académico de los/as adolescentes. Con este fin, se evaluó la disponibilidad percibida de apoyo emocional (provisiones de apego e integración), informativo (provisión de guía) y a la autonomía (provisión de refuerzo de valía) por parte de los iguales, la utilización de estrategias de autorregulación motivacional y el rendimiento académico en una muestra de estudiantes de educación secundaria. El modelo teórico analizado fue respaldado estadísticamente, lo que confirma el potencial mediador de las estrategias de autorregulación motivacional en la relación entre el apoyo y el rendimiento. Atendiendo a estos resultados, parece acertado asumir que los iguales fomentan los tipos de regulación motivacional más autónomos y actúan como factor de protección ante la amotivación académica.

Este trabajo conecta con una línea de investigación emergente, inspirada en el SSMMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007). Este modelo, basado en los supuestos de la Teoría de Autodeterminación (Deci y Ryan, 2008), ofrece una aproximación novedosa

concreto, se establece una correspondencia entre las provisiones sociales que se supone contribuirían a la satisfacción de las necesidades psicológicas básicas definidas en la Teoría de Autodeterminación (Deci y Ryan, 2008) y el desarrollo y manifestación de las destrezas de autorregulación.

Perceived peer support, motivational self-regulation and academic achievement in adolescents

School is one of the most important microsystems for human development (Bronfenbrenner & Morris, 2006). This microsystem is altered in the transition from primary to secondary education, regarding structural and organizational aspects (e.g. the size of the educational centre, departmentalization, teacher/student ratio) and instructional dynamics (demanding and complex curriculum, impersonal and competitive atmosphere, emphasis on discipline) (Anderson et al., 2000; Benner, 2011). At the same time, adolescents must face normative personal, biological, cognitive and relational changes (Lerner & Steinberg, 2009). Individuals differ in their ability to cope with these challenges and often struggle to handle academic demands, resulting in high failure and drop-out rates, with subsequent consequences for well-being and self-realization (Doll et al., 2013; Gutman et al., 2003).

Self-regulated learning (SRL) is thought to enhance academic adjustment (Cazan, 2012; García-Ros et al., 2022; Uka & Uka, 2020). It is conceived as the ability to plan and to adapt one's thoughts, feelings and actions proactively and reactively towards the attainment of personal academic goals, in interaction with environmental factors (Tinajero et al., 2024). Indeed, research has consistently found SRL to be positively associated with academic engagement (Danielsen et al., 2011; Reeve, 2012) and achievement (Dent & Koenka, 2016; Fong et al., 2021).

Four different areas of self-regulation have been identified: (meta)cognition, behaviour, context and motivation (Pintrich, 2000). The motivational facet has increasingly attracted the attention of researchers (Bakhtiar & Hadwin, 2021; Tinajero et al., 2024). Motivation is considered a core part of self-regulation, given that it is necessary for engagement, effort and persistence (Wolters, 2011; Zimmerman & Schunk, 2012). Motivational self-regulation can be

defined as monitoring one's state or level of motivation and implementing measures aimed at activating, maintaining and/or increasing motivation (Grunschel et al., 2016; Wolters, 2003).

Motivational regulation strategies

Control of personal motivation takes place through a variety of learning strategies (Wolters, 2003). Several principal motivational regulation strategies (MRSs) have been described (Wolters & Benzon, 2013; Schwinger et al., 2007, 2009) and some evidence has already been produced regarding the benefits of their application during secondary education (Villar et al., in press).

Academic goals are seen as the starting point of motivational self-regulation in any learning episode and self-management of these goals has therefore received particular attention (Miele & Scholer, 2018; Wolters, 2003). Three different goal orientations have been identified: mastery (i.e. focusing on improving competence), performance (i.e. interest in demonstrating competence and academic outcomes) and work-avoidance (i.e. seeking to avoid effort when facing academic tasks) (Pintrich, 2000). An approach-avoidance distinction has often been made within performance goal orientation (Pintrich & Schunk, 2006). The approach focus, referred to as *self-enhancing*, is characterised by directing learners' efforts towards positive or desired outcomes (e.g. self-improvement, high achievement). The avoidance focus, known as *self-defeating*, involves concentrating on preventing negative or unwanted states (e.g. failure to understand, low achievement). Finally, when adopting a performance orientation, students can focus on personal standards (e.g. obtaining high grades or avoiding obtaining low grades) or on normative standards (e.g. obtaining higher grades or avoiding obtaining lower grades than their peers) (Hayamizu & Weiner, 1991).

Students regulate their goals by means of goal-directed self-talk strategies (Wolters & Benzon, 2013). Thus, *mastery self-talk* consists of trying to persuade oneself to focus on or make salient the aim of learning. Through *performance self-talk*, students emphasize to

themselves the importance of doing well or getting good grades in academic activities that must be completed. Students may also engage in self-talk about eluding effort, in a strategy known as *work-avoidance self-talk*.

Mastery self-talk has been positively linked to several academic indicators in secondary education students, including performance, effort, engagement and involvement (Smit et al., 2017; Wang et al., 2017). The evidence regarding performance-approach self-talk is less clear, with some studies suggesting a positive association with academic achievement, engagement and effort (Fritea & Fritea, 2013; Smit et al., 2017) and others reporting no significant effect on the use of (meta)cognitive strategies (Suárez-Riveiro et al., 2016). Finally, work-avoidance self-talk has unsurprisingly been associated with poor academic outcomes (Suárez-Riveiro et al., 2016).

Data on the use and correlates of some other MRSs have also been produced. Namely, *self-efficacy enhancement* (i.e. reassuring self-talk that increases self-efficacy) has been positively linked to higher achievement (Rodríguez-Guardado & Gaeta, 2020), more frequent use of (meta)cognitive strategies (Suárez-Riveiro & Fernández-Suárez, 2012) and less avoidance of challenge (Wang et al., 2017). In a similar fashion, *enhancement of situational interest* (i.e. trying to make the academic task more enjoyable or personally interesting), *self-consequating* (i.e. self-provision of positive consequences for engagement in academic tasks), *cost appraisal* (i.e. thoughts on the adequacy of personal resources investment and academic gains), and *generation of external attributions* (finding reasons other than low ability for poor performance) have been found to positively predict (meta)cognitive strategies and effort (Schwinger & Stiensmeier-Pelster, 2012; Wolters, 1999). However, data on this group of MRSs are scarce, mainly refer to university students and are somewhat inconsistent, showing either a positive relationship, but also occasionally no significant association (Villar et al., in press).

Perceived social support and self-regulated motivation

As previously mentioned, self-regulated learning is a situated process, in which environmental conditions are expected to influence the development and implementation of the skills involved (Panadero, 2017; Tinajero et al., 2024). Special attention has been given to perceived social support (PSS), which is considered the basis for enhancing inner motivational resources (i.e. motivational self-regulation) (Martínez-López et al., 2023; Perry et al., 2018; Skinner et al., 2008). The Self-Determination Theory (SDT; Deci & Ryan, 2015) is particularly enlightening in this regard. According to this theory, satisfaction of students' basic psychological needs for relatedness (i.e. to feel loved, appreciated and connected to significant others), competence (i.e. to perceive oneself as effective when interacting with the environment) and autonomy (i.e. to feel a sense of volition) is a necessary basis for the internalization and integration of externally offered values and regulatory guidelines in the self-system. Depending on the match between basic needs and social support, individuals tend to be positioned in a self-regulation continuum (Ryan & Deci, 2000), which ranges from amotivation (i.e. lack of interest and/or effort when performing a task) to intrinsic motivation (i.e. performance guided by inherent interest and satisfaction). Extrinsic motivation (i.e. orientation towards the attainment of an external outcome), which occurs in an intermediate position, includes four types of regulation: external (i.e. dependent on external contingencies), introjected (i.e. reliant on partially internalised contingencies), identified (i.e. dependent on personally valued goals) and integrated (i.e. involving the assimilation of values in the self-system). On the other hand, MRSs can be considered to be particularly well-attuned either to types close to the intrinsic/autonomous pole of the continuum (e.g. mastery self-talk, self-efficacy enhancement, enhancement of situational interest, and cost appraisal) or to the nearest types to the extrinsic/controlled pole (e.g. self-consequating, generation of external attributions

and performance and work avoidance self-talk) (Hu & Zhang, 2017; Ilishkina et al., 2022; Wolters, 1998).

In alignment with the Self-System Model of Motivational Development (SSMMD; Connell & Wellborn, 1991), supportive environments are expected to satisfy students' needs through various provisions of PSS (Newman, 2000; Skinner et al., 2008; Tian et al., 2016). In particular, the need for relatedness should be satisfied by provision of involvement (i.e. emotional PSS), the need for competence should be met by information on desired outcomes and structure (i.e. informational PSS), and the need for autonomy should be fulfilled by transmitting confidence in students' abilities by providing choice, relevance and respect (i.e. autonomy PSS). When students' needs are satisfied, various self-system dynamics and contents, including autonomous motives, metamotivational knowledge, self-esteem and internalization of goals and values are assumed to enhance motivational self-regulation (Connell & Wellborn, 1991; Miele & Scholer, 2018; Stroet et al., 2013; Martínez-López et al., 2023). Thus, we can expect a positive influence of a supportive school context on the use of MRSs. In fact, some studies have reported a positive relationship between autonomy and emotional support from teachers and the preponderance of more autonomous types of motivation in adolescents (Marchand & Skinner, 2007; Trigueros & Navarro, 2019). Both the relationships between teacher and peer support and the use of specific MRSs remain unexplored (Martínez-López et al., 2023).

Perceived peer support and motivational regulation strategies

Peer support becomes particularly important during adolescence, due to the distancing from family and investment in peer relationships that usually occur at this developmental stage (Lerner & Steinberg, 2009). Given their availability and complicity, as well as mutually shared interests and concerns, peers can enhance a sense of connection, fulfilling the need for relatedness (Audet et al., 2021). On the other hand, peers frequently interact during the

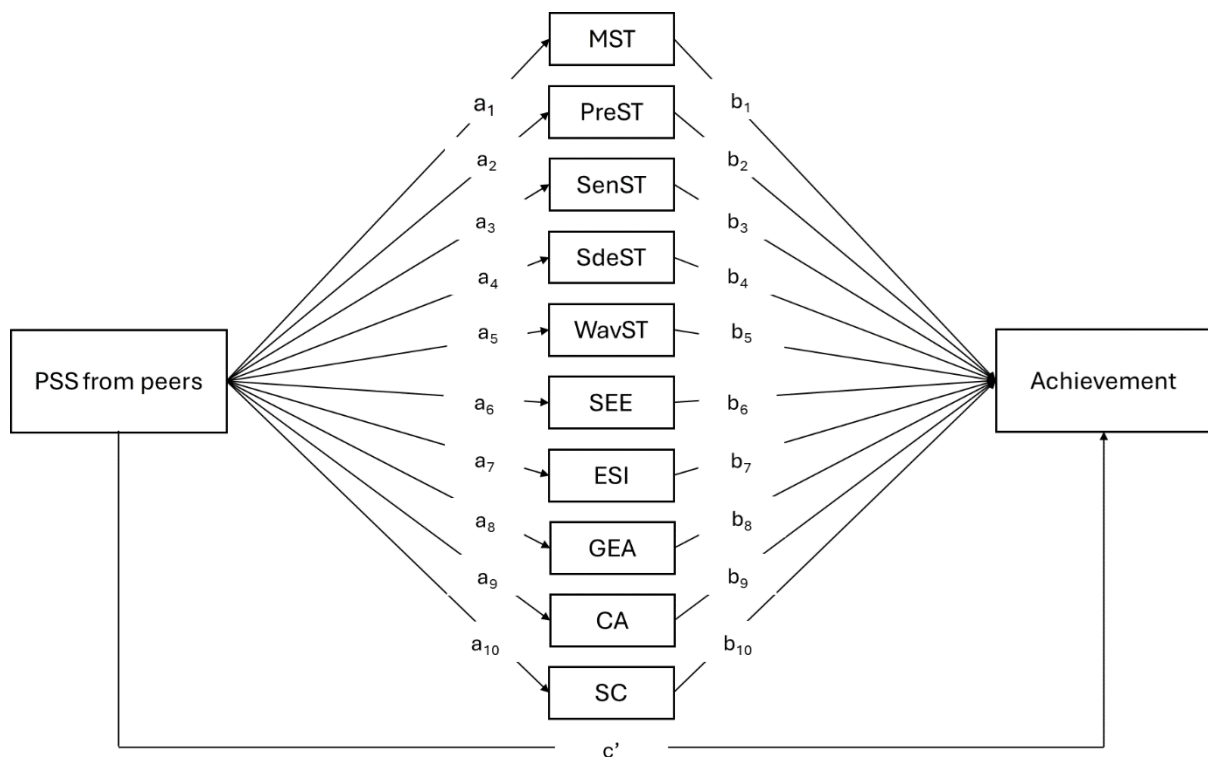
performance of academic tasks, which facilitates valuable information and advice through modelling or direct supply of information on academic contents and instructional dynamics, meeting the need for competence (Rodkin & Ryan, 2012; Ryan, 2000). Finally, peers can satisfy the need for autonomy through social comparison, which provides an understanding of the complexity and difficulty of academic tasks, by accessing alternative models of learning strategies (Skinner & Edge, 2002). Peer interactions may also be considered a favourable context in which being valued and recognized as a volitional subject, which is expected to have a positive impact on self-regulation in students (Connel & Wellborn, 1991; Martínez-López et al., 2023). In fact, peer support has been found to be related to the use of (meta)cognitive strategies for academic engagement (Danielsen et al., 2011; Hafzan et al., 2015; Patrick et al., 2007) and achievement (Tinajero et al., 2020) in adolescents. However, there are no data available regarding the possible relationship between PSS from peers and MRSs (Martínez-López et al., 2023).

The present study

We aimed to examine the relationships between PSS from peers, MRSs, and academic achievement, in adolescents. Guided by the SDT (Deci & Ryan, 2015) emotional, informational and autonomy support provisions were considered separately. We expected a mediational effect of MRSs on the relationship between provisions of support and academic achievement, as shown in Figure 1.

Figure 1

Conceptual model tested for provision of PSS.



Note. PSS = perceived social support; MST = mastery self-talk; PreST = personally referred self-talk; SenST: self-enhancing self-talk; SdeST = self-defeating self-talk; WavST = work-avoidance self-talk, SEE = self-efficacy enhancement; ESI = enhancement of situational interest; GEA = generation of external attributions; CA = cost appraisal; SC = self-consequating.

This study was guided by the following hypotheses:

H1. Emotional, informational and autonomy support provisions are associated with the use of MRSs.

H2. The use of MRSs predicts achievement.

H3. The association between support provisions and achievement is mediated by the use of MRSs.

Method

Participants

The study sample consisted of 463 students (54.1% female), aged between 12 and 18 years ($M = 13.50$ years; $SD = 1.19$ years), enrolled in compulsory secondary education (1st grade = 31.30%, 2nd grade = 24.40%, 3rd grade = 27.2%, 4th grade = 17.1%). The students were recruited from five public schools in Galicia (Spain); the schools were located in regions characterized by different levels of urbanization (European Commission, 2014), thus providing diversity regarding socioeconomic status (Calvo et al., 2013). The schools were selected by convenience sampling.

Measures

Perceived social support from peers

PSS from peers was assessed using three subscales of the Spanish version of the Relational Support Inventory – Adolescence (RSI-A; Musitu et al., 2001; Scholte et al., 2001; Van Aken, 1997). Scores related to the individual's appreciation of the availability of emotional (e.g. "They show me they love me"), informational (e.g. "They explain to me why things are right or wrong") and autonomy (e.g. "They help me make decisions for myself") support from peers were obtained.

Motivational regulation strategies

The use of MRSs in students was measured with several subscales of the Spanish version of the Motivational Regulation Survey (MRS; Rojas & Valencia, 2019; Wolters & Benzon, 2013) and the Escalas de Estrategias Motivacionales del Aprendizaje-Versión Secundaria (EEMA-VS; Suárez-Riveiro & Fernández-Suárez, 2011). Students were asked to complete the questionnaire on a scale ranging from 1 = *strongly disagree* to 6 = *strongly agree*. Sample items are given in Table 1.

Table 1

Sample items of the subscales used to measure motivational regulation strategies.

Subscale	Example item
Cost appraisal (CA) ¹	Before starting a complicated task, I usually think that accomplishment of the task will make up for the effort I have to make
Enhancement of situational interest (ESI) ²	I make studying more enjoyable by turning it into a game
Generation of external attributions (GEA) ¹	To motivate myself when doing a task, I think that if I am lucky, I can get a good outcome
Self-consequating (SC) ²	I set a goal for how much I need to study and promise myself a reward if I achieve that goal
Mastery self-talk (MST) ¹	Before starting a complicated task, I set myself the goal of improving my skills and knowledge
Performance self-talk (PST)	
Personally referred performance self-talk (PreST) ²	I tell myself I need to keep studying to do well in this course
Self-enhancing self-talk (SenST) ¹	I set myself the goal of doing the tasks better than others
Self-defeating self-talk (SdeST) ¹	When I participate in class, I set myself the goal of trying to avoid looking incompetent to my peers
Self-efficacy enhancement (SEE) ¹	I try to self-motivate during academic tasks by telling myself that I am doing a good job and praising my work
Work-avoidance self-talk (WavST) ¹	I try to avoid tasks or subjects that are difficult

¹ Subscale of the Scale of Learning Motivational Strategies – Secondary Version (Suárez-Riveiro and Fernández-Suárez, 2011).

² Subscale of the Spanish version of the Motivational Regulation Survey (Rojas and Valencia, 2019; Wolters and Benzon, 2013).

Academic achievement

The scores for the adolescents' academic achievement in seven main subjects (maths, Spanish, Galician, foreign language, geography and history, physics and chemistry, and biology and geology) were obtained. The scores were based on the results of mid-term examinations conducted in each school: i.e. they were time-limited and based on national curriculum standards for high school students. The maximum score was 10, with a pass score of 5.

Covariates

Information about the students was obtained using an *ad hoc* questionnaire including the following variables: sex (0 = female, 1 = male), age, special educational needs (SENs), courses repeated and support classes outside of school.

Given that the data collection procedure took place a year after the COVID-19 pandemic, an *ad hoc* scale (9 items) was administered to assess the perceived impact on personal well-being derived from the situation. This scale, elaborated on the basis of previous findings (Aristovnik et al., 2020; Green et al., 2021; Padrón et al., 2021, Prowse et al., 2021), considers both potential stressors derived from the pandemic (i.e. “The presence of conflicts with my close family have increased”) and its possible repercussions (i.e. “My mental health has been affected”). The measures are scored using a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*).

Procedure

The data were collected by two members of the research team during the second trimester of the academic year 2021/2022 (i.e. January 2022 to March 2022). Written informed consent was obtained from students and their families prior to administration of the measures. The university's Bioethical Committee approved the study and the data collection procedure (omitted in order to ensure blind review).

Data analysis

Preliminary tests were conducted to compute means, standard deviations and correlations for the variables of interest. These tests were performed using SPSS 27.0 (IBM Corporation, 2020). Mediation regression analysis was then conducted to test the mediating effect of MRSs on the relationship between the different provisions of PSS from peers and achievement (SPSS PROCESS; Model 4; Hayes, 2013). Sex, age, SENs, courses repeated, support classes and the self-perceived impact of the COVID-19 pandemic were used as covariates and consequently incorporated as such in each model. A saturated model that included all ten motivational strategies for each provision of PSS was constructed. Following the principle of parsimony, the non-significant paths were removed from the model considering the following criteria: those strategies that were not predicted by the provision of PSS were first removed; the strategies that were not significant predictors of achievement were then removed. Bootstrapping resampling with 5000 runs was conducted to generate 95% confidence intervals; the moderated mediating effects were considered significant when estimates for the 95% interval did not include zero (Preacher et al., 2007).

Results

Preliminary and correlation analysis

Cronbach's alpha, means, standard deviations and correlations between the main variables are presented in Table 2.

Table 2*Descriptive statistics, Cronbach's alpha, and correlations for the variables of interest.*

Scale	M(SD)	α	2	3	4	5	6	7	8	9	10	11	12	13	14
1. PSS-P-EM	3.90 (0.69)	.80	.71**	.74**	.21**	.13**	-.04	-.27**	-.11*	.24**	.19**	.01	.16**	.16**	.08
2. PSS-P-IN	3.88 (0.62)	.60		.63**	.19**	.12**	-.05	-.19**	-.14**	.21**	.13**	-.01	.14**	.15**	.02
3. PSS-P-AUT	4.01 (0.61)	.69			.13**	.08	-.06	-.21**	-.06	.17**	.13**	-.01	.14**	.10*	.03
4. MST	3.59 (1.16)	.83				.41**	.24**	.04	-.40**	.63**	.62**	-.01	.63**	.35**	.15**
5. PreST	4.86 (1.04)	.85					.34**	.19**	-.44**	.42**	.32**	.11*	.50**	.55**	.32**
6. SenST	3.22 (1.42)	.88						.40**	-.05	.21**	.12**	.18**	.31**	.21**	.22**
7. SdeST	3.70 (1.51)	.87							.13**	-.04	.06	.22**	.07	.14**	-.03
8. WavST	2.56 (1.27)	.81								-.25**	-.16**	.34**	-.35**	-.12**	-.42**
9. SEE	3.66 (1.35)	.88									.53**	.13**	.53**	.43**	.22**
10. ESI	3.53 (1.25)	.87										.11*	.44**	.45**	.01
11. GEA	3.50 (1.16)	.61											.07	.22**	-.18**
12. CA	3.84 (1.33)	.85												.38**	.21**
13. SCQ	4.23 (1.22)	.83													.13**
14. Ach.	6.93 (1.71)														
COVID-19	3.41 (0.93)	.71													

Note. PSS-P-EM = perceived emotional support from peers; PPS-P-IN = perceived informational support from peers; PSS-P-AUT = perceived autonomy support from peers; MST = mastery self-talk, PreST = personally referred self-talk; SenST = self-enhancement self-talk; SdeST = self-defeating self-talk; WavST = work-avoidance self-talk; SEE = self-efficacy enhancement; ESI = enhancement of situational interest; GEA = generation of external attributions; CA = cost appraisal; SCQ = self-consequating; ACH = achievement; COVID-19 = perceived impact on personal well-being derived from the health situation (pandemic).

* $p > .05$. ** $p > .01$.

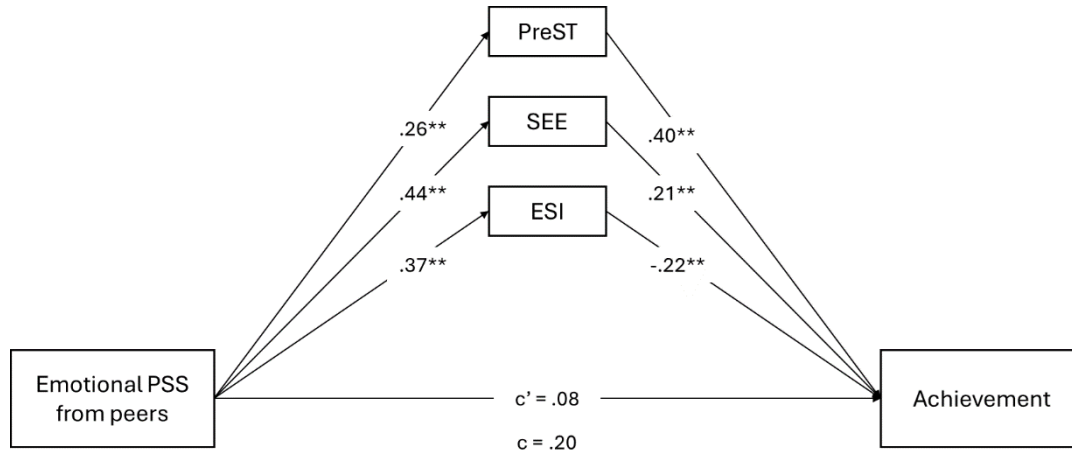
As expected, the three provisions of PSS were strongly and positively correlated with each another. A similar pattern of results was found for MRSs, except for work-avoidance self-talk, which was negatively correlated with the use of most of the remaining strategies. Overall, PSS was positively correlated with the motivational regulation strategies. As an exception, PSS was negatively correlated with self-enhancement, self-defeating and work-avoidance self-talk. Correlations between PSS and attributional control, on the other hand, were non-significant, as were the correlations between peer support and achievement. Conversely, most of the MRSs were significantly correlated with achievement.

Mediational regression analysis

As shown in Figure 2, the provision of emotional PSS from peers was positively related to the use of personally referred performance self-talk ($\beta = .26, t = 3.76, p < .001$), self-efficacy enhancement ($\beta = .44, t = 4.92, p < .001$) and enhancement of situational interest ($\beta = .37, t = 4.38, p < .001$). Of these strategies, personally referred performance self-talk ($\beta = .40, t = 5.38, p < .001$) and self-efficacy enhancement were positive predictors of achievement ($\beta = .21, t = 3.38, p < .001$), while enhancement of situational interest ($\beta = -.22, t = -3.41, p < .001$) negatively predicted achievement.

Figure 2

Mediating effect of motivational regulation strategies in the relationship between emotional PSS from peers and achievement.



Note. PreST = personally referred self-talk; SEE = self-efficacy enhancement; ESI = enhancement of situational interest.

** $p < .001$. * $p < .05$.

Personally referred performance self-talk and self-efficacy enhancement were therefore positive mediators of the relationship between emotional PSS from peers and achievement, while enhancement of situational interest negatively mediated this effect (see details in Table 3).

Table 3

Standardised estimates, errors and confidence intervals for mediation in the model for emotional PSS from peers.

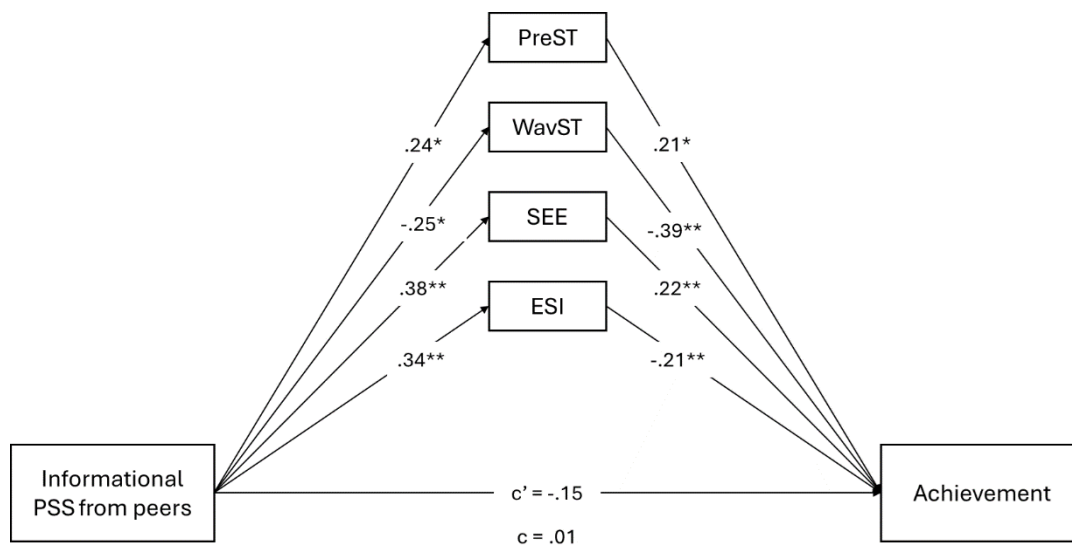
	PSS → MRSs				MRSs → Achievement				PSS → MRSs → Achievement		
	Path	β (SE)	r ²	95% CI	Path	β (SE)	r ²	95% CI	Path	β (SE)	95% CI
PreST	a_1	.26 (.07)	10.67%	[.12, .40]	b_1	.40 (.07)	31.62%	[.25, .55]	$a_1 * b_1$	.10 (.03)	[.03, .18]
SEE	a_2	.44 (.08)	12.48%	[.26, .61]	b_2	.21 (.06)		[.09, .34]	$a_2 * b_2$	.09 (.03)	[.03, .17]
ESI	a_3	.37 (.08)	6.60%	[.20, .54]	b_3	-.22 (.06)		[-.35, -.09]	$a_3 * b_3$	-.08 (.03)	[-.15, -.02]

Note. PreST = personally referred self-talk; SEE = self-efficacy enhancement; ESI = enhancement of situational interest.

Informational PSS from peers (Figure 3) was a positive significant predictor of personally referred performance self-talk ($\beta = .24, t = 3.12, p = .01$), self-efficacy enhancement ($\beta = .38, t = 3.83, p < .001$) and enhancement of situational interest ($\beta = .34, t = 3.58, p < .001$); conversely, it negatively predicted work-avoidance self-talk ($\beta = -.25, t = -2.69, p = .01$). Among these strategies, personally referred performance self-talk ($\beta = .21, t = 2.80, p = .01$) and self-efficacy enhancement positively predicted achievement ($\beta = .22, t = 3.60, p < .001$), while work-avoidance self-talk ($\beta = -.39, t = -6.56, p < .001$) and enhancement of situational interest ($\beta = -.21, t = -3.37, p < .001$) were negative predictors.

Figure 3

Mediating effect of motivational regulation strategies in the relationship between informational PSS from peers and achievement.



Note. PreST = personally referred self-talk; WavST = work-avoidance self-talk; SEE = self-efficacy enhancement; ESI = enhancement of situational interest.

$^{**} p < .001$. $^* p < .05$.

Indirect effects for the provision of informational support from peers include a positive mediating effect of personally referred performance self-talk, work-avoidance self-talk and

self-efficacy enhancement and a negative effect for the enhancement of situational interest (see details in Table 4).

Table 4

Standardised estimates, errors and confidence intervals for mediation in the model for informational PSS from peers.

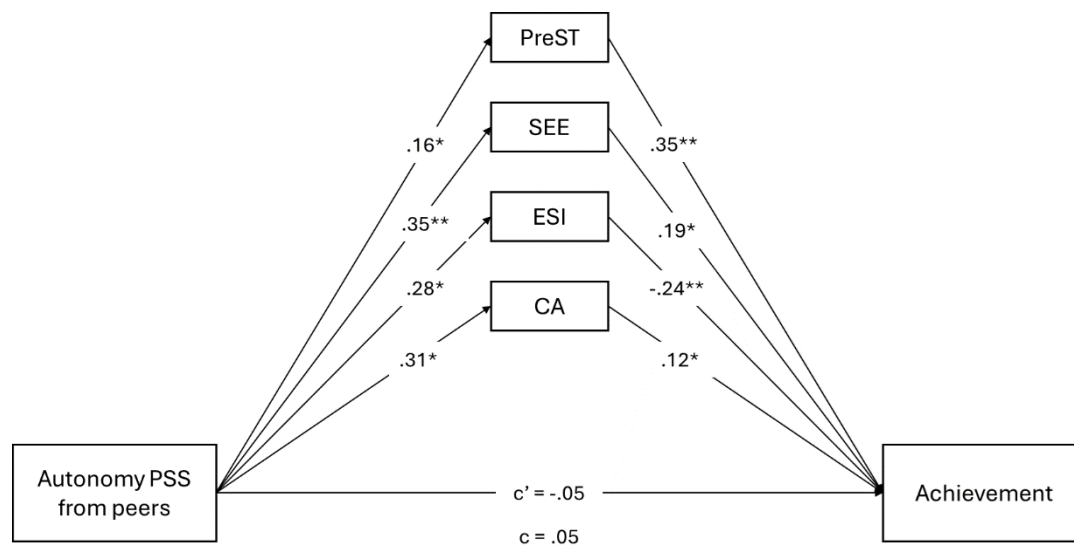
	PSS → MRSs				MRSs → Achievement				PSS → MRSs → Achievement		
	Path	β (SE)	r ²	95% CI	Path	β (SE)	r ²	95% CI	Path	β (SE)	95% CI
PreST	a_1	.24 (.07)	9.81%	[.09, .39]	b_1	.21 (.07)	37.70%	[.06, .37]	$a_1 * b_1$	.05 (.02)	[.01, .11]
WavST	a_2	-.25 (.09)	12.94%	[-.43, -.06]	b_2	-.39 (.05)		[-.50, -.27]	$a_2 * b_2$	.09 (.04)	[.02, .19]
SEE	a_3	.38 (.09)	10.66%	[.18, .57]	b_3	.22 (.06)		[.10, .34]	$a_3 * b_3$	.08 (.03)	[.02, .16]
ESI	a_4	.34 (.09)	5.31%	[.15, .52]	b_4	-.21 (.06)		[-.33, -.08]	$a_4 * b_4$	-.07 (.03)	[-.14, -.01]

Note. PreST = personally referred self-talk; WavST = work-avoidance self-talk; SEE = self-efficacy enhancement; ESI = enhancement of situational interest.

Finally, the provision of autonomy support from peers (Figure 4) significantly and positively predicted personally referred performance self-talk ($\beta = .16, t = 2.12, p = .03$), self-efficacy enhancement ($\beta = .35, t = 3.54, p < .001$), enhancement of situational interest ($\beta = .28, t = 2.95, p = .01$), and cost appraisal ($\beta = .31, t = 3.11, p = .01$). Of these, personally referred performance self-talk ($\beta = .35, t = 4.50, p < .001$), self-efficacy enhancement ($\beta = .19, t = 2.92, p = .01$), and cost appraisal ($\beta = .12, t = 1.89, p = .04$) positively predicted achievement. On the other hand, enhancement of situational interest ($\beta = -.24, t = -3.64, p < .001$) was a negative predictor of achievement.

Figure 4

Mediating effect of motivational regulation strategies in the relationship between autonomy PSS from peers and achievement.



Note. PreST = personally referred self-talk; SEE = self-efficacy enhancement; ESI = enhancement of situational interest; CA = cost-appraisal.

** $p < .00$. * $p < .05$.

Consequently, personally referred performance self-talk, self-efficacy enhancement and cost appraisal were positive mediators of the effect of perceived autonomy support from peers

and achievement. Conversely, enhancement of situational interest was a negative mediator (see details in Table 5).

Table 5

Standardised estimates, errors and confidence intervals for mediation in the model for autonomy PSS from peers.

	PSS → MRSs				MRSs → Achievement				PSS → MRSs → Achievement		
	Path	β (SE)	r ²	95% CI	Path	β (SE)	r ²	95% CI	Path	β (SE)	95% CI
PreST	a_1	.16 (.07)	8.77%	[.01, .32]	b_1	.35 (.07)	32.08%	[.20, .51]	$a_1 * b_1$	.05 (.03)	[.01, .13]
SEE	a_2	.35 (.10)	10.24%	[.15, .55]	b_2	.19 (.06)		[.06, .32]	$a_2 * b_2$	.06 (.03)	[.01, .14]
ESI	a_3	.28 (.09)	4.46%	[.09, .47]	b_3	-.24 (.06)		[-.37, -.11]	$a_3 * b_3$	-.06 (.03)	[-.14, -.01]
CA	a_4	.31 (.10)	7.62%	[.11, .50]	b_4	.12 (.06)		[.01, .25]	$a_4 * b_4$	.03 (.02)	[.01, .09]

Note. PreST: personally referred self-talk; SEE: self-efficacy enhancement; ESI: enhancement of situational interest; CA: cost-appraisal.

All of the mediating effects observed are total effects, as none of the direct effects (*path c'*) were significant after the inclusion of the MRSs. Regression coefficients of paths removed from the models are included in Table 6.

Table 6

a and b paths removed from each model and coefficients for each motivational regulation strategy.

		Emotional PSS from peers							
		MST	PreST	SenST	SdeST	WavST	GEA	CA	SC
PSS → MRSs		.32**	.26**	-.06	-.38**	-.15	.10	.31**	.24**
MRSs → Achievement		.05	.40**		-.04			.12	-.07
		Informational PSS from peers							
		MST	PreST	SenST	SdeST	WavST	GEA	CA	SC
PSS → MRSs		.31**	.24**	-.08	-.29**		.10	.27**	.30**
MRSs → Achievement		-.08	.21*		.01			.05	.01
		Autonomy PSS from peers							
		MST	PreST	SenST	SdeST	WavST	GEA	CA	SC
PSS → MRSs		.25**	.16*	-.10	-.37**	-.07	.05		.20*
MRSs → Achievement		.05	.35**		-.05				-.07

Note. The reported coefficients correspond to the step in which the strategies were removed from the model. The empty slots correspond to significant mediators. MST = mastery self-talk; PreST = personally referred self-talk; SenST = self-enhancing self-talk; SdeST = self-defeating self-talk; WavST = work-avoidance self-talk; GEA = generation of external attributions; CA = cost appraisal; SC = self-consequating.

Discussion

This study aimed to explore the associations between PSS from peers, motivational regulation and academic achievement. Based on available theoretical assumptions and data, we created three empirical models that included respectively perceived emotional, informational and autonomy support from peers as independent variables and academic achievement as dependent variable. MRSs were considered potential mediating dimensions.

The effect of perceived social support from peers on self-regulated motivation

Overall, peer support was found to have a significant effect on MRSs, which is in line with the key role that peers can play in satisfying students' basic psychological needs (Kilday & Ryan, 2022; Rodkin & Ryan, 2012; Tian et al., 2016).

More specifically, emotional PSS from peers is expected to fulfil learner's need for relatedness by promoting feelings of emotional security and closeness (Audet et al., 2021; Connel & Wellborn, 1991), which are expected to reduce school concerns and enhance self-esteem (Patrick et al., 2007). This positive appraisal of school and oneself as a learner may favour the adoption of strategies linked to more autonomous types of regulation as defined in the SDT (Deci & Ryan, 2015) (Ilishkina et al, 2022; Wolters, 1998). Thus, students who perceive high levels of emotional PSS from peers may tend to self-regulate their motivation by focusing on the task (i.e. mastery self-talk, enhancement of situational interest) and its connection with personal resources (i.e. cost appraisal) and beliefs (i.e. self-efficacy enhancement). Previous research on emotional PSS from family and teachers has yielded similar results (Martínez-López et al., 2023).

Additionally, if the need for relatedness is satisfied, students may be more likely to develop a sense of belonging, which is assumed to favour the internalization of academic goals and values (Danielsen et al., 2011; Perry et al., 2018). Given that the importance of academic attainment becomes increasingly evident as learners transition from elementary to secondary education, in line with the proximity of formative/vocational elections (Anderman & Midgley, 1997; Urdan & Midgley, 2003), a positive impact on personal endorsement of these extrinsic values is expected (Federici et al., 2015), conditioning the adherence to controlled types of regulation. In accordance, our results showed that emotional PSS positively predicted self-consequating. Emotional PSS also positively predicted personally referred performance self-talk, and negatively predicted self-defeating self-talk. No significant effect on self-

enhancement self-talk was found. Hence, emotional PSS could moderate the internalization of academic values by enhancing attention to personal progress, favouring tolerance to stage fright, and reducing students' focus on social comparison (Duchesne et al., 2017). The absence of a significant effect of emotional PSS on work-avoidance self-talk may respond to disconnection perceived by emotionally supported students between peers' acceptance and the academic work.

Regarding the provision of informational PSS from peers, giving advice and/or providing information (Weiss, 1974) is expected to fulfil the need for competence by improving students' awareness of instructional demands as well as metacognitive knowledge on learning strategies and oneself as a learner (Connel & Wellborn, 1991; Marchand & Skinner, 2007). This would facilitate focusing on compliance with success standards provided in the classroom, giving importance to a controlled style of motivational regulation (Elliot et al., 2005; Yeo et al., 2009). Our results are consistent with this rationale since informational PSS positively predicted self-consequating and personally referred self-talk. Moreover, information regarding academic activities could prevent students from endorsing and regulating work-avoidance goals (Martínez-López et al., 2023), as found in our study.

On the other hand, we found that informational support negatively predicted self-defeating self-talk, while its effect on self-enhancing self-talk was not significant. Thus, students who perceive that they receive informational support are likely to be less concerned about appearing incompetent or outperforming peers. Increased metamotivational knowledge could enhance students' perception of personal resources and their self-assessment regarding their capacity to perform successfully (Duchesne et al., 2017; Schunk & Ertmer, 2000). In turn, increased sense of competence could foster the use of MRSs attuned with autonomous styles of motivation. In accordance, self-efficacy, both academic and for motivation regulation, has been consistently reported as a positive predictor of mastery self-talk and enhancement of

situational interest (Villar et al., in press). Our results expand these findings, insofar as informational PSS positively predicted mastery self-talk, enhancement of situational interest, self-efficacy enhancement and cost-appraisal.

Autonomy PSS from peers was also explored as a separate predictor of motivational regulation. In the context of the SSMMD, autonomy PSS manifests as the provision of choice, relevance and respect (Skinner et al., 2008; Martínez-López et al., 2023b) and is expected to support learners' need for autonomy. When students' need for autonomy is fulfilled, feelings of agency are fuelled, which is expected to enhance learners' autonomous types of regulation (Connel & Wellborn, 1991; Hu & Zhang, 2017; Wolters, 1998). Our results are consistent with these assumptions, given that autonomy support was a positive predictor of MRSs linked to the task (i.e. mastery self-talk, enhancement of situational interest) and personal values (i.e. self-efficacy enhancement) and resources (i.e. cost appraisal).

Our findings also showed that autonomy PSS positively predicted personally referred performance self-talk and self-consequating, which can be considered consistent with an introjected type of regulation, considered to represent the change from more controlled types of regulation to more autonomous types. As observed for emotional and informational support, autonomous provision negatively predicted self-defeating self-talk, while its effect on self-enhancing self-talk was not significant. These results are in accordance with the expected reducing effect of autonomy support peer pressure (Wang et al., 2024). No significant effect was found for work-avoidance self-talk, suggesting that in contrast to the previous findings on autonomy-related support from teachers (Yang et al., 2022), support from peers would be experienced by students as irrelevant regarding academic engagement. At least one previous study on family support for autonomy has reported similar findings (Descals-Tomás et al., 2021).

Finally, none of the studied provisions of PSS were significant predictors of generation of external attributions. It is possible that the influence of situational variables, such as peer support, could be mediated by students' implicit beliefs about intelligence, a personal dimension known to affect SRL (Flanigan et al., 2023).

The effect of motivational self-regulation on achievement

Our results showed that personally referred self-talk, self-efficacy enhancement and cost-appraisal were positive and significant predictors of achievement. Previous studies have reported similar effects, at least for the first two MRSs (Fritea & Fritea, 2013; Rodríguez-Guardado & Gaeta, 2020). Overall, these strategies are expected to positively influence achievement by increasing students' engagement and effort. In this regard, personally referred self-talk seems to be particularly relevant during motivational setbacks, such as experiencing negative emotions (e.g. boredom) (Fitea & Fritea, 2013). Self-efficacy enhancement, on the other hand, seems to address a key motivational component (i.e. self-efficacy), which could enhance effective task management and, ultimately, help students achieve their academic goals (Miele & Schoeler, 2018). Regarding cost-appraisal, in the absence of previous research, and drawing from the situated expectancy-value theory (Eccles & Wigfield, 2020; Wigfield & Eccles, 2000), this strategy may be expected to positively influence positively academic decisions and outcomes (Urhanhe & Wijnia, 2023).

Work-avoidance self-talk was also a significant, but negative, predictor of achievement. Although, to our knowledge, no previous research has explored this effect in adolescents, if students actively avoid academic tasks, a negative effect on achievement can be expected. This statement holds especially true considering that, when regulating a work-avoidance goal, "success" is defined as minimal involvement and effort, thus hindering expenditure of effort and deep processing strategies (King & Ganotice, 2014).

Interestingly, enhancement of situational interest negatively predicted achievement. It is possible that this strategy focuses on a short-term increase in enjoyment by altering the task characteristics (Schwinger et al., 2007; Schwinger & Otterpohl, 2017). Performing these modifications might require substantial cognitive resources (Schwinger et al., 2007), which would no longer be available for other activities (Eccles & Wigfield, 2020; Urhanhe & Wijnia, 2023), such as mastering the task content.

Mastery self-talk, self-defeating self-talk and self-consequating were not significant predictors of achievement. Regarding mastery self-talk, previous findings have shown an inconsistent effect (Villar et al., in press). This can be explained by the intervention of other personal or contextual dimensions. Effort has been consistently found to mediate the relationship between mastery self-talk and achievement (Engelschalk et al., 2017; Kryshko et al., 2020). A moderating effect of mismatch between academic demands and personal interests can be also expected. Regarding self-defeating self-talk, our results are consistent with those reported for secondary school students by Schwinger & Stiensmeier (2012), who interpreted that this strategy is not effective for regulating motivation. Self-consequating was not a significant predictor of achievement in the present study, as also observed in previous studies (Fritea & Fritea, 2013; Wolters, 1999). Perhaps this strategy is not as efficient as sometimes assumed.

Mediational role of motivational self-regulation in the association between perceived support from peers and achievement

Our results confirm the expected role played by peer relations in shaping a favourable motivational state in the face of academic work. They have also allowed us to advance some ideas about the possible underlying processes. Personally referred performance self-talk and self-efficacy enhancement were found to positively mediate the relationship between perceived support from peers (whether emotional, informational and autonomy) and achievement, while

enhancement of situational interest was a negative mediator of this relationship. We found also that the effect of support for autonomy from peers on achievement was positively mediated by cost appraisal, while the effect of informational support from peers negatively affected work-avoidance self-talk, which in turn negatively affected achievement. Considering the nature of the mediational strategies, peers mainly seem to encourage autonomous types of regulation and the introjection of reasons for learning (Connell & Wellborn, 1991; Wolters, 1998). Moreover, informational support from peers has been identified as an important factor addressing the lack of motivation in students. Thus, in the light of our findings, peer support must be considered when the intention is to create a classroom climate that is conducive to engagement and learning.

Limitations and future research

The present study has several limitations. Motivational regulation, like any other dimension of self-regulated learning, is a situated process in which the characteristics of the tasks addressed by the students play a key role. Hence, not only the quantity, but also the quality and adequacy of the strategies used by learners should be taken into account (Eckerlein et al, 2019; Engelschalk et al., 2017). Although the present study explored a wide range of strategies, future research would benefit from also exploring the appropriateness of these strategies in different contexts and in relation to peer PSS. On the other hand, the current study relies on cross-sectional data, which does not allow exploration of directionality nor establishment of causal links. Moreover, given the reciprocal nature of the relationship between peer support, the acquisition of new skills (such as self-regulated motivation) and academic adjustment, future studies should further explore the issue of directionality (Garn & Morin, 2020; Kilday & Ryan, 2022).

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6. DISCUSIÓN GENERAL

6.1 *Objetivo 1: Obtener una Imagen Actual y Comprensiva de los Modelos Teóricos de Aprendizaje Autorregulado*

Los resultados obtenidos a partir de la revisión crítica realizada (Artículo 1) han permitido dar respuesta al primer objetivo teórico planteado, a través del que se buscaba obtener una imagen actual y comprensiva de los modelos teóricos sobre el AAR. En concreto, esta revisión estuvo guiada por dos preguntas de investigación.

En la primera se planteaba la delimitación de las características y componentes esenciales de los modelos teóricos identificados. En este sentido, pudimos constatar que los modelos revisados presentan rasgos comunes. En primer lugar, parten del supuesto de que el/la aprendiz adopta un papel activo y constructivo en el proceso de autorregulación (Zimmerman, 1994, 1998b). Así, los modelos de corte metacognitivo representan este papel activo del aprendiz a través de constructos como la memoria de trabajo (Boekaerts, 1996a, 2006; Wirth et al., 2020), las operaciones (Järvelä y Hadwin, 2013; Winne y Hadwin, 1998) y las habilidades metacognitivas (Efklides, 2006, 2008, 2011), mientras que los elaborados desde una perspectiva sociocognitiva hacen referencia a autoesquemas, autopercepciones y autoevaluaciones (Miele y Scholer, 2018; García y Pintrich, 1994; Schwinger y Stiensmeier-Pelster, 2012). Es más, el hecho de que tanto las aproximaciones dinámicas como las componenciales incluyan las estrategias de aprendizaje como elemento central de la autorregulación, da buena cuenta del rol activo que ha de adoptar el/la aprendiz para autorregular su aprendizaje.

La utilización de estas estrategias, por otra parte, se orienta de manera sistemática a la consecución de metas académicas personales (Boekaerts et al., 2005; Zimmerman y Schunk,

2012), lo cual representa la segunda comunalidad de los modelos analizados. A este respecto, Pintrich (2000) otorga, en sus elaboraciones, un papel central a las orientaciones a meta, entendidas como los motivos generales por los que un/a estudiante realiza una tarea académica, los cuales influyen sobre las actividades de monitorización y control propias del AAR. En consonancia, en los diferentes modelos analizados ocupan un lugar destacado componentes como el establecimiento de metas (Zimmerman y Moylan, 2009), las vías de procesamiento (Boekaerts, 1996a, 2006), los estándares de referencia (Järvelä y Hadwin, 2013; Winne y Hadwin, 1998), la orientación a meta de aprendizaje (Efklides, 2011; Schwinger y Stiensmeier-Pelster, 2012) o las metas de la tarea y de orden superior (Miele y Scholer, 2018).

En tercer lugar, en los modelos revisados están invariablemente presentes las condiciones contextuales en las que se produce el aprendizaje, tanto las próximas como las distales, y tanto las reales como las personalmente apreciadas. En este sentido, el entorno es una de las fuentes esenciales de incidencia en el AAR consideradas en el modelo de Análisis Triádico propuesto por Zimmerman (1989, 1990). En coherencia, encontramos que en el modelo de Winne y Hadwin (1998) se integran las condiciones de la tarea y Pintrich (2000) identifica el contexto como una de las áreas que el/la aprendiz tratará de autorregular, mientras que Efklides (2011) propone el análisis de las características de la tarea en curso como punto de partida para la autorregulación del aprendizaje. El estudio de la dimensión social del contexto próximo adquiere especial relevancia en el modelo desarrollado por Järvelä y Hadwin (2013), en el que se definen tres modos de manifestación del AAR en situaciones de aprendizaje colaborativas (i.e., autorregulación, correulación y regulación compartida). En lo que respecta a las representaciones estables que los individuos forjan sobre las condiciones contextuales de las tareas académicas, se contempla en los modelos que estas pasan a conformar el conocimiento metacognitivo y metamotivacional del alumnado; este será activado en función de los requisitos

y condiciones de la tarea en curso (Efklides, 2011; Miele y Scholer, 2018; Zimmerman y Moylan, 2009; Winne y Hadwin, 1998). Atendiendo a las argumentaciones de Boekaers (2006), cabe destacar que la satisfacción de necesidades psicológicas básicas por parte del contexto social puede considerarse un condicionante esencial de las apreciaciones que el individuo realiza al inicio y durante la ejecución de las tareas de aprendizaje.

En relación con la segunda pregunta de investigación planteada en conexión con el objetivo 1, en ella se proponía examinar la evolución de los modelos teóricos sobre AAR. La revisión y síntesis de los modelos contemporáneos pone de manifiesto un progresivo interés por el estudio de la autorregulación académica en relación con el proceso de aprendizaje. En este sentido, los modelos más actuales amplían las elaboraciones clásicas en cuatro direcciones: de una aproximación macro (genérica) a una micro (detallada o situada), de la actividad consciente a la implícita, del funcionamiento individual al interpersonal y de la autorregulación “fría” a la “caliente” (a través de la progresiva relevancia atribuida a la faceta afectivo motivacional).

En definitiva, los esfuerzos de síntesis y organización, que han cristalizado en el Artículo 1, sientan las bases de las subsiguientes elaboraciones teóricas y empíricas que conforman el cuerpo de la presente tesis. Así, se reafirma la relevancia del contexto social a la hora de obtener una imagen situada del AAR y la autorregulación de la faceta motivacional como un objeto de investigación especialmente relevante.

6.2 Objetivo 2: Aunar las Definiciones y Principales Supuestos sobre el Constructo de Apoyo Social Percibido

El segundo objetivo teórico planteado se abordó mediante el estudio plasmado en el Artículo 2. Como contribución de especial relevancia de este estudio, cabe destacar los argumentos aportados respecto a la correspondencia entre algunas de las provisiones de apoyo definidas en

la taxonomía de Weiss (1974) y las dimensiones contextuales contempladas en el SSMMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007). De este modo, las provisiones de apego (i.e., ofrecimiento de intimidad, proximidad emocional y seguridad) e integración social (i.e., promover el sentimiento de pertenencia mediante el descubrimiento intereses, aficiones, actitudes y/o creencias compartidos) (Weiss, 1974) parecen corresponderse con el suministro de afecto delimitado en el SSMMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007), que se presupone reside en el grado de interés y conocimiento sobre el otro y la búsqueda de conexión emocional.

Por otra parte, la provisión de guía, definida por Weiss (1974) como la disponibilidad de consejo o información, se presenta en clara sintonía con el suministro de estructura, en los términos definidos por el SSMMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007). En este sentido, un entorno estructurado es aquel en el que el contexto social proporciona al aprendiz información sobre las expectativas y consecuencias de sus acciones, en las cantidades apropiadas y con una calidad adecuada.

Por último, la provisión de refuerzo de valía, entendida como el reconocimiento de la competencia, habilidades y valor del individuo (Weiss, 1974), puede identificarse con el apoyo a la autonomía en el SSMMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007). En este modelo, el apoyo a la autonomía se define como la dotación, por parte del contexto, de oportunidades, relevancia y respeto, así como la promoción de la conexión entre las acciones y las metas del individuo. Este tipo de actuaciones supone reconocer los intereses y perspectivas del aprendiz y, en términos generales, su identidad como sujeto volitivo.

Ciertos vínculos relacionales pueden ser percibidos como más apropiadas en relación con provisiones específicas (Pierce et al., 1991). Así, la familia y el profesorado parecerían ser las fuentes principales de la provisión de guía, mientras que el apego y la oportunidad de cuidado

podrían considerarse provisiones especialmente compatibles con los roles de la familia y los iguales. La provisión de alianza confiable, por otra parte, parece ser exclusiva de la familia, al tiempo que la provisión de integración social sería especialmente relevante por parte del grupo de iguales. En cuanto al refuerzo de valía, parece esperable que reciba la influencia de todas las fuentes consideradas.

Resumiendo, la revisión sistemática de las investigaciones identificadas ha permitido constatar el potencial efecto protector del apoyo en general, siendo especialmente relevante su contribución durante periodos transicionales como la adolescencia. Además, la síntesis realizada ha permitido conectar provisiones particulares de apoyo con las variables contextuales definidas en el SSMMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007). Esta correspondencia sienta las bases de las subsiguientes elaboraciones teóricas y empíricas del manuscrito, en las que se plantea la satisfacción de las tres necesidades psicológicas básicas (i.e., relación, competencia y autonomía) como potencial mecanismo subyacente a la relación entre ASP, AAR y ajuste académico durante la adolescencia.

6.3 Objetivo 3: Delimitar el Tipo de Estrategias de Autorregulación Afectivo-Motivacional que Utilizan los Individuos en Entornos de Educación Formal, sus Posibles Antecedentes y Repercusiones Educativas

Para dar respuesta al tercer objetivo teórico que inspiró los estudios compilados en el presente manuscrito, se llevaron a cabo dos revisiones sistemáticas. La primera se destinó al análisis de la literatura existente en materia de autorregulación de las emociones académicas (Artículo 3). La segunda revisión sistemática se centró en la recopilación de los hallazgos disponibles sobre estrategias de regulación motivacional (Artículo 4). Esta última fue acompañada de una síntesis cuantitativa de los resultados disponibles a través de una serie de metaanálisis.

Ante la ausencia, en la literatura existente, de clasificaciones comúnmente aceptadas de las estrategias afectivo-motivacionales, se optó por elaborar sendos listados de estrategias (uno para cada revisión sistemática), integrando denominaciones y definiciones coincidentes. Así, se identificaron 11 estrategias de autorregulación emocional: reevaluación, búsqueda de apoyo, autoconsecuencias, aproximación cognitiva, evitación, supresión, autohabla de autoeficacia, aproximación conductual, liberación de estrés, control ambiental, negación y rumiación. El orden en el que estas estrategias se han relacionado refleja el interés suscitado en las investigaciones revisadas, de forma que las primeras estrategias fueron las investigadas con mayor frecuencia (Pekrun y Stephens, 2009). Este orden, sin embargo, no se corresponde con la frecuencia de uso informado por los/as aprendices, quienes refieren un mayor uso de las estrategias de aproximación cognitiva y conductual y de autoconsecuencias, ocupando la reevaluación y la búsqueda de apoyo puestos intermedios, al menos durante la educación superior (Webster y Hadwin, 2015). En cualquier caso, parecen existir diferencias culturales en la manifestación de estas destrezas (Tze et al., 2013), hecho que no hace sino respaldar la influencia que el contexto social en general, y los agentes de socialización en particular, ejercen sobre el AAR.

Por otra parte, los hallazgos revisados sugieren que las mismas estrategias de regulación emocional pueden ser utilizadas con diferentes fines y en diferentes situaciones, al tiempo que diferentes estrategias pueden ser empleadas con un mismo objetivo y en las mismas condiciones. En cuanto al objetivo perseguido por el/la aprendiz a la hora de emplear estas estrategias, la gestión de emociones negativas ha recibido especial atención, en consonancia con la relevancia atribuida por parte de los/as estudiantes a este tipo de experiencias emocionales (De Corte et al., 2011; Kalenda, 2015; Webster y Hadwin, 2015). En este contexto,

la aproximación cognitiva, la reevaluación y la búsqueda de apoyo parecen ser las estrategias empleadas con mayor frecuencia durante la adolescencia (De Corte et al., 2011; Kalenda, 2015).

En lo que respecta a las estrategias de regulación motivacional, a partir del ejercicio de revisión y síntesis realizado, pudieron ser identificados 18 tipos: anulación de los otros, evaluación del coste, engaño, pesimismo defensivo, ensalzamiento de los otros, regulación del interés personal, regulación del interés situacional, control ambiental, generación de atribuciones externas, autohabla de dominio, autohabla de aproximación al rendimiento, autohabla de evitación del rendimiento, establecimiento de metas próximas, autoconsecuencias, autohabla de autoeficacia, atribuciones ensalzadoras y autosabotaje. En términos generales, nuestros resultados sugieren que los/as estudiantes tienden a emplear estrategias asociadas a estilos más controlados de regulación motivacional (e.g., autohabla de aproximación al rendimiento), en detrimento de las estrategias más acordes con tipos motivacionales autónomos (e.g., autohabla de dominio). Tal y como sugieren Wolters y Bencion (2013), estas tendencias podrían originarse en un mayor conocimiento declarativo y procedimental sobre el primer tipo de estrategias, y/o la creencia de que su utilización será especialmente eficiente. En este sentido, el alumnado parece estar respondiendo a demandas de un contexto académico altamente competitivo, que los llevaría a centrarse en metas relacionadas con el rendimiento y la autodisciplina (Elliot et al., 2005; Yeo et al., 2009). De nuevo, estos resultados respaldan la necesidad de considerar el contexto en el que se desarrolla la autorregulación para obtener una imagen comprensiva de este fenómeno.

En las dos revisiones comentadas se examinaron las diferencias individuales en el uso de las estrategias afectivo-motivacionales. Destaca la edad, entre de las fuentes de variabilidad constatadas. Por una parte, se observa una progresiva adquisición de habilidades de autorregulación, que se produce a lo largo del desarrollo psicológico. En lo relativo a los

mecanismos subyacentes a este proceso, se suele aludir la consolidación de diferentes funciones ejecutivas (e.g., planeación secuencial, flexibilidad mental, fluidez verbal, etc.). Estas permiten al individuo procesar y manipular cada vez mayor cantidad de información, planificar y organizarse de manera más efectiva y secuenciar las acciones orientadas al logro de un objetivo superior (Flores-Lázaro et al., 2014). Sin embargo, tal como indican los datos disponibles, durante la adolescencia se observan tendencias descendentes en el uso de ciertas estrategias (e.g., reevaluación y de estilos motivacionales autónomos) (Ben-Eliyahu y Linnenbrink-García, 2015; Suehiro y Burochovich, 2017). Este descenso podría atribuirse a procesos neuromadurativos (e.g., (des)equilibrio entre la maduración de los sistemas asociados al control cognitivo y el sistema emocional/motivacional), así como a ciertos elementos contextuales (e.g., currículo más exigente y complejo, mayor énfasis en la disciplina) (Anderson et al., 2000; Chouinard et al., 2017; Romer et al., 2011).

En los estudios revisados también se identificaron diferencias en función del sexo de los participantes, observándose, en términos generales, una mayor utilización de las distintas estrategias revisadas entre las mujeres. En lo referente a los mecanismos subyacentes a estas diferencias, las elaboraciones teóricas y empíricas disponibles apuntan hacia la relevancia del contexto cultural y social. Por una parte, Pajares y Valiante (2002) refieren la existencia de una orientación femenina caracterizada por los comportamientos propios del aprendizaje autorregulado (e.g., contar con un espacio ordenado para el estudio, priorizar las actividades escolares frente a otro tipo de actividades, etc.). Esta orientación, según los autores, es más frecuente entre las mujeres quienes, en consecuencia, informan de un mayor uso de estrategias para la regulación de su aprendizaje. Por otra parte, Peklak y Pecja (2002) reflejan en sus elaboraciones la importancia de considerar el contexto cultural, en un sentido amplio, a la hora de interpretar estos resultados. En concreto, las autoras plantean la existencia de estereotipos

de género, de acuerdo con los cuales se espera que las mujeres sigan diligentemente las demandas curriculares y del profesorado, sean más exactas en su trabajo escolar y obtengan mejores calificaciones. Las desviaciones por parte de los hombres en lo relativo a estas normas parecen ser mejor aceptadas socialmente. En lo que respecta a estrategias particulares, la mayor utilización por parte de las mujeres de la estrategia de búsqueda de apoyo (De Corte et al., 2011) parece estar asociada a procesos diferenciados de socialización, determinados en relación con el sexo. En este sentido, la expresión emocional y el compartir dificultades con otras personas parecen ser conductas fomentadas entre las mujeres, mientras que no se suelen considerar apropiadas para los hombres (Tinajero et al., 2015).

En cuanto a los posibles antecedentes del uso de las estrategias afectivo-motivacionales, los estudios revisados señalan la capacidad predictiva de distintas variables motivacionales (i.e., orientaciones a meta, expectativas de éxito, valor de la tarea, autoevaluaciones) sobre el uso de estrategias de regulación emocional. En esta misma línea, se observó una correlación positiva, significativa y de intensidad moderada entre diferentes creencias motivacionales (e.g., autoeficacia, valor de la tarea, orientaciones a meta, etc.) y la utilización de estrategias de autorregulación motivacional. Estos resultados se encuentran en sintonía con los principales modelos de autorregulación motivacional, en los que se sugiere que el conocimiento y los sentimientos metamotivacionales representan la base de la autorregulación de la motivación académica (Schwinger y Stiensmeier-Pelster, 2012; Miele y Scholer, 2018). Cobran especial relevancia, en este contexto, las elaboraciones de Boekaerts (2006), quien plantea que las creencias activadoras sobre la competencia personal y/o la relevancia de las tareas académicas predispondrían al aprendiz a adoptar una actitud de autorregulación autodirigida.

En lo que respecta a las posibles repercusiones educativas de la utilización de estrategias de regulación emocional, los resultados de los estudios revisados sugieren la existencia de un

efecto positivo sobre la motivación intrínseca (Tze et al., 2013) y el desarrollo y la manifestación de habilidades de autorregulación en general (Ben-Eliyahu y Linnenbrink-García, 2015; Stiller et al., 2019).

En lo relativo a las estrategias de regulación motivacional, estas se han asociado de manera consistente con el uso de estrategias cognitivas y metacognitivas, con experiencias emocionales positivas y activadoras y con altos niveles de implicación académica (Grunschel et al., 2016; Smit et al., 2017; Trautner y Schwinger, 2020). Cabe destacar que estos dos últimos correlatos han sido identificados como los posibles medios a través de los que la autorregulación motivacional influye sobre el esfuerzo (Schwinger y Stiensmeier-Pelster, 2012; Wolters y Benzon, 2013). Los resultados de las comparaciones metaanalíticas realizadas (Artículo 4) indican que las estrategias de autorregulación motivacional que muestran un mayor efecto sobre el esfuerzo son las dirigidas a persuadirse de la importancia de la tarea académica, seguidas por las que inciden en el interés por aumentar el repertorio de conocimientos y habilidades personales, las que enfatizan los resultados esperados del esfuerzo y, en menor medida, las dirigidas a los costes asociados a las tareas académicas, bien fraccionándolas o mediante la evitación de distractores.

En todo caso, nuestros resultados son consistentes con las elaboraciones teóricas disponibles sobre la autorregulación motivacional (Miele y Scholer, 2016, 2018; Schwinger y Stiensmeier-Pelster, 2012), en las que se sugiere que las estrategias motivacionales de aprendizaje actúan como factores condicionantes del procesamiento de la tarea y, en última instancia, de la volición y el rendimiento. En efecto, los datos revisados sugieren que el uso de diferentes estrategias de regulación motivacional afecta positivamente al uso de estrategias cognitivas de aprendizaje a través de la conciencia y regulación metacognitivas (Suárez-Riveiro et al., 2016; Suárez-Riveiro y Fernández-Suárez, 2012).

Sin embargo, la relación entre las estrategias de regulación motivacional y el rendimiento se muestra inconsistente, según los datos recabados en nuestra revisión, lo que sugiere que es necesario dilucidar el posible papel de variables moderadoras y mediadoras en la citada asociación. A este respecto, el esfuerzo ha sido consistentemente identificado como variable mediadora entre las estrategias de autorregulación motivacional y el rendimiento (Engelschalk et al., 2017; Kryshko et al., 2020; Schwinger et al., 2009; Trautner y Schwinger, 2020).

Así pues, la revisión de la evidencia disponible sobre la autorregulación de la faceta afectivo-motivacional pone de manifiesto la existencia de una amplia variedad de estrategias, las cuales son empleadas por los/as estudiantes con diferente frecuencia. A la hora de tratar de comprender esta variabilidad, cabe considerar el posible efecto de variables personales (e.g., sexo, edad, creencias personales, conocimiento y sentimientos metamotivacionales) y contextuales (e.g., demandas curriculares, procesos de socialización). En este sentido, se ha identificado la necesidad de profundizar sobre la incidencia que los factores contextuales puedan tener sobre la adquisición y manifestación de las destrezas de autorregulación, entrañando especial relevancia a este respecto el papel de los principales agentes de socialización durante la adolescencia (i.e., familia, profesorado e iguales). Por otra parte, los esfuerzos de análisis y síntesis realizados ponen de manifiesto la relevancia de las diferentes estrategias identificadas en el proceso de aprendizaje. A este respecto, merecen especial atención las relaciones entre distintos tipos de estrategias (i.e., motivacionales, cognitivas y metacognitivas), pues explorar la direccionalidad y magnitud de estos efectos aportaría respaldo a los supuestos de los modelos de AAR.

6.4 Objetivo 4: Recopilar y Sistematizar la Evidencia Empírica Disponible sobre las Interconexiones entre el Apoyo Social Percibido y el Aprendizaje Autorregulado

El cuarto objetivo teórico al que se buscaba responder en la presente tesis hace referencia a la exploración de la evidencia empírica disponible sobre las interconexiones entre el ASP, el AAR y el progreso académico. Con este fin, se llevó a cabo una revisión sistemática y un metaanálisis (Artículo 2).

Los análisis realizados revelaron la existencia de una relación positiva y moderada entre los índices de estas dimensiones. Para explicar, de manera tentativa, estos resultados, partimos de las elaboraciones relativas a las propiedades del contexto social que favorecen la satisfacción de las necesidades psicológicas básicas, integradas en el SSMMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007). Así, cabe esperar que un entorno rico en compromiso (comunicación de interés y dedicación de tiempo y amparo afectivo) satisfaga la necesidad de relación al generar en el/la aprendiz sentimientos de seguridad, cercanía, integración y pertenencia (Connell y Wellborn, 1991; Marchand y Skinner, 2007). Estos sentimientos, a su vez, podrían reducir las preocupaciones académicas y aumentar la autoestima del aprendiz (Patrick et al., 2007), al tiempo que facilitarían la integración de metas y valores educativos (Danielsen et al., 2011; Perry et al., 2018) externamente transmitidos. Los informes revisados (Artículo 2) apoyan estas premisas, en tanto que las provisiones de apego e integración social por parte de la familia, el profesorado y los iguales se ha asociado de manera consistente con la utilización, por parte del alumnado, de estrategias de aprendizaje.

Por otra parte, cabe esperar que la dotación de un entorno estructurado satisfaga la necesidad de competencia del alumnado, incrementando su conocimiento metacognitivo sobre las estrategias de aprendizaje y ellos/as mismos/as como aprendices (Connell y Wellborn, 1991; Marchand y Skinner, 2007), sentando así las bases para su autorregulación durante la ejecución

de las tareas académicas. Los estudios identificados en nuestra revisión sistemática sobre la relación entre el ASP y el AAR (Artículo 2) respaldan este razonamiento, pues la provisión de apoyo informativo (i.e., guía), por parte de las tres fuentes analizadas, se ha asociado de manera consistente con la ejecución de destrezas de autorregulación.

Finalmente, la necesidad de autonomía, según postula el SSMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007) podría satisfacerse mediante el apoyo a la autonomía, esto es, el reconocimiento y respeto por parte del contexto social, en el sentido de admitir al individuo como un sujeto volitivo con sus propios intereses y perspectiva (i.e., provisión de refuerzo de valía). De este modo, el contexto social favorecería la adopción de estilos motivacionales autónomos (Hu y Zhang, 2017), lo que a su vez favorecería la autorregulación cognitiva y conductual. Así al menos lo sugieren los datos obtenidos en nuestra revisión sistemática sobre la relación entre el ASP y el AAR (Artículo 2). En ella reunimos datos acerca del efecto del apoyo a la autonomía por parte de la familia y el profesorado y constatamos que falta realizar investigación sobre los iguales como suministradores de este tipo de apoyo.

En definitiva, la revisión realizada permitió confirmar la existencia de la hipotetizada relación entre el ASP y el AAR. Estos resultados han sido interpretados atendiendo a las elaboraciones del SSMD (Connell y Wellborn, 1991; Marchand y Skinner, 2007). En líneas generales, parece acertado asumir que el ASP facilita la integración de valores y metas, incrementa el conocimiento metacognitivo y fomenta sentimientos de agencia en el aprendiz. Estos tres efectos, a su vez, promoverían la adopción de estilos de regulación autónomos, los cuales parecen favorecer el AAR. Por lo tanto, el ASP se ha identificado como una variable contextual clave a la hora de comprender la manifestación de las destrezas de autorregulación académica.

6.5 Objetivo 5: Plantear Modelos Explicativos sobre las Interconexiones entre las Provisiones de Apoyo Social Percibido, el Conocimiento Metacognitivo, las Estrategias de Aprendizaje y el Rendimiento Académico durante la Educación Secundaria y Someterlos a Comprobación Estadística

Con el objetivo de validar empíricamente las elaboraciones teóricas derivadas de los anteriores objetivos, en el Artículo 5 se recogen los resultados de un estudio realizado sobre las interconexiones entre apoyo social percibido de distintas fuentes, el autohabla dirigida a metas, el conocimiento metacognitivo, las estrategias cognitivas de aprendizaje y el rendimiento académico en estudiantes de educación secundaria. Los hallazgos obtenidos respaldan las esperadas asociaciones entre las citadas dimensiones. Más concretamente, los efectos observados sugieren que las percepciones de apoyo por parte del profesorado y la familia disminuyen la regulación de metas de evitación y favorecen los esfuerzos del estudiante por autorregular sus metas de dominio, efectos que, a su vez, incrementan el conocimiento metacognitivo disponible, el cual repercute positivamente sobre el uso de estrategias cognitivas y metacognitivas y sobre el rendimiento. Estos resultados fueron interpretados en términos de la satisfacción de las tres necesidades psicológicas básicas definidas en la Teoría de Autodeterminación (Deci y Ryan, 2008).

Los efectos constatados para el apoyo percibido por parte de la familia se encontraban en el sentido esperado y en consonancia con las investigaciones previas que respaldan su papel como principal agente de socialización (Deci y Ryan, 2012). La influencia de esta fuente parece fundamentarse en la creación de entornos en los que el/la adolescente se pueda sentir valorado/a, querido/a y responsable de sus propias acciones, lo cual favorecería la adopción de estilos de regulación más autónomos (Soenens et al., 2007). En el marco de los deberes escolares, los padres tienen la potestad de establecer la estructura física (e.g., lugar de estudio,

organización temporal) y psicológica (mediante prácticas como el andamiaje, el refuerzo, el modelado y la comunicación inductiva) para el desempeño académico (Hoover-Dempsey et al., 2001; Pino-Pasternak et al., 2010). La satisfacción de las necesidades básicas mediante este tipo de conductas de apoyo parece estar en la base del desarrollo y manifestación de la autoconciencia y las destrezas de autorregulación, facilitando el ajuste al medio escolar y favoreciendo la generación de autopercepciones favorables (e.g., autoestima y autoeficacia académicas) (Chu et al., 2010; Grolnick et al., 1999; Yang et al., 2022).

En lo tocante a los efectos obtenidos para el apoyo del profesorado, estos son consistentes con elaboraciones que ubican las características de sus prácticas instruccionales y su gestión del clima del aula como catalizadoras de un estilo motivacional autónomo (Ryan y Deci, 2020) y de la implicación y el rendimiento académicos (An et al., 2022; Lee y Simpkins, 2021). Esta influencia ha sido principalmente analizada en términos de prácticas de apoyo a la autonomía (e.g., escuchar activamente al alumnado, ofrecer feedback informativo, proponer tareas con un nivel óptimo de desafío), en contraposición con aquellas de naturaleza controladora (e.g., imponer reglas estrictas, controlar al alumnado mediante amenazas y/o fomentando la competitividad, desincentivar la participación) (Reeve, 2009; Urdan y Schoenfelder, 2006). Así, las primeras se han asociado positivamente con la manifestación de las destrezas de autorregulación y el rendimiento (Schuitema et al., 2016; Wang et al., 2017), mientras que las segundas parecen representar un impedimento para las conductas de aprendizaje autónomo (Vansteenkiste et al., 2012; Haerens et al., 2016).

Por otra parte, es esperable que el profesorado ofrezca información y oportunidades de elección al alumnado, favoreciendo su adquisición de los conocimientos y habilidades necesarias para autorregular su aprendizaje (OCDE, 2018). Estas actividades podrían manifestarse de forma directa a través de la instrucción, o de manera indirecta al fomentar

entornos de aprendizaje constructivistas, colaborativos y situados (Kistner et al., 2010). Dentro de esta segunda vía de influencia, en la medida en que el profesorado promueva una estructura de metas de dominio en el aula, estarían transmitiendo al alumnado el valor de adquirir nuevas destrezas y conocimientos, relegando a un segundo plano la importancia de las calificaciones obtenidas. Estos mensajes parecen favorecer la adopción personal de metas de dominio, a las cuales se asocia un amplio rango de beneficios motivacionales y conductuales, entre los que se incluyen las destrezas de AAR (Urda y Schoenfelder, 2006; Gaeta et al., 2012).

En cuanto a las interconexiones observadas entre las dimensiones del AAR consideradas, así como su relación con el conocimiento metacognitivo, estas se presentaron en el sentido esperado. Así, los resultados sugieren que la meta regulada por el/la aprendiz en una determinada situación de aprendizaje estaría condicionando el conocimiento metacognitivo activado. A su vez, el conocimiento metacognitivo disponible determinará las estrategias cognitivas a emplear en una situación de aprendizaje determinada (Efklides, 2011; Miele y Scholer, 2018; Zimmerman y Moylan, 2009; Winne y Hadwin, 1998).

En suma, los resultados presentados en el Artículo 5 han permitido obtener una imagen situada del AAR, en tanto que subrayan la relevancia del ASP por parte del profesorado y la familia. Además, estos resultados contribuyen a esclarecer las relaciones entre la regulación de la faceta (meta)cognitiva y la motivacional, así como el papel que juega el conocimiento metacognitivo, habiendo sido identificado como una dimensión mediadora clave entre las variables de interés. Sin embargo, esta investigación plantea importantes incógnitas acerca del rol que el apoyo social percibido por parte de los iguales pueda llegar a ejercer en la manifestación de las destrezas de autorregulación.

6.6 Objetivo 6: Explorar los Efectos de Mediación de las Estrategias de Autorregulación Motivacional en la Relación del Apoyo Social Percibido de los Iguales con el Rendimiento Escolar en Adolescentes

El último objetivo que se buscaba alcanzar en la presente tesis fue abordado en el estudio presentado en el Artículo 6. Los resultados obtenidos confirmaron el esperado efecto de mediación para cinco de las diez estrategias de regulación motivacional consideradas (i.e., autohabla de rendimiento, autohabla de evitación, autohabla de autoeficacia, regulación del interés situacional y valoración del coste). A la hora de explicar, de manera tentativa, estos resultados, cabe considerar el contexto específico de las relaciones entre iguales en el aula durante la adolescencia, así como las demandas académicas propias de la educación secundaria.

En lo que respecta a la capacidad predictiva de las diferentes provisiones de apoyo consideradas, parece acertado asumir que los iguales influyen sobre las destrezas de autorregulación motivacional a través de tres vías: transmitiendo y favoreciendo la interiorización de metas y valores académicos (Danielsen et al., 2011; Perry et al., 2018), fomentando, en el/la aprendiz, el desarrollo de autoCREENCIAS positivas (Fernández-Zabala et al., 2020; Sarkova et al., 2014) y facilitando información relevante para el desempeño de las tareas de aprendizaje (Järvela y Hadwin, 2013; Jelas et al., 2016; Nurfadilah et al., 2024).

En lo relativo a la primera vía, la transmisión de valores y metas parece estar condicionada por la progresiva importancia que el rendimiento académico adquiere en la transición desde niveles de educación primaria a la secundaria (Anderman y Midgley, 1997; Urdan y Midgley, 2003). En este sentido, es esperable que un contexto altamente competitivo y orientado al rendimiento cristalice en la transmisión de valores extrínsecos (Federici et al., 2015). Asimismo, percepciones elevadas de apoyo resultarían en un mayor interés por cumplir con estos estándares de éxito (Elliot et al., 2005; Yeo et al., 2009). En consonancia con estas

premisas, en nuestros datos se observó un efecto positivo de las tres provisiones de apoyo evaluadas sobre el uso del autohabla de rendimiento autorreferido y las autoconsecuencias. Nótese que se trata de estrategias que parecen estar en sintonía con el tipo de autorregulación identificada, uno de los delimitados en la Teoría de Autodeterminación de Deci y Ryan (2008), situado en un lugar intermedio en el continuum conformado por los estilos autónomos y controlados. Esto nos lleva a sugerir que, al tiempo que el apoyo de los iguales favorece la interiorización de los valores del contexto escolar relativos al desempeño académico, también proporciona al individuo la seguridad para aceptar su responsabilidad al respecto y establecer estándares e incentivos personales, dejando en un segundo plano el interés por la comparación social (Duchesne et al., 2017). De hecho, en nuestro estudio se obtuvo un efecto negativo del apoyo de los iguales sobre el autohabla de autoderrota, mientras que sobre el autohabla de autoensalzamiento no era significativo.

Como segunda vía de influencia hemos propuesto la incidencia de los iguales parece ejercer en el desarrollo de un autoconcepto académico positivo durante la adolescencia (Wouters et al., 2013). En este sentido, percepciones elevadas de apoyo por parte de los iguales parecen favorecer la presencia de creencias positivas sobre la competencia personal (Fernández-Zabala et al., 2020; Sarkova et al., 2014). A su vez, estas autopercepciones favorables podrían estar contribuyendo a la adopción de un estilo más autorregulado (Ilishkina et al., 2022; Wolters, 1998). Los datos obtenidos se presentan en línea con este razonamiento, pues las tres provisiones de apoyo consideradas actuaron como predictores positivos y significativos de estrategias vinculadas con la tarea (i.e., autohabla de dominio y regulación del interés situacional), los valores personales (i.e., autohabla de autoeficacia) y los recursos disponibles (i.e., valoración del coste de consecución).

En lo que respecta a la tercera vía de influencia, relativa a la relevancia de la información proporcionada por los iguales sobre los contenidos y procedimientos requeridos para la realización de las tareas académicas (Järvela y Hadwin, 2013; Jelas et al., 2016; Nurfadilah et al., 2024), esta podría actuar como elemento disuasorio de la adopción y regulación de metas de evitación; al mismo tiempo, parecería facilitar la adopción de estilos de regulación autónomos (e.g., autohabla de dominio y regulación del interés situacional).

Pasando ahora a la capacidad predictiva de las distintas estrategias de regulación motivacional, los diferentes efectos identificados pueden ser tentativamente atribuidos a la influencia diferencial de las distintas estrategias sobre el esfuerzo invertido, por parte del aprendiz, a la hora de realizar la tarea académica (Engelschalk et al., 2017; Kryshko et al., 2020; Schwinger et al., 2009; Trautner y Schwinger, 2020).

En este sentido, la regulación de metas de rendimiento autorreferidas, el autohabla de autoeficacia y la valoración del coste de consecución han sido identificadas como predictores positivos del rendimiento. Atendiendo a elaboraciones previas, estas estrategias parecen favorecer el rendimiento académico al facilitar la implicación del estudiante en las tareas académicas (Fritea y Fritea, 2013; Miele y Scholer, 2018; Urhahne y Wijnia, 2023).

En concreto, la regulación de metas de rendimiento autorreferidas parece contrarrestar el impacto de las experiencias emocionales negativas, potenciando las creencias motivacionales del aprendiz (e.g., valor de la tarea, autoeficacia), el uso de estrategias cognitivas y metacognitivas y el esfuerzo invertido (Fritea y Fritea, 2013). Por otra parte, la monitorización y control de la autoeficacia podría aumentar el compromiso con la tarea y, en última instancia, facilitar la consecución de las metas académicas del estudiante (Miele y Scholer, 2018). Existe evidencia empírica a favor de estos efectos, en tanto que el autohabla de autoeficacia se ha identificado como un predictor positivo del uso de estrategias cognitivas y metacognitivas

(Suárez-Riveiro y Fernández-Suárez, 2011) y negativo de la evitación de situaciones académicas desafiantes (Wang et al., 2017). Por último, la regulación de los costes de oportunidad (i.e., establecer una meta concreta, en detrimento de otras) y de esfuerzo (i.e., enfocarse en el esfuerzo requerido para realizar una tarea) parece influir positivamente en las decisiones y resultados académicos (Urhanhe y Wijnia, 2023).

Sin embargo, parece acertado asumir que ciertas estrategias promueven esfuerzos discordantes con las demandas curriculares, lo cual repercutiría negativamente sobre el rendimiento. Así, la regulación del interés situacional fue identificada como un predictor negativo del rendimiento. A la hora de tratar de explicar este efecto, cabe destacar que, a través de esta estrategia, el/la aprendiz busca incrementar la persistencia y el disfrute a corto plazo alterando las características de la tarea (Schwinger et al., 2007; Schwinger y Otterpohl, 2017). Realizar estas modificaciones puede requerir importantes esfuerzos (Schwinger et al., 2007), lo cual mermaría los recursos cognitivos disponibles para realizar otras actividades (Eccles y Wigfield, 2020; Urhanhe y Wijnia, 2023), como trabajar los contenidos de la tarea.

Un proceso similar podría subyacer a la ausencia de significatividad de la capacidad predictiva de la regulación de metas de aprendizaje. En este sentido, el rendimiento se puede considerar contingente a la armonización entre la agenda académica del aprendiz y la del docente (Broekkamp et al., 2002; Senko y Miles, 2008). Cuando los/as estudiantes adoptan metas de aprendizaje, tienden a centrarse en lo que les resulta más relevante en términos de su compatibilidad con los esquemas de conocimiento, lo cual podría llevarlos/as a desatender contenidos que perciben como aburridos o irrelevantes. Sin embargo, estos aspectos que quedan desatendidos podrían ser percibidos por el/la docente como importantes (Senko, 2019). En consecuencia, si bien la regulación de metas de dominio podría ser esencial para el aprendizaje comprensivo del material escolar (Wolters, 1999), también podrían repercutir negativamente

sobre el rendimiento debido a un desajuste entre las demandas académicas y el interés y bagaje personal.

Por otra parte, la regulación de metas de evitación parece reducir el esfuerzo invertido en la tarea y el uso de estrategias de aprendizaje, repercutiendo, en última instancia, negativamente sobre el rendimiento. Este efecto perjudicial podía estar condicionado por la definición de “éxito” que adopta el/la estudiante al emplear esta estrategia, siendo su principal objetivo el invertir la menor cantidad de esfuerzo posible (King y Ganotice, 2014).

Por último, parece acertado asumir que algunas de las estrategias consideradas no logran influir de manera efectiva y/o prolongada sobre el esfuerzo (Schwinger y Stiensmeier-Pelster, 2012). A este respecto, las estrategias de autohabla de autoderrota y las autoconsecuencias no fueron predictores significativos del rendimiento. En el caso de esta última estrategia, si bien ha sido previamente identificada como un predictor significativo y positivo del esfuerzo (Wolters, 1999), cabe esperar que sus efectos no sean sostenidos en el tiempo, lo cual limitaría el impacto que esta estrategia pueda llegar a ejercer sobre el rendimiento.

En definitiva, los resultados obtenidos en el presente estudio han permitido explorar el hipotetizado efecto de mediación de la autorregulación motivacional en la relación entre el apoyo de los iguales y el rendimiento académico durante la adolescencia. Los efectos observados sugieren que los iguales favorecen estilos de regulación motivacional más autónomos, al tiempo que previenen la desmotivación académica. Estos efectos pueden ser atribuidos a tres vías de influencia: transmisión de valores y metas, facilitación del desarrollo de un autoconcepto positivo y abastecimiento de información relevante. Dado que estos procesos tienen lugar en un contexto académico determinado, cabe considerar el papel que las demandas instruccionales, y el entorno educativo en general, juegan en los procesos de transmisión de información e internalización de valores y metas considerados. En cuanto al

efecto de las estrategias sobre el rendimiento, este parece producirse a través del impacto diferencial de las estrategias sobre el esfuerzo invertido. El aspecto de la tarea al que se dirigen estos esfuerzos parece condicionar la efectividad de dichas estrategias.

6.7 Limitaciones y Futuras Vías de Investigación

Si bien los ejercicios de revisión y evaluación empírica de los modelos planteados han ayudado a esclarecer las relaciones entre el ASP, las destrezas de autorregulación académica y el rendimiento durante la adolescencia, estos no están exentos de limitaciones. En primer lugar, los metaanálisis realizados se vieron condicionados por el limitado número de estudios disponibles. En este sentido, las asociaciones entre ciertas estrategias (e.g., ensalzamiento de otros/as, engaño) y algunos de los correlatos considerados (e.g., disfrute, ritmo de aprendizaje) no han podido ser sintetizadas cuantitativamente. Por otra parte, la naturaleza correlacional de gran parte de los datos considerados en la presente tesis hace que sean insuficientes para el establecimiento de relaciones causales entre las variables de interés. En tercer lugar, la estrategia de medida empleada (i.e., test autoinformados) ha influido significativamente sobre la interpretación de los datos analizados. Así, los análisis realizados han permitido obtener una comprensión genérica de las interconexiones entre las variables de interés, en detrimento de un análisis situado de las variables objeto de estudio. Asimismo, se debe contemplar la posibilidad de que las respuestas obtenidas hayan sido influidas por ciertos sesgos subjetivos (e.g., deseabilidad social).

Al margen de estas limitaciones, el trabajo de tesis ha permitido identificar una serie de cuestiones que merecen ser atendidas en subsiguientes investigaciones. En este sentido, atendiendo a la naturaleza recíproca de las relaciones entre las variables de interés (Garn y Morin., 2021; Kilday y Ryan, 2022), se destaca la necesidad de realizar estudios longitudinales

que permitan explorar y establecer conclusiones sobre la evolución y direccionalidad de los efectos constatados. A su vez, obtener datos empíricos sobre esta posible causalidad recíproca permitiría ampliar las propuestas teóricas existentes en dichos términos o, de ser necesario, desarrollar nuevos modelos teóricos.

En segundo lugar, atendiendo a la naturaleza situada del AAR, se ha identificado la necesidad de considerar la calidad y adecuación de las estrategias empleadas por los/as estudiantes (Eckerlein et al., 2019; Engelschalk et al., 2017). Cabe destacar, en este sentido, la pertinencia de investigaciones que adopten una aproximación cercana al proceso de aprendizaje, en las que las destrezas de AAR se pongan en relación con episodios de aprendizaje concretos y situados.

En tercer lugar, los efectos recogidos en la presente tesis subrayan la necesidad de considerar el contexto social a la hora de comprender el proceso de adquisición y manifestación de las destrezas de autorregulación. En concreto, la satisfacción de necesidades básicas se revela como una prometedora línea de trabajo para la elaboración de propuestas de intervención en materia de AAR durante la educación secundaria. Por lo tanto, se destaca como una futura línea de investigación el diseño y el análisis de la eficacia de programas de entrenamiento en destrezas de autorregulación contruidos considerando las variables contextuales mencionadas.

7. CONCLUSIONES

In conclusion, the results obtained in the research endeavours reported in the body of the present thesis allow the following conclusions to be reached:

- The self-regulated learning construct is of great heuristic value, laying the foundations for the development of numerous empirical investigations and interpretation of the results.
- Self-regulation of the affective-motivational facet is nowadays considered a key element in self-regulated learning.
- Learners can use a wide range of emotional and motivational regulation strategies, with use being influenced by personal variables (e.g. age, sex) and beliefs (e.g. self-efficacy, goal orientation), as well as contextual dimensions (e.g. curricular demands, socialization processes).
- Perceived social support seems to play an essential role in the acquisition and manifestation of self-regulated learning skills and in academic progress in general. Satisfaction of the three basic psychological needs (i.e. connectedness, competence and autonomy) could be highlighted as a key mechanism underlying these effects.
- Perceived social support from teachers seems to have a direct positive effect on achievement during adolescence, while family support may influence achievement through metacognitive knowledge.
- Emotional support, which includes the provision of attachment and integration, seems to contribute to the aforementioned effects by facilitating the development of positive self-beliefs among learners, as well as the integration of academic values and goals.

- Informational support, or the provision of guidance, is expected to foster self-regulated learning by increasing learners' awareness regarding instructional demands and the available metacognitive knowledge.
- Autonomy support, which corresponds to reassurance of worth, seems to promote self-regulation whenever it is expected to increase students' feelings of agency.
- The academic context during secondary education (e.g. impersonal relationships between teachers and students, more demanding curriculum, competitive environment) is important in relation to interpreting the effects of particular motivational regulation strategies on achievement.

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ANEXOS

Anexo I: Autorización del comité de bioética



VICERREITORÍA DE INVESTIGACIÓN
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JOSÉ MANUEL CIFUENTES MARTÍNEZ, PRESIDENTE DO COMITÉ DE BIOÉTICA DA UNIVERSIDADE DE SANTIAGO DE COMPOSTELA,

INFORMA:

Que o proxecto de investigación con rexistro **USC-29/2020** titulado “**Factores asociados ao axuste académico en adolescentes: o papel do apoio social percibido e a autorregulación da aprendizaxe**”, do que é investigador responsable Dona **Carolina Tinajero Vacas**, ten sido examinado por o Comité de Bioética desta Universidade, cumprindo o seu protocolo experimental os requisitos éticos esixidos.

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Lugo, 03 de decembro de 2020.



Anexo II: Licencias bajo las que han sido publicados los artículos que componen el cuerpo de la tesis

Artículo 1

Citation: Tinajero C, Mayo ME, Villar E and Martínez-López Z (2024) Classic and modern models of self-regulated learning: integrative and componential analysis. *Front. Psychol.* 15:1307574. doi: 10.3389/fpsyg.2024.1307574

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Artículo 2





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Perceived social support and self-regulated learning: A systematic review and meta-analysis

Zeltia Martínez-López ^a  , Sónia Nouws ^b, Eva Villar ^a, M^a Emma Mayo ^a, Carolina Tinajero ^a


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Artículo 3

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DOI: <https://doi.org/10.6018/analesps.415651>

Palabras clave: Aprendizaje autorregulado, Autorregulación afectiva, Estrategias de aprendizaje, Educación secundaria, Universidad

Resumen

En el presente trabajo, se ofrece una revisión de la literatura científica sobre la autorregulación de las emociones académicas. Se realizó una búsqueda sistematizada de documentos en las bases de datos Scopus y Web of Science. Se seleccionaron 29 artículos y capítulos de libro, que cumplieran los criterios de elegibilidad previamente establecidos. Se reunieron datos e interpretaciones teóricas que nos han permitido obtener una visión global del estado del conocimiento en torno a los núcleos de interés prioritarios: tipos y frecuencia de

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What are the principal and most effective strategies for motivational self-regulation? A systematic review and meta-analyses ☆

Eva Villar, M^a. Emma Mayo  , Zeltia Martínez-López, Carolina Tinajero


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Artículo 5

Perceived social support and its relationship with self-regulated learning, goal orientation self-management, and academic achievement

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La adolescencia es un periodo transicional durante el cual tienen lugar importantes cambios en el individuo y su contexto. Afrontarlos con éxito es esencial para el bienestar y progreso académico; sin embargo, a menudo encuentran dificultades. La capacidad para autorregular el aprendizaje (AAR) se considera una condición favorecedora para soslayar estas dificultades. Por otra parte, el apoyo social percibido (ASP) se ha propuesto como condicionante principal del AAR. Partiendo de estas premisas, la presente tesis busca contribuir a esclarecer el papel del AAR y el ASP en el rendimiento académico durante la adolescencia. Los resultados obtenidos respaldan el efecto esperado del ASP sobre el AAR, así como el papel mediador de estas destrezas en la relación del ASP con el rendimiento académico.