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Learning Motivation in Children: A Systematic Review of Assessment Tools

Motivación para el aprendizaje en niños: Revisión sistemática de instrumentos de evaluación

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ABSTRACT

Given the inherent complexity of assessing motivation in educational contexts, the use of theoretically grounded and psychometrically validated instruments is essential to ensure accurate measurement. This systematic review aims to identify and analyze the assessment tools and their psychometric properties used to evaluate learning motivation in children aged 6 to 12 years. Following PRISMA guidelines, searches were conducted in databases such as B-on, ERIC, and PsycINFO, identifying 473 articles published between 2010 and 2024. After applying exclusion criteria, 54 studies were included, revealing 44 distinct instruments based on six predominant theoretical models, including Self-Determination Theory, Expectancy-Value Theory, and Achievement Goal Theory. Most instruments demonstrated strong internal consistency, and a wide range of validity indicators—such as criterion, discriminant, and external validity—were frequently reported. The review offers a comprehensive synthesis of validated tools for measuring motivation in elementary education, providing practical guidance for educators and psychologists to enhance motivational assessments in school settings.

Keywords: Motivation Assessment; Assessment Tools; Primary Education; Learning Motivation; Systematic Review; Self-Determination Theory; Educational Psychology

RESUMEN

Dada la complejidad inherente a la evaluación de la motivación en contextos educativos, resulta fundamental utilizar instrumentos teóricamente fundamentados y validados psicométricamente para garantizar una medición precisa. Esta revisión sistemática tiene como objetivo identificar y analizar los instrumentos de evaluación y sus propiedades psicométricas utilizados para medir la motivación en el aprendizaje en niños de 6 a 12 años. Siguiendo las directrices PRISMA, se realizaron búsquedas en bases de datos como B-on, ERIC y PsycINFO, identificándose 473 artículos publicados entre 2010 y 2024. Tras aplicar criterios de exclusión, se incluyeron 54 estudios que reportaron 44 instrumentos distintos basados en seis modelos teóricos predominantes, entre ellos la Teoría de la Autodeterminación, la Teoría Expectativa-Valor y la Teoría de Metas de Logro. La mayoría de los instrumentos mostraron una fuerte consistencia interna y se reportaron frecuentemente indicadores de validez, como la validez de criterio, discriminante y externa. Esta revisión ofrece una síntesis integral de herramientas validadas para medir la motivación en la educación primaria, brindando orientación práctica a educadores y psicólogos para mejorar las evaluaciones motivacionales en entornos escolares.

Palabras Clave: Evaluación de la motivación; instrumentos de evaluación; Educación primaria; Motivación en el aprendizaje; Revisión sistemática; Teoría de la Autodeterminación; Psicología educativa

INTRODUCTION

A central process in shaping children's academic success is motivation, defined as "a set of interrelated desires, goals, needs, values, and emotions that explain the initiation, direction, intensity, persistence, and quality of behaviour" (Wentzel & Miele, 2016, p. 1). It is also described as "the process whereby goal-directed activities are instigated and sustained" (Schunk *et al.*, 2014, p. 5). Accordingly, a motivated student is someone who is actively involved in the learning process (Stipek, 1998). Engaged students eagerly tackle challenging tasks, exert intense effort using active problem-solving strategies, and persevere in the face of difficulty. They also are more oriented toward developing understanding and mastering skills. When they are engaged in the academic tasks, display enthusiasm and optimism, take enjoyment, and take pride in their achievements (Burnette *et al.*, 2013; Gottfried *et al.*, 2013; Howard *et al.*, 2021; Martinelli, 2014; Stipek, 1998).

Motivation is crucial to learning because it is an active and intentional process (Stipek, 2002). Research on learning motivation has shown that motivation influences what, when, and how one learns (Karlen, 2016; Zimmerman & Schunk, 2013).

Learning in infancy and early childhood primarily occurs through intrinsic processes, driven by spontaneous interests (Ryan & Deci, 2017). However, upon entering school, which is mandatory and offers limited autonomy, students often feel bored and frustrated. Several studies report a decline in motivation starting in primary school (Hornstra, Van Der Veen, Peetsma, & Volman, 2013; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Spinath & Spinath, 2005; Stoel, Peetsma, & Roeleveld, 2003). Research also shows that some children tend to avoid learning activities and are influenced by rote memorization practices and disciplinary approaches within the school environment (Bojović & Antonijević, 2017).

In the classroom, motivation often explains students' levels of effort and in school tasks. According to Brophy (2010), motivation reflects students' prior experiences, interests, and goals, which may not always align with teachers' expectations. When students are motivated toward a subject or topic, they are more open to engaging with tasks they perceive as relevant. They pay more attention to explanations, work harder to organize and to activate strategies (e.g., note-taking, content structuring, self-evaluation), and developed positive beliefs about the relevance of the learning and their own abilities, contributing to a productive and emotionally supportive learning climate (Schunk *et al.*, 2014; Zimmerman, 2000). Therefore, teachers must create learning contexts that encourage active engagement and positive learning outcomes (Dolores *et al.*, 2020; Stipek, 2002).

The importance of motivation and self-efficacy beliefs in this context cannot be overstated (Unrau *et al.*, 2018). These factors help promote a positive disposition toward learning in children, which serves as a foundation for academic development. In fact, there is a strong evidence supporting the link between motivation and learning (Lourenço & Paiva, 2010; Schunk, 1991). Students with higher levels of motivation are more likely to actively engage in the learning process than less motivated peers.

Assessing Motivation

The assessment of motivation is a relevant issue for professionals and researchers interested in understanding motivational mechanisms and strategies to enhance student motivation (Schunk *et al.*, 2014). The multidimensional and complex nature of motivation raises several concerns regarding measurement practices and instruments. It is fundamental to develop and use suitable and valid measures, with rigorous methodological procedures, to ensure that "the meaning and knowledge we gain from empirical research" is not severely compromised (Howard, 2023, p. 2).

A scheme developed by Schunk *et al.* (2014) identify three larger techniques of assessing motivation: (1) direct observations, (2) rating by others, and (3) self-reports, including questionnaires, interviews, stimulated recalls, think-aloud, and dialogues. Questionnaires are the most commonly used instruments, usually containing various subscales, encompassing

areas such as interest, attributions, self-perception, self-efficacy, preference for challenge, curiosity, mastery orientation, persistence, and enjoyment of learning (Broussard & Garrison, 2004; Schunk *et al.*, 2014).

Regarding the assessment of children' motivation, researchers have adapted instruments by reducing language complexity, simplifying rating scales, and reading items aloud to students (Schunk *et al.*, 2014). They also have pointed several challenges namely: (1) the cognitive components of the motivation are not directly observable, (2) many items are designed to elicit generalized responses rather than those tied to specific activities, and (3) the instruments are often not developmentally appropriate for children (e.g., children may struggle to distinguish effort and intention from the task itself, and tend to be more optimistic and vulnerable to social desirability biases) (Lai, 2011; Turner, 1995).

In line with this, motivation in children is best understood as a multidimensional construct, shaped by internal psychological needs and contextual influences. Several theoretical frameworks specify different components and perspectives on motivation (e.g., Bandura, 1986; Ryan & Deci, 2020; Stipek, 2002). Various theories have been applied to the study of children' motivation, each emphasizing different facets of the construct, as outlined below.

Self-Determination Theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2000, 2017, 2020) posits that intrinsic motivation arises when three basic psychological needs are satisfied: (1) autonomy (i.e., the sense of volition and personal agency), (2) competence (i.e., the perception of being effective in one's actions), and (3) relatedness (i.e., feeling connected to others). Motivation can be intrinsic (i.e., driven by satisfaction) or extrinsic (i.e., driven by external rewards or pressures), with higher-quality motivation resulting when extrinsic motives are internalised.

Expectancy-Value Theory (EVT; Eccles & Wigfield, 2002) suggests that children's motivation depends on their expectation of success (i.e., belief in their ability to succeed) and the subjective value they assign to a task. This value includes intrinsic value (i.e., enjoyment or interest), utility value (i.e., perceived usefulness), and attainment value (i.e., personal importance of success). These beliefs influence effort, choice, and persistence.

Achievement Goal Theory (AGT; Dweck & Leggett, 1988) focuses on students' goal orientations in academic settings. It distinguishes between mastery goals (i.e., focused on learning and improvement) and performance goals (i.e., focused on demonstrating ability or outperforming others). Mastery-oriented goals are generally associated to persistence and deeper learning, while performance goals often relate to external rewards or recognition.

Social-Cognitive Theory (Bandura, 1986) highlights the role of self-efficacy—one's belief in their ability to execute specific tasks—as central to motivation. Higher self-efficacy

leads children to engage with challenges, persist through setbacks, and self-regulate their learning processes more effectively.

These theoretical models highlight critical dimensions of motivation, such as autonomy, competence, relatedness, expectancy beliefs, subjective value, goal orientation, and self-efficacy. Accordingly, the selection and evaluation of assessment instruments should be grounded in these theories to ensure they reflect the multidimensional nature of the motivational construct.

While the literature identifies instruments based on multidimension motivational theories, previous reviews have focused on specific domains, such as engagement (Martins, Cunha, Lopes, Moreira, & Rosário, 2022), writing motivation (Unrau *et al.*, 2018), or the satisfaction of basic psychological needs within the SDT in elementary education (Conesa, Onandia-Hinchado, Duñabeitia, & Moreno, 2022). However, these reviews do not examine or synthesise the psychometric properties of instruments used to measure children' motivation. The present review aims to fill this gap by mapping the most widely used motivational theories and corresponding instruments for evaluating children' motivation.

Research Aims

This systematic review aims to identify the instruments used to assess children's motivation and the motivational theories that underpin them. Additionally, we analyze the psychometric properties of these instruments to determine their validity and applicability in educational contexts. Accordingly, the research questions that guide this review are:

RQ1: What instruments are used to assess motivation in children, and what are their psychometric properties?

RQ2: What motivational theories form the basis of these instruments?

METHODS

Research Protocol and Registration

Following the definition of the research protocol, the study was registered on PROSPERO (i.e., an international database of systematic reviews in health and social work), on the 26th of March of 2023, under the ID CRD42023455965. This registration increases transparency and visibility of the process and helps to prevent possible duplications (Vilelas, 2022).

Data Collection and Study Selection

The present systematic review was conducted according to the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses; (Page *et al.*, 2021).

Data collection was performed on January 5, 2024, across four databases: B-on, Eric, PsycINFO, and Web of Science. The following search terms were use to identify studies that met the inclusion criteria: "Motivation to learn" OR "Motivation" AND "Assessment" OR "Evaluation" OR "Scale" OR "Psychometric" AND "Children" OR "Child" OR "Elementary" OR "Primary" AND "School". Additionally, a snowball technique was used to identify potentially relevant articles from the references of the selected papers.

Inclusion and Exclusion Criteria

The inclusion criteria were as follows: 1) scientific articles; 2) quantitative studies; 3) variables of motivation in learning; 4) sample composed of elementary school students aged between 6 and 12 years; 5) articles published from 2010 onwards. As for the exclusion criteria, articles identified with the following characteristics were not included: a) thesis and dissertations, literature reviews, books, conferences; b) qualitative studies; c) studies that do not evaluate motivation; d) samples that only include preschool-aged children, middle school students, high school students, college students, teachers, and adults; e) motivation is studied in other contexts.

Data Extraction

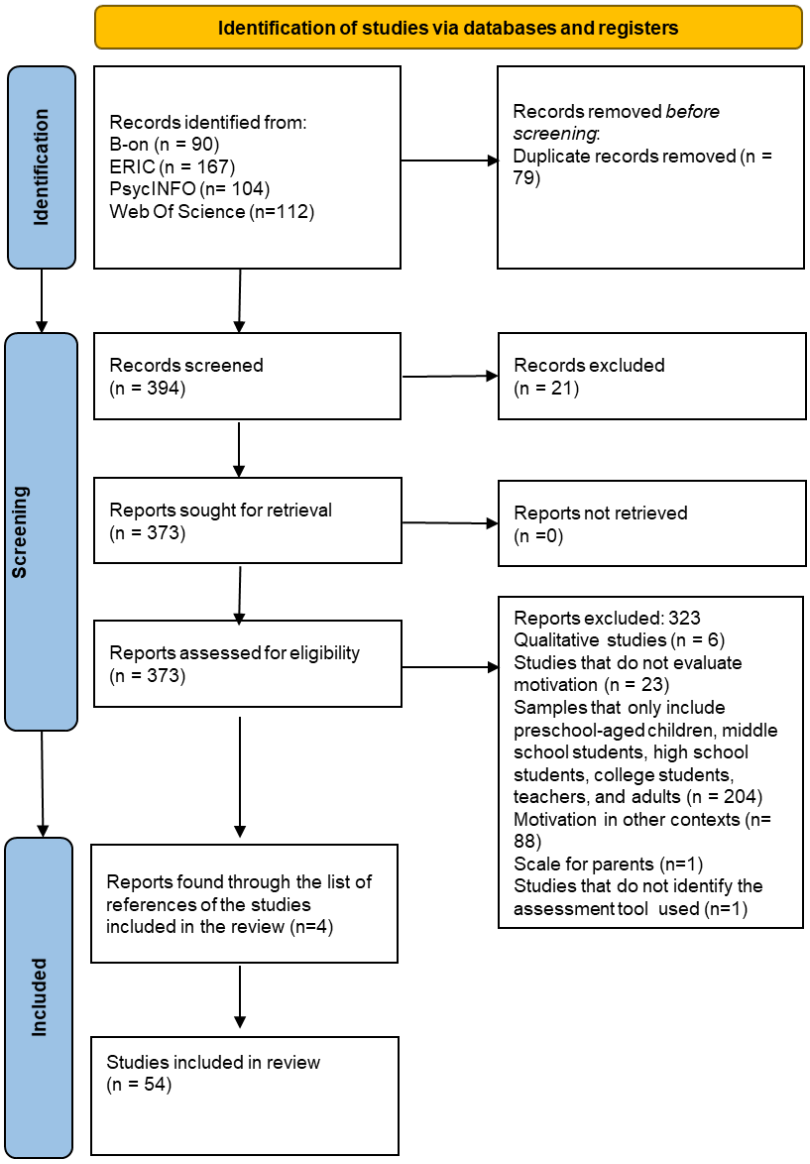
The following data were extracted from each selected study: author(s), publication year, title, aim(s), country, study type, instrument(s) used, data analysis, sample characteristics (i.e., size, age, school year), number of items and responses, length, construct definitions, assessed content, dimensionality, reliability measures and evidence of external validity. All selected references were first exported to an Excel spreadsheet and duplicates were removed. First, the titles and afterward abstracts were screened to determine the studies' relevance. Studies that met the inclusion criteria were submitted to a full-text review. When the eligibility criteria was not established, studies were excluded. Each phase of the selection process was carried out independently or by two researchers. In the case of disagreement, a third author was consulted to reach consensus. Appendix A presents all extracted data and identification codes for the included studies.

RESULTS

In total, 473 articles were identified. After screening and applying the inclusion/exclusion criteria, 53 articles were included in final review. The remaining 420 were excluded (see Figure 1 for the PRISMA flow diagram).

Figure 1

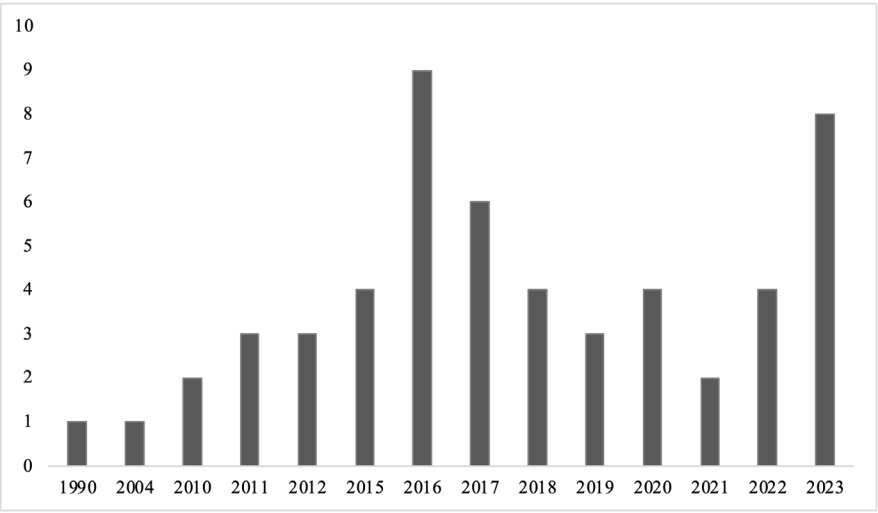
Prisma Flowchart



During the exploration conducted in this study, a moderate number of studies in the educational and psychological domains were identified, with notable increases in 2016 (f = 9) and 2023 (f = 8) (Figure 2).

Figure 2

Publications over the years



Regarding the school years targeted in the studies (Figure 3), there was a particular focus on the effects of motivation in fourth-grade students (f = 33), followed by second grade (f = 22), third and fifth grades (f = 20). First-grade (f = 17) and sixth-grade students (f = 15) had the lowest representation.

Our review demonstrates an international interest in investigating and measuring motivational factors in elementary school students (Table 1). Among the 19 countries represented in the reviewed articles, Turkey (f = 8) and the United States (f = 8) emerged as the leading contributors, each publishing eight articles on this topic.

A total of 44 instruments designed to measure motivation in elementary school contexts were identified (Table 1). The most frequently used were the "Motivation for Reading Questionnaire" (MRQ; f = 5), the "Intrinsic Motivation Inventory" (IMI; f = 2), the "Learning Motivation Questionnaire" (LMQ; f = 2), the "Motivated Strategies for Learning Questionnaire" (MSLQ; f = 2), the "Motivation to Write Profile Scale" (MWPS; f = 2), the "Self-Regulation Questionnaire" (SRQ; f = 2); and the "Writing Motivation Scale" (WMS; f = 2).

Most studies reported the theoretical model on which the instruments were based (f = 42). These models spanned various theoretical approaches (Table 1), with the most frequently cited being Self-Determination Theory (Deci & Ryan, 1985; f = 20), Expectancy-Value Theory (Eccles *et al.*, 1983; f = 10), Self-Efficacy Theory (Bandura, 1997; f = 7); and the ARCS Model (Keller, 1987; f = 4).

Table 1

Instruments to assess motivation and its theoretical models

Denomination	Abbv.	Theoretical model	ID	*f*
Motivation for Reading Questionnaire (Wigfield & Guthrie, 1997)	MRQ	Self-Determination Theory (Deci & Ryan, 1985)	5, 6, 8, 14, 54	5
Intrinsic Motivation Inventory (Meijer, van Eck, & Felix, 2008; Monteiro, Mata, & Peixoto, 2015)	IMI	Self-Determination Theory (Deci & Ryan, 1985)	27, 47	2
Learning Motivation Questionnaire (Hu, Jia, Plucker, & Shan, 2016; Setiani, Sanjaya, & Jatmiko, 2019)	LMQ	Expectancy-Value Theory (Wigfield & Eccles, 2002); ARCS-Model (Keller, 1987); Flow Theory (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003)	16, 34	2
Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991)	MSLQ	Self-Determination Theory (Deci & Ryan, 1985); Self-efficacy Theory (Bandura, 1997)	43, 46	2
Motivation to Write Profile Scale (Codling & Gambrell, 1997)	MWQS	Self-Determination Theory (Deci & Ryan, 1985); Self-efficacy Theory (Bandura, 1997)	30, 38	2
Self-Regulation Questionnaire - SRQ-RM (De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012)	SRQ-RM	Expectancy-Value Theory (Eccles et al., 1983)	10, 39	2
Writing Motivation Scale (Öztürk, 2013)	WMS	Self-efficacy Theory (Bandura, 1997); Self-Determination Theory (Deci & Ryan, 1985)	12, 31	2
Achievement Motivation Questionnaire (Herman, 2000)	AMQ	Self-efficacy Theory (Bandura, 1997); Social cognitive Theory (Bandura, 1986)	25	1
Beliefs, Engagement, and Attitude Math Motivation Scale (Orosco, 2016)	BEAMMS	Expectancy-Value Theory (Eccles et al., 1983); Self-efficacy Theory (Bandura, 1997); Gender and Motivation (Meece, Glienke, & Askew, 2009); Motivation for Achievement in Mathematics (Middleton & Spanias, 1999)	18	1

Denomination	Abbv.	Theoretical model	ID	*f*
Children´s Motivation for Reading (Baker & Wigfield, 1999)	CMR	Self-Determination Theory (Deci & Ryan, 1985); Self-efficacy Theory (Bandura, 1997)	42	1
Questionnaire with 5 items based on two Dutch studies, the COOL 5e18 cohort study (Driessen, Mulder, & Roeleveld, 2012)	COOL	Goal-setting Theory (Locke & Latham, 2002); Model of Feedback (Hattie & Timperley, 2007); TAD (Ryan & Deci, 2000a); Control Theory (Carver & Scheier, 1990)	27	1
Children's Perceived Use of Self-Regulated Learning Inventory (Vandevelde, Van Keer, & Rosseel, 2013)	CP-SRLI	TAD (Deci & Ryan, 2000; Ryan & Deci, 2000a); Self-regutaled Learning (Andrade & Brookhart, 2016); Perspective of formative assessment (Black & Wiliam, 1998; Wiliam, 2011)	40	1
Dimension of Mastery Questionnaire 18 (Morgan, Liao, & Józsa, 2020)	DMQ 18	Achievement Goal Theory (Dweck, 1986)	47	1
Early Reading Motivation Assessment; some items adapted (Cartwright, Marshall, & Wray, 2016; Chapman & Tunmer, 1995; Eccles & Harold, 1993; Valeski & Stipek, 2001)	ERMA	Reading Comprehension Engagement Model (Guthrie & Wigfield, 1999); Expectancy-Value Theory (Eccles et al., 1983); Cognitive Flexibility in Reading Comprehension (Cartwright, 2002, 2007, 2012; Cartwright, Marshall, Dandy, & Isaac, 2010; Cartwright et al., 2016)	15	1
Elementary School Motivation Scale (Guay et al., 2010)	ESMS	TAD (Gottfried, 1985, 1990; Ryan & Deci, 2000a)	4, 20	2
Electronic Storybook Motivation Scale: scale adaptation of IMMS – Instructional Materials Motivation Scale (Keller, 1991)	ESMS	Engagement and motivation in reading (Guthrie & Wigfield, 2000); ARCS Model (Keller, 1983);	22	1
Harter Academic Motivation (Harter, 1981)	HAM	Harter Academic Motivation (Harter, 1981)	51	1

Denomination	Abbv.	Theoretical model	ID	*f*
Instructional Materials Motivation Survey (Keller, 1987)	IMMS	ARCS Model (Keller, 1987)	41	1
Intrinsic Motivation Questionnaire (Chad-Friedman, Lee, Liu, & Watson, 2019)	IMQ	Componential Model of Creativity (Amabile, 1982, 1983; T. M. Amabile, 2018; Hennessey, 2003); TAD (Deci & Ryan, 1985)	35	1
Intrinsic motivation questionnaire in Leibham's study (Leibham, 2005), adapted from the Youth Children's Academic Intrinsic Motivation Inventory (Y-CAIMI) instrument in the study by (Gottfried, 1990)		Self-Determination Theory (Deci & Ryan, 1985)	5	1
Learning Motivation Scale (LMS) (Liu et al., 2010)	LMS	ARCS Model (Keller, 1983)	37	1
Success Motivation Scale I-A Knowledge Learning Scene	MAAT-IA	NR	11	1
Motivation for learning (Pacheco, Villafuerte-Holguín, & López, 2022)	ML	Self-Determination Theory (Deci & Ryan, 1985); Self-efficacy Theory (Bandura, 1997)	44	1
Me and My Reading Profile questionnaire (Marinak, Malloy, Gambrell, & Mazzoni, 2015)	MMRP	Self-Determination Theory (Deci & Ryan, 1985)	50	1
Motivation to Read Profile Revised Survey (Gambrell, Palmer, Codling, & Mazzoni, 1996)	MRP-R	TAD (Ryan & Deci, 2000a); Model of Phases of Learning to Read (Ehri, 2005); Model Game-Based learning (Garris, Ahlers, & Driskell, 2002)	29	1
Motivation Scale (Komarudin, 2017)	MS	Theory of Cognitive Development (Piaget, 1971); Theory of Motor cycle/ Cognitive Approach by Deci (Walgito, 2002)	24	1

Denomination	**Abbv.**	**Theoretical model**	**ID**	***f***
Motivation to Read Profile (adapted to Turkish) (Yildiz, 2013); Interview Form	MTRP	Cognitive Model (Atkinson et al., 1995); Model of Reading Engagement (Guthrie & Wigfield, 1999); Expectancy-Value Theory (Eccles et al., 1983)	26	1
Motivation Scale towards Science Learning (Uyanık, 2014)	MTSL	Theory and Stages of Cognitive Development (Piaget, 1950); Learning Cycle Approach (Karplus, 1980)	17	1
Model of Academic Motivation Inventory (Sigmon & Jones, 2015)	MUSIC	Goal Orientation Theory (de la F. Arias, 2004); Multidimensional Approaches to Motivation (Wentzel & Miele, 2009)	19	1
Pupil Reading Motivation Scale - PRMS (Liu, 2012)	PRMS	Family Literacy Theory (Taylor, 1983); Reading Self-concept (Chapman & Tunmer, 1995); Expectancy-Value Theory (Eccles & Gootman, 2002); Gender and Motivation (Meece, Anderman, & Anderman, 2006)	36	1
Questionnaire for Achievement Motivation-Munich High Ability Test Battery - Short and Adapted Version (Heller & Perleth, 2008)	QAMMHATB	Theory of Achievement Motivation (Atkinson, 1957); Expectancy–value theory of achievement motivation (Wigfield & Eccles, 2000); Intrinsic and Extrinsic Motivation (Gottfried, 1985); Personality Theory (Murray, 1938); The achievement Motive (McClelland, Atkinson, Clark, & Lowell, 1953)	21	1
Reading Motivation Questionnaire for Elementary Students (Schaffner & Schiefele, 2007)	RMQ-E	Expectancy-Value Theory (Eccles et al., 1983); Academic Self-Concept and Academic Achievement (Marsh & Martin, 2011; Spinath, Spinath, Harlaar, & Plomin, 2006)	28	1

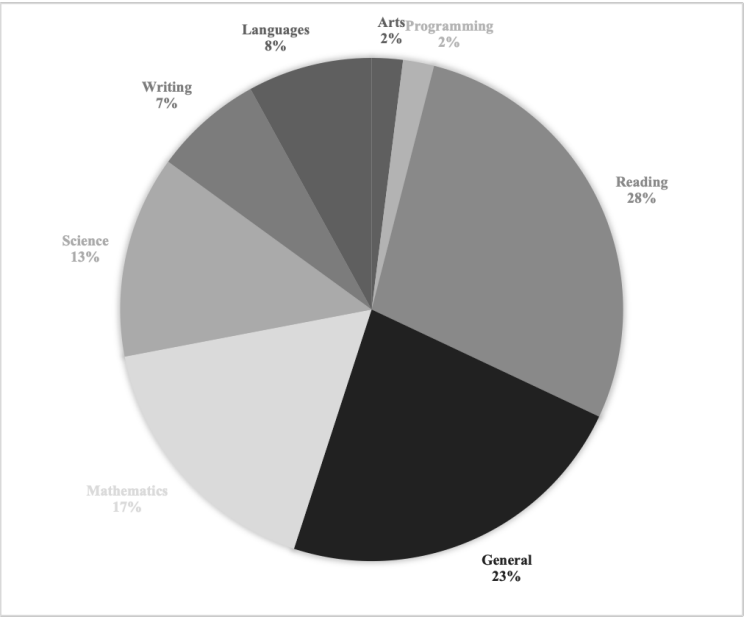
Denomination	Abbv.	Theoretical model	ID	*f*
Students' Achievement Goals adapted from (Midgley et al., 2000) and (Wang, King, & Rao, 2019)	SAG	Achievement Goal Theory (Dweck, 1986); Self-Regulation Theory (Zimmerman, 2001)	54	1
Science Motivation Questionnaire (Glynn & Koballa, 2006)	SMQ	Cognitive Theory and the Design of Multimedia Instruction (Mayer, 2002)	7	1
Book Reading Motivation Scale (Katranci, 2015)	SMRB	Self-efficacy Theory (Bandura, 1997; Bandura & Cervone, 1983; Margolis & Mccabe, 2006; Schunk, 2003; Wigfield & Eccles, 2000; Zimmerman & Martinez-Pons, 1992); TAD (Ryan & Deci, 2000b)	13	1
Self-Reports of Intrinsic Motivation	SRIM	Expectancy–value theory of achievement motivation (Weiner, 1986)	9	1
Self-reported Motivation Questionnaire (Torff & Tirotta, 2010)	SRMQ	NR	3	1
Self-regulation Questionnaire (Ryan & Connell, 1989)	SRQ	Self-Determination Theory (Deci & Ryan, 1985); Attribution Theory (Weiner, 1986)	52	1
Extrinsic Motivation toward Math	SSEM-M	Self-Determination Theory (Ryan & Deci, 2000b)	45	1
Situated Writing Activity and Motivation Scale (Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013)	SWAMS	Self-Determination Theory (Ryan & Deci, 2000b)	49	1
Text-oriented Reading Motivation Scale (Aydemir & Öztürk, 2013)	TRMS	NR	32	1
Traditional Scale of Extrinsic Motivation toward Math	TSEM-M	Self-Determination Theory (Deci & Ryan, 1985)	45	1
Task-Value Scale for Children (Aunola, Leskinen, & Nurmi, 2006)	TVS-C	Expectancy-Value Theory (Eccles et al., 1983)	33	1
Young Children's Academic Intrinsic Motivation Inventory	Y-CAIMI	Self-Determination Theory (Deci & Ryan, 1985)	1	1

Notes. Abbv = abbreviation, ID = Study identification, f = Frequency, NR = Not Reported.

This review identified seven distinct content areas explored in the included articles (Figure 3). The topic of reading motivation was the most frequently investigated (28%), followed by general education (23%), mathematics (17%), and science (13%). Although arts and programming were each addressed in only one article, their inclusion suggests a potential emerging interest in exploring motivational factors across a broader range of disciplines.

Figure 3

Publications by subjects



Based on the analysis of Appendix A, seven countries stood out in terms of the number of conducted studies: the United States (f = 9), Turkey (f = 8), the United Kingdom (f = 5), China (f = 5), Germany (f = 4), Indonesia (f = 3), and Taiwan (f = 3).

The sample sizes studies ranged from 9 to 1,808 participants (M = 362.26; Md = 183; DP = 423.23), with participants aged between 6 to 12 years: 6-year-old (f = 9; 16.7%); 7-year-old (f = 17; 31.5%); 8-year-old (f = 20; 37.0%); 9-year-old (f = 17; 31.5%); 10-year-old (f = 18; 33.3%); 11-year-old (f = 14; 25.9%); and 12-year-old (f = 5; 9.3%). In terms of school years, the studies included students in: 1st grade (f = 14; 25.9%), 2nd grade (f = 19; 35.2%), 3rd grade (f = 17; 31.5%), 4th grade (f = 30; 55.6%), 5th grade (f = 17; 31.5%), and 6th grade (f = 8; 14.8%).

Table 2

Instruments' theoretical features and psychometric quality

ID	Design	Construct definition	Content validity	Item analysis	Dimensionality analysis	Reliability analysis	Reliability Scores	External validity
1	L+CS	No	NR	Yes	EFA+CFA	CA	0.82-0.91	Conv+Div
2	P+C	No	Exp	Yes	CFA	CA	0.59 - 0.88	Conv+Div
3	D+C	No	NR	Yes	EFA	CA	0.89	NR
4	P+C	No	Exp	Yes	CFA	CA	0.73-0.91	Disc
5	C	No	Exp	Yes	NR	CA	0.66 - 0.79	Disc
6	C	No	NR	Yes	NR	CA	0.75	Disc
7	E	No	Exp	Yes	NR	CA	0.88	NR
8	C	No	NR	Yes	NR	CA	0.71-0.81	Conv+Disc
9	D+C	No	NR	Yes	NR	CA	0.72-0.84	NR
10	P	No	Pilot+Int	Yes	EFA+CFA	MBIC	0.72-0.87	Conv+Disc
11	QE	No	NR	Yes	NR	SHR+TRt	SHR = 0.83–0.89; TRt = 0.79–0.86	Div+Disc
12	D	No	NR	No	EFA	CA	0.81	Conv
13	P	No	Exp+CVI	Yes	EFA+CFA	CA	0.85	NR
14	C	No	NR	Yes	NR	CA	0.70	Disc
15	C+L	No	NR	Yes	EFA	CA	0.50 - 0.64	Conv+Disc
16	QE	Yes	NR	Yes	CFA	CA+CC	0.41 - 0.76	NR
17	QE	No	Exp	Yes	EFA	CA	0.87	Disc
18	P	No	IDA	Yes	CFA	CA	0.85	Disc
19	P	No	NR	Yes	CFA	CA	0.62 a 0.80	Disc
20	C+L	No	Exp	No	CFA	CA	0.75 a 0.81	Conv+Disc
21	C	No	NR	Yes	CFA	CA	0.64- 0.68	Conv
22	QE	No	NR	Yes	NR	CA	0.94	Conv

ID	Design	Construct definition	Content validity	Item analysis	Dimensionality analysis	Reliability analysis	Reliability Scores	External validity
23	QE	No	Exp	Yes	NR	CA	0.79	NR
24	C	No	NR	No	NR	NR	NR	Conv
25	C+CS	No	NR	No	NR	NR	NR	Conv
26	M	No	NR	No	NR	NR	NR	Disc
27	E	No	NR	Yes	NR	CA	0.84	Disc
28	P	Yes	NR	Yes	CFA	NR	0.75 - 0.85	Disc
29	D	No	NR	No	NR	NR	NR	NR
30	M	No	Exp	Yes	CFA	CA	0.89	CRV
31	M	No	NR	Yes	EFA	CA	0.93	Disc
32	D+C	No	NR	Yes	NR	CA	0.78- 0.81	Conv+Disc
33	C+L	No	NR	Yes	NR	CA	0.74	NR
34	P	No	Exp+ICC	Yes	NR	ICC	0.81-0.89	Conv
35	QE	No	NR	Yes	NR	CA	0.75	NR
36	C+CS	No	NR	Yes	CFA	CA	0.76	Conv+Disc
37	QE	No	NR	Yes	NR	CA+TRt	0.87	CRV
38	E	No	NR	No	CFA	CA	NR	Disc
39	P	No	NR	Yes	CFA	CA	0.82-0.88	Conv+Disc
40	QE	No	NR	Yes	CFA	CA	0.63-0.86;	NR
41	E	No	NR	No	NR	NR	NR	Disc
42	C	No	NR	No	NR	NR	NR	Disc
43	C+CS	No	NR	No	NR	NR	NR	NR
44	M	No	Exp	No	NR	NR	NR	Disc
45	P+C	No	NR	Yes	CFA	CA	0.87-0.90	Conv+Div
46	QE	No	NR	Yes	NR	CA	0.76-0.83	NR

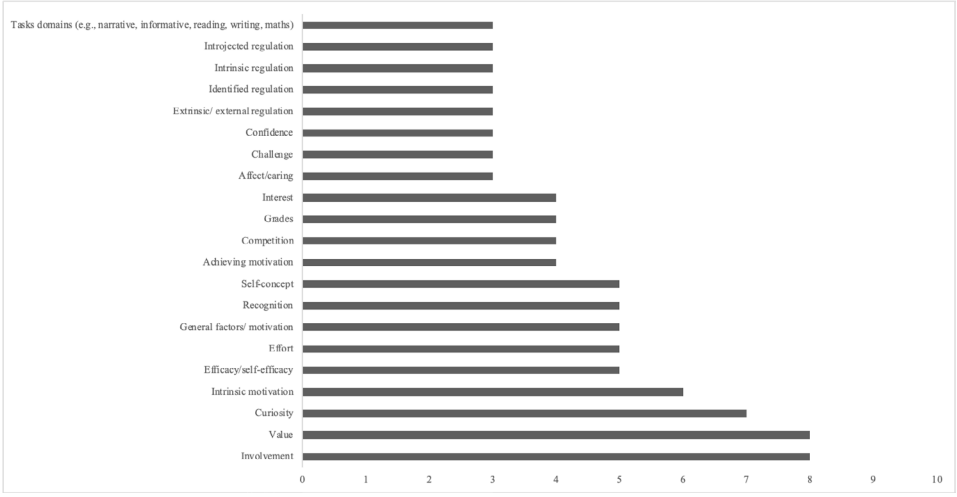
ID	Design	Construct definition	Content validity	Item analysis	Dimensionality analysis	Reliability analysis	Reliability Scores	External validity
47	C+CS	No	NR	Yes	NR	CA	0.82 - 0.85	Conv+Disc
48	E	No	Exp	Yes	NR	CA	0.68-0.74	NR
49	C+CS	No	NR	Yes	CFA	CA	0.85 - 0.87	Disc
50	C+CS	No	NR	Yes	NR	CA	Total = 0.85; 0.56-0.77	Conv
51	E	No	NR	No	NR	CA	0.84-0.92	Disc
52	C+L	No	NR	Yes	CFA	NR	NR	NR
53	C+CS	No	NR	Yes	CFA	CA	>.70	Conv+Disc
54	P+C+L	No	NR	Yes	CFA	CA	0.70	Conv

Notes. NR = Not reported; QE = Quasi-Experimental; P = Psychometric; C = Correlational ; CS = Cross-sectional; E = Experimental; IG = Intervention group; CG = Control group; M = Mixed-Methods ; D = Descriptive; L = Longitudinal; Exp = Experts; CVI = Content Validity Index; ICC = Intra-Class Correlation Coefficient; IDA = Item-Difficulty analysis; Pilot = Pilot test; Int = Interview; EFA = Exploratory Factor Analysis; CFA = Confirmatory Factor Analysis; CA = Cronbach Alpha; CC = Correlation coefficient; TRt = Test-Retest; SHR = Split-Half Reliability; MBIC = Model based internal consistency; CRV = Criterion-Related Validity; Conv = Convergent; Disc = Discriminant; Div = Divergent.

Regarding its internal structure, many of the identified instruments were multidimensional (f = 39; 72.22%), nine were unidimensional (16.67%), and six studies (11.11%) did not report this information. A closer look at the reported dimensions (Figure 4) shows that the most common were "involvement" and "value" (f = 8), followed by "curiosity" (f = 7) and "intrinsic motivation" (f = 6). Other frequently highlight features included "self-concept", "recognition", "effort", "efficacy" and "general motivation" (f = 5). Additionally, more instrumental components such as "competition", "achievement motivation", and "grades" were noted (f = 4). Finally, several subscales derived from SDT were identified (i.e., from "extrinsic/external" to "intrinsic" regulations, f = 3).

Figure 4

Measured dimensions of the instruments



An analysis of the studies regarding the number of items revealed a range from 3 to 45 items (M = 20.11; Me = 18). Notably, four scales consisted of 15 items, making this the most frequently used quantity. However, seven studies did not report this information. The majority of the studies did not specify the administration time of the instruments (f = 48). Among the six studies that did report this data, administration time ranged from 3 to 45 minutes (M = 22.33), with the most frequent time being 20 minutes (f = 2). The most frequently used response formats were 4-point scale (f = 19) and 5-point (f = 15). Eleven studies did not disclosed the number of response options.

Regarding the design, 25 studies used a correlational approach, 11 employed a psychometric design, 9 were quasi-experimental, 6 were experimental, 5 were descriptive, and 4 adopted mixed methods designs. In terms of temporal design, 8 studies were cross-sectional,

and 6 were longitudinal. A large majority of the studies (*f* = 52; 96.30%) did not describe the construct being assessed. Similarly, with respect to content validity, 70.07% (*f* = 40) of the studies did not report any procedures. Among those that did, the most common strategies included expert judgement (*f* = 12), content validity index (*f* = 1), intra-class correlation coefficient (*f* = 1), item-difficulty analysis (*f* = 1) and pilot testing/intervention (*f* = 1).

Most studies (*f* = 52) did not perform items statistical analysis. Only two studies (3.70%) reported descriptive item statistics such as means and standard deviations. As for internal structure of the instruments, Confirmatory Factor Analysis (CFA) was the most used procedure (*f* = 18), followed by the Exploratory Factor Analysis (EFA) (*f* = 5), while three studies applied both techniques.

Concerning reliability, Cronbach Alpha was the most commonly reported indicator (*f* = 41). Fewer studies reported the use of test-retest reliability (*f* = 2), intra-class correlation (*f* = 1), model based internal consistency (*f* = 1), or split-half reliability (*f* = 1). Reported reliability coefficients were mostly above 0.70 (*f* = 45), with a few studies falling between 0.60 and 0.70 (*f* = 9), and three studies reporting values below 0.60.

External validity was primarily assessed through discriminant (*f* = 27), convergent (*f* = 20) and divergent validity (*f* = 4); only two studies examined criterion validity.

DISCUSSION

Motivation is one of the most widely studied psychological constructs in the educational setting (Koenka, 2020; Urhahne & Wijnia, 2023), with extensive research analysing its influence on learning and academic achievement (Schunk *et al.*, 2014; Urhahne & Wijnia, 2023). While numerous systematic reviews have addressed student motivation (e.g., Conesa *et al.*, 2022; Martins *et al.*, 2022; Unrau *et al.*, 2018), to our knowledge, none have focused specifically on instruments available for assessing children's motivation. This review aimed to fill that gap by identifying available instruments and analysing their psychometric properties to guide researchers and practitioners in selecting appropriate tools (Howard, 2023).

We identified 54 articles published between 1990 and 2023 that assessed motivation in primary school-aged children (6-12 years). These studies employed 44 instruments. Of these, eleven were explicitly developed or validated to measure motivation for learning (e.g., De Naeghel *et al.*, 2012; Guay *et al.*, 2010; Ives *et al.*, 2020; Jones & Sigmon, 2016; Katranci, 2015; Leonid & Kanonire, 2022; Orosco, 2016; Setiani *et al.*, 2019; Stutz *et al.*, 2017; Wang & Bai, 2023; Wang & Guthrie, 2004).

While a slight increase in publications was observed over time, 2016 and 2023 were the most productive years – perhaps reflecting changing research interests following the COVID-19 pandemic. The countries contributing the most were United States, Turkey, China, and Germany, reflecting the engagement of active research groups.

Fourth grade was the most frequently studied year level, followed by the second year grade. These findings suggest that researchers tend to focus on children who have already acquired foundational academic skills (e.g., reading and writing), facilitating the implementation of motivational assessments. Assessing motivation in young children presents challenges, including the need for simplified language, modified rating scales, and adapted administration procedures (Howard, 2023; Lai, 2011; Schunk *et al.*, 2014).

The identified instruments varied widely in length and administration time, ranging from three to forty-five items, and from three to forty-five minutes. Despite this variability, many studies failed to report these characteristics. However, scholars highlight the importance of such details in insuring the appropriateness, and psychometric quality of assessment tools (e.g., Breakwell *et al.*, 2012; Schunk *et al.*, 2014; Stipek, 2002).

The Self-Determination Theory (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017) was the most frequently used theoretical framework, followed by Expectancy-Value Theory (Eccles *et al.*, 1983), Self-Efficacy Theory (Bandura, 1997; Bandura, 1986), and the ARCS model (Keller, 1987). This reflects a shift from expectancy-based (Bandura, 1997; Bandura, 1986; Eccles *et al.*, 1983) to needs-based approaches (Ryan & Deci, 2000; Ryan & Deci, 2017), emphasizing the role of psychological needs in fostering motivation (Ryan & Deci, 2000; Urhahne & Wijnia, 2023). A relevant feature is that the selected studies clearly and consistently identify approaches to support their work (Howard, 2023).

A key limitation across studies was the lack of clear construct definitions, which undermines validity – the cornerstone of psychometric theory (Kline, 2015). Without a precise construct definition, researchers cannot determine whether instrument better serves its intended purpose (Carretero-Dios & Pérez, 2005; Kline, 2015).

The dimensions assessed included both internal aspects (e.g., curiosity, value, self-efficacy, self-concept, interest), and interactional aspects (e.g., involvement, competition, challenge). These reflect core components of achievement motivation (Stipek, 2002) and align with constructs proposed by SDT (Ryan & Deci, 2019, 2020), one of the most commonly used theories of the studies of this work (Howard *et al.*, 2021).

Many instruments assessed motivation both globally and within specific academic domains such as reading, sciences, mathematics, and writing. The most frequently used tools included MRQ, which assesses intrinsic (e.g., curiosity, involvement) and extrinsic motivation (e.g., recognition, grades), in several scenarios as reading (e.g., Logan *et al.*, 2011; Logan & Medford, 2011; S. McGeown *et al.*, 2012; McGeown, 2015). The IMI was also used for mathematics assessment (Cubillos, Roncagliolo, & Cabrera-Paniagua, 2023; Faber, Luyten, & Visscher, 2017).

Hattie *et al.* (2020) proposed a comprehensive framework to organize motivational constructs, distinguishing between personal (e.g., success expectations, self-efficacy),

social (e.g., modelling, relatedness), and cognitive (e.g., self-regulation, attributions); tasks attributes (e.g., locus, stability, controllability) and goals (e.g., performance, mastery and social); and motivation benefits (e.g., autonomy, pride, compliance and re-wards satisfaction) and costs (e.g., investment, intensity, opportunities consequences, and emotional consequences). This "person-in-context" view highlights the "interplay between internal and external processes" (Hattie *et al.*, p. 4).

Sample sizes ranged from 9 to 1808 participants, with a mean around 360 – sufficient for psychometric analysis such as EFA or CFA, which typically require at least 150-200 participants (Breakwell *et al.*, 2012). Most instruments demonstrated acceptable internal consistency ($a > .70$), though some reported lower values (e.g., Jones & Sigmon, 2016; Logan & Medford, 2011). Overall, the identified instruments can be considered reliable and valid, although with varying levels of psychometric rigor. These results were also reported by other systematic reviews (e.g., (Ayala-Nunes, Jiménez, Hidalgo, & Jesus, 2014).

Despite the variety of designs used, only twenty percent were psychometric. A robust instrument must demonstrate evidence of reliability, validity, and accuracy, and be appropriate for the population under study (Kline, 2015). Many studies failed to report such essential information, limiting the interpretability and replicability of findings (Barak *et al.*, 2011; Komarudin, 2017; Logan *et al.*, 2011).

In response to these concerns, the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014) outline criteria for test development, including: clear construct definitions; expert involvement; item clarity and fairness; evidence of reliability and validity; standardized administration procedures; and transparent reporting. Adherence to these standards enhances the quality and ethical use of assessment tools.

Beyond identifying instruments and analysing their psychometric characteristics, this review also offers insight into trends and ongoing challenges in assessing children's motivation. The frequent use of frameworks such as Self-Determination Theory, reflects a growing interest in understanding motivation as a multidimensional construct shaped by both personal and contextual factors. However, absence of consistent construct definitions and the limited theoretical coherence across studies indicate a lack of alignment that may hinder theoretical and practical advancement. Additionally, although most instruments reported satisfactory internal consistency, relatively few provided robust evidence of construct validity or longitudinal stability, limiting their use for tracking motivational trajectories over time, inclusive through schooling. These limitations underscore the need for more rigorous test development practices, informed by both developmental psychology and educational theory. Ultimately, progress in this area will depend on collaborative efforts to clarify conceptual foundations, develop age-appropriate instruments, and ensure research transparency and replicability.

Practical Recommendations

This study contributes to the field of educational psychology by offering practical and scientific recommendations for motivation assessment. We highlight the need for brief, culturally sensitive instruments, and encourage the development of short-form versions of validated scales suitable for school settings. Tools should support longitudinal monitoring and provide real-time feedback to inform instruction.

Improving educators' understanding of basic psychometric principles can enhance early identification of motivational difficulties. Technological innovations offer opportunities for online assessment and automated feedback, facilitating integration into educational practices. Active collaboration between researchers and practitioners is essential to ensure that assessment tools are contextually relevant, scientifically sound, and pedagogically useful.

Future studies and limitations

This review has some limitations. First, only studies using quantitative methodologies were included, despite the recognized value of qualitative and mixed approaches in assessing children's motivation (Schunk *et al.*, 2014). Second, future work should investigate instruments that combine solid psychometric properties with short administration times to ensure feasibility in school settings.

Moreover, many studies used small sample sizes, which limits generalizability. Finally, this review only included English-language publications, potentially excluding relevant research. Nonetheless, we hope this work serves as a foundation for the development of new, evidence-based assessment tools in this field.

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The authors declare no competing interests.

Data availability statement

The data supporting this review are available from the corresponding author upon reasonable request.

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