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RESEARCH ARTICLE

The relationship between self-determination theory–based L2 motivation and L2 achievement: A multilevel meta-analysis

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Abstract

Over the past decades, self-determination theory (SDT) has been widely applied in second language (L2) motivation research. The present study employed a multilevel meta-analysis to examine the direction and magnitude of the relationship between SDT-based L2 motivation and L2 achievement. We systematically searched ten English databases and pooled the data using random-effects models. A total of 74 eligible studies involving 220 estimates were included in the analyses. The results showed that both intrinsic motivation (r = .318, $p < .001$) and extrinsic motivation (r = .166, $p < .001$) were significantly and positively correlated with L2 achievement. Two autonomous dimensions of extrinsic motivation—integrated regulation (r =. 248, $p < .001$) and identified regulation (r = .190, $p < .001$)—were positively related with L2 achievement, whereas controlled dimensions—introjected regulation (r = .006, p = .866) and external regulation (r = .010, p = .781)—were not. The aggregated associations between intrinsic/extrinsic motivation and L2 achievement were moderated by learning context and teaching mode. Theoretical and practical implications of this study are discussed.

Keywords: extrinsic motivation; intrinsic motivation; L2 achievement; multilevel meta-analysis; self-determination theory

Introduction

The study of motivation in second language (L2) learning has reached an important theoretical turning point. Although the socio-educational model (SEM; Gardner, 1985) and the L2 motivational self-system (L2MSS; Dörnyei, 2005) have shaped the field for decades, both have faced increasing conceptual and empirical challenges. The SEM has been criticized for its limited explanatory scope, while the L2MSS is currently undergoing a validation crisis (Al-Hoorie, Hiver, & In'nami, 2024, 2025). These challenges

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create an opportunity to reconsider the foundations of L2 motivation research and strengthen its methodological basis. Self-determination theory (SDT; Ryan & Deci, 2017) offers a promising framework. As a broad theory of human motivation, SDT has been extensively validated across educational, organizational, and other life domains (Cerasoli, Nicklin, & Ford, 2014; Howard, Bureau, Guay, Chong, & Ryan, 2021; Ntoumanis & Standage, 2009; Ryan, 2023). In language education, SDT has also shown explanatory power in accounting for how learners develop, sustain, and regulate motivation in different learning contexts (Oga-Baldwin, Nakata, Parker, & Ryan, 2017; Sugita-McEown, Noels, & Chaffee, 2014).

A central strength of SDT is its focus on motivational quality rather than quantity. Within SDT, organismic integration theory conceptualizes motivation along a continuum of autonomy, ranging from amotivation to controlled and autonomous forms of extrinsic motivation and intrinsic motivation (Ryan & Deci, 2017, 2020). This continuum is relevant to L2 learning, which is shaped by both personal interest and external demands. It enables researchers to examine whether more autonomous forms of motivation are more strongly associated with achievement than controlled forms, while also retaining continuity with earlier L2 research based on the broader intrinsic–extrinsic distinction. Nevertheless, the application of SDT to L2 learning remains debated. Critics argue that its emphasis on autonomy may reflect Western individualistic assumptions and insufficiently capture interdependence and social harmony in collectivist settings (Chirkov, Ryan, Kim, & Kaplan, 2003; DeVoe & Iyengar, 2004), suggesting that motivation–achievement relationships may vary across cultures.

A meta-analysis is therefore needed to establish the magnitude and consistency of these associations. Existing reviews of SDT in L2 learning have been primarily narrative research syntheses (Al-Hoorie, Oga-Baldwin, Hiver, & Vitta, 2022; Oga-Baldwin, Abigail, & Kimberly, 2022), while the recent meta-analysis by Alamer, Robat, Shirvan, and Ryan (2025) focused mainly on the categories of autonomous and controlled motivation. It did not fully integrate the substantial body of earlier L2 studies on intrinsic and extrinsic motivation. To address these gaps, the present study conducts an updated systematic review and three-level meta-analysis of the studies available through the end of 2025. The three-level approach accounts for dependencies among multiple effect sizes within studies. By synthesizing global intrinsic motivation, extrinsic motivation, and differentiated forms of extrinsic regulation, this study provides precise estimates of their relationships with L2 achievement. It thereby clarifies the empirical support and cross-contextual applicability of SDT and provides an evidence base for motivation-supporting interventions in language education.

Literature review

Self-determination theory in L2 motivation research

L2 motivation has long been a cornerstone of second language acquisition research and has evolved through several distinct theoretical periods (Dörnyei, 2005; Gardner, 1985). The field now stands at a critical crossroads that calls for both theoretical reconsideration and methodological advancement (Oga-Baldwin, 2024). At this juncture, accumulated empirical evidence suggests that conventional approaches to motivational theorizing are no longer tenable (Al-Hoorie, McClelland, Resnik, Hiver, & Botes, 2026). Accordingly, researchers are increasingly called upon to reconsider not only the foundations of L2 motivation theory but also the ways in which its central constructs are conceptualized, operationalized, and evaluated.

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Concerns about the foundations of L2 motivation research are not new. Gardner's socio-educational model was criticized for insufficient attention to classroom micro-contexts (Crookes & Schmidt, 1991), limited integration of cognitive theories of motivation (Oxford & Shearin, 1994), and restricted practical guidance for language education (Lamb, 2004). More recently, the L2 Motivational Self System (L2MSS) has faced concerns regarding discriminant validity (Al-Hoorie et al., 2024), theoretical inconsistency (Henry & Liu, 2023; Liu & Henry, 2025), conceptual imprecision (Al-Hoorie et al., 2024), methodological weaknesses (McClelland & Larson-Hall, 2025), insufficient attention to measurement invariance (Nagle, 2025), and operational ambiguity arising from jingle–jangle fallacies (Henry & Liu, 2024; Oga-Baldwin et al., 2025). Although recent research has attempted to address some of these concerns through the development of new measurement scales (e.g., Papi & Teimouri, 2025), the broader validation crisis indicates that theoretical reconsideration must proceed alongside more rigorous methodological practices (Oga-Baldwin, 2024).

Against this background, self-determination theory (SDT) has emerged as a particularly valuable framework because it offers both theoretical coherence and methodological rigor (Al-Hoorie et al., 2024; Oga-Baldwin, 2024). Unlike frameworks developed specifically for language learning, SDT is embedded in a cross-disciplinary theory of human motivation, allowing L2 motivation to be linked to established processes across educational, psychological, and social domains. SDT has also demonstrated considerable explanatory power in language learning contexts (Al-Hoorie et al., 2022). Since its introduction to L2 research by Noels, Clément, and Pelletier (1999), SDT has been applied from elementary to university settings and has illuminated how learners develop, internalize, and sustain language learning motivation (Noels, Vargas Lascano, & Saumure, 2019; Oga-Baldwin et al., 2017).

A central contribution of SDT is its emphasis on the quality, rather than merely the quantity, of motivation (Sugita-McEown & Oga-Baldwin, 2019). SDT broadly distinguishes between intrinsic and extrinsic motivation. Intrinsic motivation refers to engaging in an activity because it is inherently interesting, enjoyable, or satisfying, whereas extrinsic motivation refers to engaging in an activity for outcomes that are separable from the activity itself (Ryan & Deci, 2017, 2020). Intrinsic motivation is regarded as the prototype of autonomous motivation because it arises from curiosity, enjoyment, exploration, or an inherent interest in the activity (Deci & Ryan, 1985, 2000).

Importantly, SDT does not conceptualize extrinsic motivation as a unitary or necessarily maladaptive form of motivation. Organismic integration theory, a subtheory of SDT, proposes that extrinsic motivation comprises several regulatory styles that vary according to the extent to which externally initiated behavior has been internalized. External regulation represents the most controlled form, in which behavior is driven by external rewards, demands, or punishments, such as learning a language solely to pass an examination or avoid negative consequences. Introjected regulation involves partially internalized pressures, including guilt, anxiety, contingent self-worth, or the desire to obtain approval from others. Identified regulation is more autonomous because individuals consciously recognize and endorse the personal value of an activity; for example, learners may study a language because they consider it important for their future careers. Integrated regulation represents the most fully internalized form of extrinsic motivation, in which the activity is assimilated into the individual's broader identity, values, and life goals (Ryan & Deci, 2020). These regulatory styles are often organized into two broader motivational dimensions. Controlled motivation comprises external and introjected regulation, whereas autonomous motivation comprises identified regulation, integrated regulation, and intrinsic motivation. Autonomous motivation

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reflects volition and personal endorsement, whereas controlled motivation involves behavior driven by external demands or internally pressuring contingencies. In educational contexts, autonomous motivation is generally associated with more adaptive outcomes, including sustained engagement, persistence, achievement, and well-being (Oga-Baldwin & Fryer, 2018).

SDT is particularly well positioned to explain language learning outcomes because it specifies the psychological processes through which qualitatively different forms of motivation influence learners' behavior and development (Sugita-McEown, Noels, & Chaffee, 2014). By emphasizing learners' internal motivational resources rather than external control, SDT aligns with the educational goal of supporting sustained, self-directed learning (Oga-Baldwin & Nakata, 2020; Sugita-McEown & Oga-Baldwin, 2019). Empirical research has shown that SDT-based motivational constructs significantly predict learning effort in English (Takahashi & Im, 2020) and other target languages (Sugita-McEown, Noels, & Saumure, 2014). The framework has also been applied across a wide range of educational stages, language skills, cultural settings, and instructional contexts, indicating its broad relevance to L2 education.

Alongside this empirical expansion, researchers have developed several validated SDT-based instruments for assessing motivational regulation in language learning. Noels et al. (1999) introduced one early SDT-informed L2 motivation scale measuring intrinsic, identified, introjected, and external regulation. Later studies adapted and validated such measures in broader English-learning contexts (e.g., Oga-Baldwin et al., 2017) and specific domains such as vocabulary learning (e.g., Li, King, & Wang, 2022). Alamer (2021, 2022) subsequently developed and validated the SDT-L2 scale, which assesses intrinsic motivation, forms of extrinsic regulation, and the broader dimensions of autonomous and controlled motivation. Together with other validated instruments (e.g., Noels et al., 1999; Oga-Baldwin & Nakata, 2017), these measures provide a robust foundation for investigating motivation in L2 learning.

Intrinsic/extrinsic motivation and L2 achievement

Research examining the relationship between SDT-based motivation and L2 achievement has expanded considerably in recent years. Overall, empirical evidence suggests that intrinsic motivation is positively associated with L2 achievement (Lee, 2020; Li, 2022). Intrinsically motivated learners tend to demonstrate higher levels of achievement across a range of language domains, including listening (Tsang, 2025), speaking (Luo, Shao, & Ma, 2024), reading (Yau, 2022), writing (Amin, 2019), and vocabulary learning (Sun, O'Brien, Arshad, & Sun, 2024). This association may be explained by the greater engagement, persistence, and sustained interest that intrinsic motivation fosters during the language learning process (Siddikova, 2023).

Despite this generally positive pattern, the magnitude and even the direction of the association vary substantially across studies. Reported correlations between intrinsic motivation and L2 achievement range from weak (r = .06; Taboada Barber et al., 2020) to moderate (r = .43; Alamer & Lee, 2019) and strong (r = .65; Amin, 2019). Moreover, some studies have reported negative associations in particular contexts (e.g., Sun et al., 2024). The relationship between extrinsic motivation and L2 achievement is similarly complex. Although some studies have found that extrinsic motivation can facilitate language learning and is positively associated with achievement (Luo et al., 2024; Yau, 2022), its effects appear less consistent across contexts (Liu, Cheong, Ng, & Tse, 2024). In some cases, extrinsic motivation has been negatively related to L2 achievement. For example, Taboada Barber, Klauda, and Stapleton (2020) found that, among primary

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school learners, extrinsic motivation was negatively associated with reading comprehension, word identification, and linguistic comprehension. Such findings indicate that externally regulated learning may be less beneficial when learners focus primarily on external outcomes rather than on engagement with the learning process itself.

The relative predictive strength of intrinsic and extrinsic motivation also remains unclear. Although intrinsic motivation is generally considered more strongly associated with adaptive language learning outcomes (Yau, 2022), some studies have reported stronger relationships between extrinsic motivation and L2 achievement (e.g., Wang & Low, 2024). This apparent inconsistency may be partly attributable to differences in the conceptualization and operationalization of extrinsic motivation. From an SDT perspective, extrinsic motivation encompasses regulatory forms that vary considerably in their degree of internalization. Measures that combine relatively controlled forms of regulation with more autonomous forms may therefore obscure theoretically meaningful differences in their associations with L2 achievement.

Taken together, existing research generally supports an association between SDT-based motivation and L2 achievement, but the magnitude and direction of this relationship remain inconclusive. Findings vary across motivational types, learner populations, educational settings, and language skills. The rapid accumulation of empirical research, together with the substantial variability in reported findings, therefore calls for a systematic meta-analytic synthesis to estimate the overall associations between different forms of SDT-based motivation and L2 achievement and identify the contextual and methodological factors that may explain heterogeneity across studies.

Moderators

Moderators clarify the boundary conditions under which a theoretical relationship varies and are therefore essential for evaluating a theory's generalizability and practical applicability (Aguinis, Gottfredson, & Wright, 2011). In this meta-analysis, target language, educational stage, language skill, cultural context, learning context, teaching mode, and publication year were examined as potential moderators.

Target language

English has long dominated L2 motivation research, largely because of its global status as a lingua franca and its institutionalized role as a compulsory subject in many educational systems (Sugita-McEown, Noels, & Saumure, 2014). By contrast, languages other than English (LOTEs) have received less attention and are often learned under different curricular and sociocultural conditions. English learners may be motivated by its perceived global utility, whereas LOTE learners may be driven by more diverse personal, cultural, or academic reasons. Thus, the strength of the motivation–achievement association may differ by target language. Including both English and LOTE studies allows the present meta-analysis to assess the cross-language generalizability of this association.

Educational stage

Educational stage is a meaningful indicator of motivational development because it reflects not only age but also learners' cognitive maturity, academic demands, self-regulatory capacity, and learning goals. Prior research has reported mixed developmental patterns: some studies suggest that motivation changes or develops over the

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school year (Cerasoli et al., 2014; Spinath & Spinath, 2005), whereas others show declines in intrinsic motivation as students progress through schooling (Yeung, Lau, & Nie, 2011). From an SDT perspective, older learners may have a greater capacity for internalization and self-regulation, which could strengthen the link between autonomous motivation and achievement. Because many primary studies did not report participants' age information, educational stage was used as a feasible moderator.

Language skill

L2 skills are multidimensional, involving skills such as listening, speaking, reading, writing, vocabulary, and grammar. Motivation may operate differently across these domains because each skill involves distinct task demands, learning processes, and feedback conditions. Within SDT, autonomous motivation tends to be more domain-sensitive, whereas controlled motivation may be relatively more stable across subjects or tasks (Guay et al., 2010). A recent meta-analysis found that autonomous motivation was more strongly associated with vocabulary achievement than with listening achievement, while language skill did not moderate the association between controlled motivation and achievement (Alamer et al., 2025). Therefore, language skill was examined as a potential moderator.

Cultural context

Cultural context may shape how motivational regulation relates to L2 achievement. SDT does not treat autonomy as limited to individualistic cultures; rather, learners in collectivist contexts may autonomously endorse group values and social expectations when these are internalized as personally meaningful (Deci & Ryan, 2000). In such contexts, family expectations, collective goals, and social responsibilities may function either as controlling pressures or as internalized motives, depending on how learners interpret them. Earlier work also suggested that extrinsic motives may be especially salient in settings where educational achievement is closely tied to family obligations and social mobility (Gardner, 1985). Recent meta-analytic evidence further indicates that cultural context can moderate the association between autonomous motivation and L2 achievement, with stronger effects in contexts such as Saudi Arabia, Korea, and China (Alamer et al., 2025).

Learning context

The relationship between L2 motivation and L2 achievement may also differ between foreign language and second language contexts. A key distinction concerns learners' exposure to and interaction with the target language community (Dörnyei, 1990). In foreign language (FL) contexts, learners usually encounter the target language mainly in classrooms, whereas second language (L2) contexts provide more opportunities for authentic communication beyond school. These differences may influence learners' perceived relevance of the language, motivational orientations, and opportunities to convert motivation into achievement (Li, 2014).

Teaching mode

Teaching mode has become increasingly relevant with the expansion of online, blended, and technology-mediated language learning, particularly after the COVID-19 pandemic and the rapid integration of AI-supported tools. Offline classrooms often provide immediate interpersonal support through teacher supervision and peer

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interaction. Online environments, in contrast, require learners to sustain motivation with greater autonomy and less physical monitoring. From an SDT perspective, online learning may challenge relatedness because of reduced face-to-face interaction, but it may also support autonomy by offering flexible and self-paced learning opportunities. Thus, teaching mode may influence how motivation translates into achievement. For instance, Wang and Low (2024) found that extrinsic motivation mediated the relationship between English reading self-efficacy and language performance in a social-media-supported EFL context in China. Teaching mode was therefore considered as a moderator.

Publication year

Publication year was included to examine whether the motivation–achievement association has changed over time. L2 motivation research has undergone substantial theoretical and methodological development, including the growing adoption of SDT, improved measurement practices, and increasing attention to diverse learning contexts and technology-mediated instruction (Al-Hoorie et al., 2022). Publication year may therefore capture historical changes in measurement quality and learning environments. Including it as a moderator allows the present meta-analysis to assess whether reported effect sizes have remained stable or varied across time.

Previous meta-analyses on L2 motivation and L2 achievement

A rigorous evaluation of SDT requires not only the accumulation of primary studies but also a systematic synthesis of their findings. As SDT is a mature human motivation theory, several meta-analyses have synthesized empirical evidence within general education (Cerasoli et al., 2014; Howard, Bureau, Guay, Chong, & Ryan, 2021; Taylor et al., 2014). These syntheses consistently demonstrate that intrinsic motivation is positively correlated with academic achievement, with effect sizes of r = .21 (Cerasoli et al., 2014), r = .27 (Taylor et al., 2014), r = .32 for self-report academic performance, and r =.13 for objective academic performance (Howard et al., 2021). However, extrinsic motivation yielded more inconsistent findings, demonstrating either a non-significant association (Taylor et al., 2014) or a weak positive association (Howard et al., 2021).

Despite evidence from general education, very few meta-analyses have examined the association between L2 motivation and L2 achievement. Existing meta-analyses have focused on SEM (Masgoret & Gardner, 2003) and L2MSS (Al-Hoorie, 2018; Yousefi & Mahmoodi, 2022). Specifically, Masgoret and Gardner (2003) found that the effect sizes for integrative orientation ranged from .15 to .20, while those for instrumental orientation ranged from .08 to .16, based on different achievement measurements. Al-Hoorie (2018) revealed that the components of the L2MSS were weakly related to objected achievement (r = –.05–.20). Similarly, Yousefi and Mahmoodi (2022) found a strong association between L2 motivation and language learning outcomes (r = .59) and identified learners' age, gender, educational stage, learning context, target language, learning outcomes, and geographical location as moderators. To date, Al-Hoorie et al. (2022) and Oga-Baldwin et al. (2022) have provided systematic reviews of SDT research in L2 research. Until recently, Alamer et al. (2025) have meta-analytically explored the association between SDT-based L2 motivation and L2 achievement. Synthesizing 21 studies comprising 85 samples, Alamer et al. (2025) found that autonomous motivation was positively associated with L2 achievement (r = .23), whereas the

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relationship between controlled motivation and L2 achievement was not significant ($r = -.03$). However, this meta-analysis did not include a substantial body of earlier L2 studies on intrinsic and extrinsic motivation. In addition, because the literature search conducted by Alamer et al. (2025) ended in late 2022, the study did not account for the rapid growth of SDT-based L2 motivation research in recent years. To address these gaps, the present study updates and extends previous work by providing more comprehensive and precise effect-size estimates for the relationship between intrinsic/extrinsic motivation and L2 achievement, drawing on studies published through the end of 2025. Specifically, it addresses the following research questions:

RQ1. What is the association between intrinsic motivation and L2 achievement?

RQ2. What is the association between extrinsic motivation (including integrated, identified, introjected, and external regulation) and L2 achievement?

RQ3. Which factors moderate the association between intrinsic/extrinsic motivation and L2 achievement?

Method

Literature search and criteria of inclusion

A systematic and rigorous literature search was conducted following the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021). To ensure extensive coverage of the relevant studies, a multi-database search strategy was employed, drawing from ten databases, including Google Scholar, Scopus, Web of Science, PsycINFO, Education Resources Information Clearinghouse (ERIC), JSTOR, EBSCO Open Dissertations, ProQuest Dissertation & Thesis Index, ProQuest, and Wiley. The search strategy included: ("self-determination theory" OR "SDT" OR "self-determined motivation" OR "intrinsic motivation" OR "extrinsic motivation" OR "autonomous motivation" OR "controlled motivation" OR "external regulation" OR "introjected regulation" OR "identified regulation" OR "integrated regulation" OR "motivational regulation") AND ("reading skills" OR "writing skills" OR "speaking skills" OR "listening skills" OR "L2 grade" OR "L2 performance" OR "L2 achievement" OR "L2 outcome" OR "English grade" OR "English performance" OR "English achievement" OR "English outcome" OR "foreign language grade" OR "foreign language performance" OR "foreign language achievement" OR "foreign language outcome"). Key journals in SLA and the reference lists from relevant review articles were further examined to identify additional studies. The final search was conducted on November 27, 2025.

Literature searches yielded 3946 studies. After removing duplicates and an initial screening of titles and abstracts, 207 studies were selected for further evaluation.

The 207 studies were further screened based on the following inclusion criteria:

1) The study must provide sufficient data for effect size calculation;
2) The study must be an empirical study with quantitative data on L2 motivation and L2 achievement;
3) The study must explicitly address the association between a specific type of motivation and L2 achievement;
4) The study must be written in English.

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However, studies were excluded if:

1) The study contains duplicate data, particularly those in which a journal article was based on a previously published doctoral dissertation. In such cases, the modified journal article was selected;
2) The study is non-empirical;
3) The study does not report sufficient quantitative data;
4) The study cannot be obtained in full text.

To ensure the quality of the studies included in the meta-analysis, we adapted the scale developed by Huang and Zhang (2025) based on the Newcastle-Ottawa Scale (NOS) to assess the quality of the included studies, which includes dimensions of methodological rigor, transparency, social value, and ethics (Plonsky, 2024). This scale comprises 3 sections with 10 items, including 3 items for selection, 2 items for comparability, and 5 items for outcome (see Appendix 2 in the supplementary material). Each item was scored on a scale of 0 or 1. Studies scoring above 5 points were considered eligible for inclusion in the meta-analysis, while those scoring above 7 points were regarded as high-quality studies (Stang, 2010).

Finally, 220 samples involving 38138 participants from 74 studies conducted between 1999 and 2025 were selected for the coding (see Appendix 1 for the studies included in this meta-analysis in supplementary material). The process of literature screening and selection is shown in Figure 1.

Data coding

The included studies were first coded for the following information: basic study details (authors and year), effect size, sample size, target language (English or LOTE), educational stage (preschool and primary school, junior and senior high school, or university), language skill (overall, receptive, or productive skill), cultural context (country or region where the study was conducted), learning context (FL or L2), teaching mode (online, offline, or blended), and publication year. The coding process was performed independently by the first two authors, achieving a high level of inter-coder reliability (kappa value = 97.8%). Any discrepancies were resolved through discussion.

Data analysis

We used the "metafor" package (Viechtbauer, 2010) in R (Version 4.5.1) to calculate effect sizes, test for heterogeneity, assess publication bias, and perform moderator analyses. To address the dependency issues inherent in studies with multiple outcomes, this study utilized a three-level meta-analysis, partitioning the total variance into three components: level 1, the sampling variance of each effect size; level 2, the within-study variance; and level 3, the between-study variance (Assink & Wibbelink, 2016).

Heterogeneity

I^2 and Q-test values were calculated to assess heterogeneity. I^2 statistic measures the variance across studies, with thresholds of 25% (low), 50% (moderate), and 75% (high) heterogeneity (Higgins et al., 2003). The p-value of the Q-test below .05 indicates significant heterogeneity; therefore, a moderator analysis is conducted to calculate the influence of other variables.

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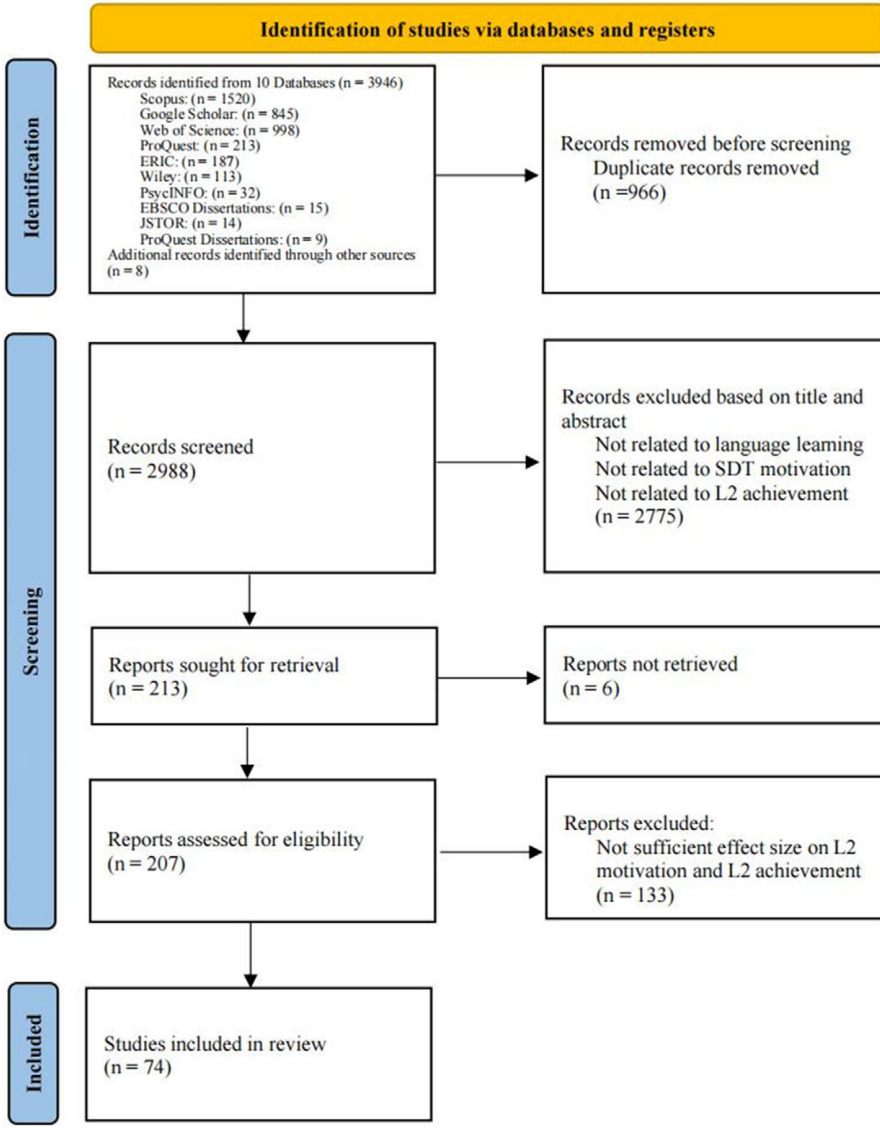


Figure 1. PRISMA flow diagram of literature searching and screening.

Publication bias

Multiple approaches were employed to test for publication bias. First, a funnel plot was constructed, with a symmetrical plot indicating minimal publication bias (Sterne & Egger, 2001). Second, two-level Egger's test was conducted, with a p-value above .05 suggesting no publication bias (Egger, Smith, Schneider, & Minder, 1997). Third, the trim-and-fill method (Duval & Tweedie, 2000) was used to adjust for missing studies. If the adjusted values did not substantially differ from the observed values, publication bias would not have influenced the credibility of the results.

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Effect size calculations

As meta-analyses typically use correlation coefficients (r-value) as the common effect size, we employed the conversion formula $r = 0.98\beta + 0.05\lambda$ developed by Peterson and Brown (2005) to incorporate regression coefficients (β-value) into this meta-analysis. Specifically, λ is an indicator variable assigned a value of 1 when β is positive and 0 when β is negative. To account for the normality of the sampling distribution, these correlation coefficients were converted into Fisher's z-scores for analysis and subsequently back-transformed into Pearson's r values for interpretation (Borenstein et al., 2021). The interpretation of the correlation coefficients followed recommendations for field-specific benchmarks (Plonsky & Oswald, 2014): small (r = .25), medium (r = .40), and large (r = .60). Additionally, a sensitivity analysis was conducted in Comprehensive Meta-Analysis (CMA) to assess the stability of the results by examining the influence of extreme values or outliers. This ensured that the overall findings were not affected by atypical data, thereby contributing to more robust conclusions.

Moderator analysis

Moderator analyses were conducted using multilevel meta-regression models to explore the potential sources of variation. To ensure sufficient statistical power, moderator analyses were conducted at the global construct level. In addition, following the widely accepted recommendations by Borenstein, Hedges, Higgins, and Rothstein (2021), the cut-off for determining unique samples per subgroup is typically $k \geq 5$ in moderator analyses. Therefore, subgroups that contain fewer than five samples, such as the online category in teaching modes and the primary and preschool category in educational stages, were excluded to ensure the robustness of data analysis.

Results

Study and scale quality analysis

Study quality assessment showed that the included studies had a mean quality score of 7.97, indicating that they were generally suitable for meta-analysis. However, several reporting limitations were identified. As shown in Table 1, only 19 of the 74 studies (25.7%) reported participant response rates in the selection domain. In the comparability domain, fewer than half of the studies controlled for confounding variables (47.3%, k = 35). Reporting was also incomplete in the outcome domain. Only 18.9% of the studies (k = 14) specified participants' language proficiency levels, and 20.3% (k = 15) reported prior language learning experience. In addition, 41.8% (k = 31) did not report participants' age. Among studies involving university populations, 34.2% (k = 13) omitted students' academic majors. Of those reporting this information, 32.0% (k = 8) involved English majors. Most studies targeted English (94.5%, k = 70), whereas only four studies focused on Japanese, Chinese, or French.

The quality of the motivation scales was also assessed. Among the 74 studies, 12 studies employed 9 previously validated scales. 59 studies adapted scales derived from validated scales, whereas 3 studies did not provide sufficient information regarding the scales employed. The most frequently adopted or adapted scales were those developed by Noels et al. (1999, 2000), Alamer (2021, 2022), and Oga-Baldwin and Nakata (2017). In terms of psychometric reporting, 47 studies (63.5%) reported both reliability and validity evidence. Reliability indices were available in 68 studies (91.9%), while validity evidence was reported in 48 studies (64.9%) (see Appendix 2 in supplementary material for the coding of the study and scale quality assessment).

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Table 1. Results of study quality and scale quality assessment

Dimension	Assessment item	*K* (%)
Selection	Clarity and selection of study population	74 (100%)
	Representativeness of the sample	74 (100%)
	Participation rate	19 (25.7%)
Comparability	Control of major confounding factors	35 (47.3%)
	Use of multivariate analysis	71 (95.9%)
Outcome	Measurement of SDT-based motivation (reliability)	68 (91.9%)
	Measurement of SDT-based motivation (validity)	48 (64.9%)
	Measurement of L2 achievement	71 (95.9%)
	Completeness of data collection	56 (75.6%)
	Appropriateness of statistical analysis	74 (100%)

Heterogeneity

As shown in Table 2, significant heterogeneity was observed across all motivational dimensions. The Q-statistics were significant for intrinsic, extrinsic, identified, introjected, and external motivation ($p < .001$), with I^2 values ranging from 66.42% to 86.31%. These values indicate substantial between-study variability that warrants further moderator analysis (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006). In addition, the limited number of effect sizes ($k = 7$) for integrated regulation necessitates a cautious interpretation of this finding, though the heterogeneity was moderate. Given the substantial heterogeneity, multilevel random-effects meta-analytic models were employed to account for dependency among effect sizes.

Publication bias

Publication bias was assessed using funnel plots, Egger's tests, and trim-and-fill analyses (Borenstein et al., 2021). As shown in Figure 2, the effect sizes for the global constructs and specific dimensions of extrinsic motivation were distributed relatively symmetrically around the funnel plots. The two-level Egger's tests were nonsignificant (ps > .05), suggesting a low risk of publication bias (see Table 3). Egger's test was not performed for integrated regulation because the number of available effect sizes was insufficient. The trim-and-fill analyses imputed no missing effect sizes on either side of the funnel plots, and the adjusted estimates were identical to the observed estimates.

Table 2. Test of heterogeneity

	Heterogeneity				Tau-squared
SDT-based motivation	*Q*	df	*P*	I^2	τ^2
Global constructs					
Intrinsic motivation	1184.44	96	<.001	86.31%	.05
Extrinsic motivation	1125.89	122	<.001	83.94%	.04
Dimensions of extrinsic motivation					
Integrated regulation	12.52	6	.05	54.60%	.01
Identified regulation	73.44	21	<.001	66.42%	.01
Introjected regulation	134.03	20	<.001	71.22%	.01
External regulation	86.44	20	<.001	69.62%	.01

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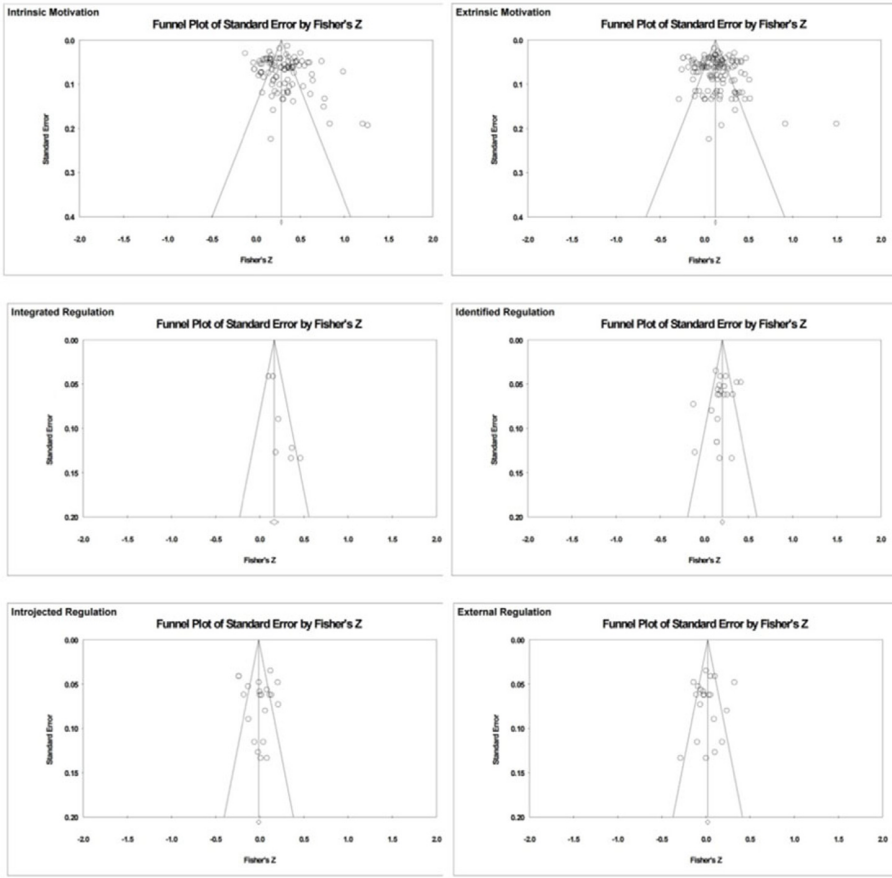


Figure 2. Funnel plots of the relationships between different types of SDT-based L2 motivation and L2 achievement.

Table 3. Results of Egger's regression and effect sizes for the association between SDT-based L2 motivation and L2 achievement

		Egger's regression			95% CI		Test of null
SDT-based motivation	*K*	z	p	*r*	Lower limit	Upper limit	*P*
Global constructs							
Intrinsic motivation	97	.801	.425	.318	.258	.355	<.001
Extrinsic motivation	123	.812	.418	.166	.115	.212	<.001
Dimensions of extrinsic motivation							
Integrated regulation	7			.248	.110	.367	<.001
Identified regulation	22	–1.119	.277	.190	.126	.248	<.001
Introjected regulation	21	.558	.584	.006	–.067	.079	.866
External regulation	21	–.400	.694	.010	–.061	.081	.781

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These findings suggest that publication bias had a negligible influence on the meta-analytic results.

Overall effect sizes

The multilevel meta-analysis included 74 studies, yielding 97 effect sizes for intrinsic motivation and 123 effect sizes for extrinsic motivation as global constructs. Specific regulatory dimensions of extrinsic motivation were also analyzed. The results are presented in Table 3.

The overall effect size for intrinsic motivation was moderate and statistically significant, $r = .318$, 95% CI [.258, .355]. Global extrinsic motivation showed a small but significant positive association with L2 achievement, $r = .166$, 95% CI [.115, .212]. Among the subtypes of extrinsic motivation, significant positive effects were found for the two autonomous forms: integrated regulation, $r = .248$, 95% CI [.110, .367], and identified regulation, $r = .190$, 95% CI [.126, .248]. By contrast, the controlled forms were not significantly associated with L2 achievement: introjected regulation, $r = .006$, 95% CI [–.067, .079], and external regulation, $r = .010$, 95% CI [–.061, .081]. Sensitivity analyses showed only minimal changes in the results, supporting the robustness of these findings.

Moderator analyses

The interpretation of moderator effects was guided by theoretical plausibility and systematic effect-size patterns rather than by p-values alone (Gass, Loewen, & Plonsky, 2021; Plonsky, 2024). Subgroups with small sample sizes ($k < 5$), including online teaching mode, primary/preschool educational stage, and publication year (1999–2010), were excluded from the formal moderator analyses. As shown in Tables 4 and 5, learning context and teaching mode moderated the relationship between intrinsic motivation and L2 achievement, whereas teaching mode was the only significant moderator for extrinsic motivation. Although target language, educational stage, language skill, cultural context, and publication year were not statistically significant moderators, their effect-size patterns suggested meaningful between-group variation.

Multilevel meta-regression analyses showed positive associations in studies targeting English, both for intrinsic motivation ($r = .316$) and extrinsic motivation ($r = .173$), whereas the corresponding associations in studies targeting languages other than English (LOTEs) were not statistically significant. Effect sizes also appeared to increase across educational stages, with the largest associations observed among university students ($r$intrinsic = .338; $r$extrinsic = .178), followed by junior and senior secondary learners ($r$intrinsic = .294; $r$extrinsic = .160) and primary/preschool learners (r intrinsic = .196). Although language skill did not reach conventional levels of statistical significance as a moderator, effect sizes varied systematically across skill categories. With respect to cultural context, studies conducted in Middle Eastern contexts showed the largest association for intrinsic motivation ($r = .361$), whereas studies conducted in East Asian contexts showed the largest association for extrinsic motivation ($r = .217$).

Learning context significantly moderated the association between intrinsic motivation and L2 achievement, $Q(1) = 8.682$, $p = .003$, with a larger effect in foreign language (FL) contexts ($r = .332$) than in second language (L2) contexts ($r = .111$). However, learning context did not significantly moderate the association between extrinsic motivation and L2 achievement, $Q(1) = 1.804$, $p = .179$; the effect was positive in FL

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Table 4. Moderator analyses for intrinsic motivation-L2 achievement relationship

		Effect size and 95% interval			Test of moderators		
Groups	*K*	*r*	Lower limit	Upper limit	*Q*-value	*df*	*p*-value
Target language					1.716	1	.190
English	91	.316	.265	.364			
LOTE	6	.173	–.046	.376			
Educational stage					3.004	2	.223
University	49	.338	.272	.401			
Junior and senior	36	.294	.210	.373			
Primary and preschool	12	.196	.036	.346			
Language skill					1.329	2	.515
Overall	38	.333	.264	.399			
Productive	19	.295	.214	.372			
Receptive	40	.279	.208	.347			
Cultural context					8.778	4	.067
East Asia	50	.337	.273	.399			
Europe	6	.102	–.135	.328			
Middle East	19	.361	.262	.453			
North America	9	.165	–.006	.328			
Southeast Asia	13	.248	.107	.379			
Learning context					8.682	1	.003
FL	85	.332	.283	.379			
L2	12	.111	–.035	.251			
Teaching mode							
Blended	8	.518	.357	.649	6.300	1	.012
Offline	87	.299	.249	.347			
Online	2	/	/	/			
Publication year					.868	2	.658
1999–2010	4	/	/	/			
2011–2015	15	.258	.089	.413			
2016–2020	24	.287	.186	.382			
2021–2025	54	.326	.261	.387			

Notes: FL = Foreign language learning context; L2 = second language learning context.

contexts (r = .177) but non-significant in L2 contexts (r = .080). Teaching mode emerged as a significant moderator for both intrinsic motivation, $Q(1) = 6.300$, p = .012, and extrinsic motivation, $Q(1) = 13.940$, p < .001. The strongest associations were observed in blended learning environments ($r$intrinsic = .518; $r$extrinsic = .490), followed by traditional offline instruction ($r$intrinsic = .299; $r$extrinsic = .138). However, these findings should be interpreted cautiously because of the small number of studies in the blended and online learning categories. When publication year was grouped into five-year intervals, the intrinsic motivation–achievement association peaked during 2021–2025 (r = .326).

Discussion

Study and scale quality

The assessment of study and scale quality using the NOS framework indicated that SDT-based L2 research generally demonstrated a satisfactory level of methodological quality. Most studies showed reasonable alignment between their theoretical frameworks, research designs, and statistical analyses, and the majority reported evidence of scale reliability. A substantial proportion also provided validity evidence. Collectively,

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Table 5. Moderator analyses for extrinsic motivation-L2 achievement relationship

		Effect size and 95% interval			Test of moderators		
Groups	*K*	*r*	Lower limit	Upper limit	*Q*-value	*df*	*p*-value
Target language					1.889	1	.169
English	106	.173	.123	.223			
LOTE	17	.043	–.138	.221			
Educational stage					.125	1	.723
University	71	.178	.108	.247			
Junior and senior	49	.160	.081	.236			
Primary and preschool	3	/	/	/			
Language skill					.263	2	.877
Overall	59	.153	.084	.221			
Productive	24	.184	.086	.279			
Receptive	40	.171	.091	.248			
Cultural context					5.659	4	.226
East Asia	52	.217	.149	.284			
Europe	5	.137	–.108	.366			
Middle East	30	.100	–.006	.203			
North America	27	.072	–.065	.205			
Southeast Asia	9	.168	.023	.306			
Learning context					1.804	1	.179
FL	104	.177	.125	.229			
L2	19	.080	–.055	.211			
Teaching mode					13.940	1	<.001
Blended	5	.490	.321	.628			
Offline	116	.138	.092	.184			
Online	2	/	/	/			
Publication year					.410	3	.938
1999–2010	14	.097	–.136	.321			
2011–2015	24	.185	.035	.327			
2016–2020	28	.163	.058	.264			
2021–2025	57	.168	.101	.233			

Notes: FL = Foreign language learning context; L2 = second language learning context.

these strengths suggest that the existing literature offers a reasonably solid empirical foundation for examining the relationship between SDT-based motivation and L2 achievement.

Nevertheless, several limitations warrant attention. Many studies did not report participant response rates, missing data procedures, or essential sample characteristics, including age, language proficiency, prior language learning experience, and academic major, echoing concerns raised by Sudina (2021). Such omissions may obscure selection bias, produce biased estimates when missing data are handled inadequately (Little & Rubin, 2019), and limit both the interpretation of individual findings and the examination of moderators in meta-analysis. Open science practices also remained uncommon, restricting opportunities for replication, verification, and secondary analysis, as noted by Hiver and Al-Hoorie (2020), In'nami, Mizumoto, Plonsky, and Koizumi (2022), and Nagle (2025).

Methodological control and sampling also require improvement. Fewer than half of the studies controlled for potential confounding variables, making it difficult to determine whether observed motivation–achievement associations were attributable specifically to motivational constructs. In addition, the concentration of university students and English majors suggests that sampling was often driven by accessibility

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and researcher familiarity (Larsson et al., 2023). The overwhelming focus on English further reflects the long-standing English-centric orientation of applied linguistics research (Goetze & Driver, 2022), limiting the generalizability of the findings to K–12 learners, non-English majors, and learners of LOTEs.

Measurement practices also warrant closer attention. Consistent with Sudina (2021), most studies relied on Cronbach's alpha as evidence of internal consistency, while comparatively fewer reported content or construct validity. Reliability alone, however, cannot establish that a scale adequately represents the intended construct or distinguishes among different forms of motivational regulation. This issue is especially important when established scales are translated, shortened, or adapted for new linguistic, cultural, or educational settings, because evidence from the original instrument cannot automatically be assumed to apply to the modified version.

Future research should therefore improve transparency in methodological reporting; control relevant confounders more systematically; and broaden sampling across educational levels, academic backgrounds, and target languages. Greater attention should also be given to scale validity. These improvements would strengthen the interpretability and cumulative value of SDT-based L2 motivation research.

The association between intrinsic/extrinsic motivation and L2 achievement

The present meta-analysis revealed a moderate association between intrinsic motivation and L2 achievement (r = .318). This estimate is broadly consistent with previous educational meta-analyses, including Taylor et al. (2014; r = .27), Cerasoli et al. (2014; r = .21), and Howard et al. (2021; r = .32). The positive role of intrinsic motivation may be explained by its contribution to sustained effort (León et al., 2015), positive emotional experiences (Li et al., 2022), and resilience (Aydin & Michou, 2020), all of which are conducive to successful L2 learning. Global extrinsic motivation also showed a small but significant association with L2 achievement (r = .166), exceeding the non-significant effect reported by Taylor et al. (2014) and the weak association reported by Howard et al. (2021; r = .12). This finding may reflect the domain-specific nature of L2 learning, where extrinsic motives are often tied to both short-term academic demands, such as examinations and grades, and long-term goals, such as career development and intercultural communication.

A key contribution of this study lies in its differentiation of extrinsic motivation into regulatory subtypes. Integrated regulation (r = .248) and identified regulation (r = .190) were positively associated with L2 achievement, whereas introjected and external regulation showed negligible effects. This pattern is consistent with SDT's distinction between autonomous and controlled motivation and aligns with Alamer et al.'s (2025) meta-analysis, which reported a positive association for identified regulation (r = .160). The present study extends this work by including integrated regulation as a distinct subtype. Although integrated regulation has often been omitted from SDT-based L2 instruments because of its conceptual and empirical overlap with intrinsic motivation and identified regulation (Howard et al., 2021), its positive association with achievement suggests that future research should reconsider its measurement and clarify its role within organismic integration theory, echoing Ryan's (2023) call for more refined assessment of integrated regulation.

Consistent with prior meta-analytic evidence (Alamer et al., 2025; Taylor et al., 2014), intrinsic motivation emerged as a stronger predictor of L2 achievement than extrinsic motivation. The effect sizes observed in this study were also larger than those

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reported by Alamer et al. (2025) for intrinsic motivation (r = .26), autonomous motivation (r = .23), and controlled motivation (r = −.003). Although these effects are moderate or small in magnitude, they remain theoretically and practically meaningful. L2 achievement is a complex outcome shaped by multiple cognitive, affective, social, and contextual factors; motivation may therefore influence achievement indirectly through mediating processes such as engagement (Oga-Baldwin et al., 2017) and emotional experience (Tahmouresi & Papi, 2021). Moreover, as the moderator analyses indicated, the strength of the motivation–achievement relationship varies across learning contexts. Thus, modest effect sizes should not be interpreted as evidence of a limited role for motivation.

When viewed against broader L2 motivation theories, the present findings suggest that SDT-based constructs, particularly intrinsic motivation, show relatively coherent and robust associations with L2 achievement. In the socio-educational model, integrative and instrumental orientations have been found to correlate only weakly with achievement (Masgoret & Gardner, 2003). The present results also resonate with recent discussions of construct overlap between SDT and the L2 motivational self-system, particularly between intrinsic motivation and L2 learning experience, identified regulation and ideal L2 self, and introjected regulation and ought-to L2 self (Oga-Baldwin et al., 2025). Compared with Al-Hoorie's (2018) meta-analysis, intrinsic motivation in the present study showed a stronger association with achievement than L2 learning experience (r = .318 vs. r = .17), whereas identified regulation showed an effect comparable to that of the ideal L2 self (r = .190 vs. r = .20). Both introjected regulation and the ought-to L2 self showed nonsignificant associations. These patterns highlight the need for future research to compare SDT and L2MSS constructs directly using competing models and content-validity approaches.

Overall, the findings indicate that intrinsic motivation and autonomous forms of extrinsic motivation are positively associated with L2 achievement, whereas controlled forms contribute little. SDT therefore provides a fine-grained and theoretically parsimonious framework for explaining how motivational quality relates to L2 achievement (Alamer & Lee, 2019), with important implications for both theory development and motivation-supportive pedagogy.

The effects of moderators in the association between intrinsic/extrinsic motivation and L2 achievement

Moderator analyses showed that learning context and teaching mode significantly moderated the association between L2 motivation and L2 achievement. Although the remaining moderators did not reach statistical significance, the differences in pooled effect sizes provide useful insight into the contextual conditions under which motivation may be more strongly related to achievement.

Target language was not a significant moderator, which differs from Alamer et al. (2025), who reported a moderating effect for autonomous and controlled motivation. Nevertheless, consistent with their findings, motivation–achievement associations were stronger in studies targeting English than in those targeting LOTEs. This pattern suggests that English learning may carry stronger academic, professional, and global communication value, thereby strengthening the link between motivation and achievement.

Educational stage was also not a significant moderator. Stronger associations were observed at higher educational levels, consistent with meta-analytic evidence from general education (Cerasoli et al., 2014; Taylor et al., 2014). As learners mature, they

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may develop greater self-awareness, cognitive regulation, and capacity to internalize learning goals, which can strengthen both intrinsic motivation and autonomous forms of extrinsic motivation (Froiland & Worrell, 2016). More advanced learners may also use motivational regulation strategies more effectively and better recognize the long-term value of L2 learning (Papi & Teimouri, 2014).

Language skill was not a significant moderator, but the effect sizes suggest that intrinsic motivation may be more strongly associated with overall and productive language skills. Intrinsically motivated learners are likely to sustain effort across skill domains and engage more actively in creative, meaning-oriented language use (Amabile, 1983; Benware & Deci, 1984). Productive skills, in particular, require learners to generate language, express ideas, and take communicative risks, making them especially sensitive to motivational quality. By contrast, receptive skills may depend more heavily on input and comprehension processes, leaving less room for personal agency and creative expression. Besides, although motivation is commonly viewed as an antecedent of L2 achievement, emerging longitudinal evidence suggests that the relationship may be reciprocal, with L2 achievement also positively predicting subsequent L2 motivation (Alamer & Alrabai, 2023). For extrinsic motivation, effect sizes across skills were generally weaker and more similar, suggesting that intrinsic motivation may be the more consistent predictor of skill-related achievement. This only suggests a possible trend, but it should be interpreted cautiously because the moderating effect was not significant.

Cultural context also did not significantly moderate the associations, although stronger effects were observed in Eastern than in Western samples. One possible explanation is that, in many collectivist contexts, academic success is closely linked to family expectations and social values, which learners may internalize as personally meaningful goals (Ryan & Deci, 2000; Dörnyei, 2009). In such contexts, externally endorsed motives may function in relatively autonomous ways, thereby strengthening the motivation–achievement relationship. However, this interpretation should remain tentative because broad cultural categories may obscure substantial within-region variation.

Learning context was a significant moderator, consistent with Yousefi and Mahmoodi's (2022) meta-analysis of the L2MSS. The motivation–achievement association was stronger in FL contexts than in L2 contexts. In FL settings, where natural exposure to the target language is often limited, motivation may play a particularly important role in sustaining effort beyond the classroom. Learners with stronger intrinsic motivation may seek additional input and practice opportunities, whereas those with internalized extrinsic motives may view language proficiency as important for academic or career goals. These conditions may explain the stronger effects observed in FL contexts.

Teaching mode also moderated the motivation–achievement relationship, with the strongest effects observed in blended learning environments. This finding should be interpreted cautiously because of the small number of studies in the online and blended categories. Nevertheless, it aligns with the stronger effects observed in studies published between 2021 and 2025, a period marked by rapid growth in digital, online, and AI-supported language learning. Blended environments may provide greater flexibility, personalized resources, and opportunities for autonomous learning, thereby strengthening the link between motivation and achievement. Future research should examine these emerging instructional contexts more systematically as generative AI and other technologies become increasingly integrated into L2 learning.

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Limitations and implications

This meta-analysis has several limitations. First, most included studies used cross-sectional designs to examine associations between motivation and L2 achievement; therefore, the present findings cannot establish causal relationships. Second, this review included only studies published in English, which may limit the generalizability of the findings, particularly in moderator analyses involving cultural and contextual variables. Third, all included studies in the present meta-analysis were published journal articles, which may increase the risk of publication bias because studies reporting nonsignificant or unfavorable results are less likely to be published. Consequently, the estimated overall effect sizes may be inflated, which is a common file drawer problem in L2 meta-analyses (Hu, 2026).

Despite these limitations, the findings offer several pedagogical implications. The observed pattern of effect sizes was consistent with the SDT continuum, with stronger associations for intrinsic motivation and autonomous forms of extrinsic motivation than for controlled forms. This suggests that teachers should prioritize the development of autonomous motivation by supporting students' sense of choice, competence, and self-regulation in L2 learning (Alqahtani, 2024; Ryan & Deci, 2017). In practice, teachers can provide meaningful options, explain the value of learning activities, offer competence-supportive feedback, and encourage learners to set personally relevant goals. The moderator findings further suggest that motivational support should be adapted to teaching mode and learning context. By tailoring pedagogical strategies to these conditions, teachers can better support learners' engagement in L2 learning.

Conclusion

This multilevel meta-analysis provides a comprehensive synthesis of the relationship between SDT-based motivation and L2 achievement. The findings showed that intrinsic motivation, integrated regulation, and identified regulation were positively associated with L2 achievement, whereas introjected and external regulation showed no significant associations. This pattern is consistent with SDT's prediction that more autonomous forms of motivation are more strongly linked to adaptive learning outcomes than controlled forms. At the same time, the magnitude of these associations varied across learning context and teaching mode.

These findings are timely given the current "crisitunity" in L2 motivation research (Oga-Baldwin, 2024). As dominant L2 motivation frameworks face increasing conceptual and empirical challenges, SDT offers a parsimonious, empirically grounded, and cross-disciplinary framework for understanding language learning motivation and its outcomes (Al-Hoorie et al., 2022, 2024). Its shared conceptual language also connects L2 motivation research with broader psychological and educational sciences, creating stronger foundations for theory building, replication, and intervention design. In particular, SDT-informed interventions that have proven effective in other educational contexts (e.g., Cheon & Reeve, 2015) may offer useful models for supporting motivation in language learning.

Future research should continue to anchor L2 motivation studies in well-validated frameworks such as SDT. Greater attention should be given to other SDT mini-theories while extending inquiry beyond organismic integration theory and to emerging L2 learning environments, including GenAI-supported and other technology-enhanced contexts. Such work can further clarify how motivational quality develops, operates, and supports achievement across diverse language learning settings.

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References

*Studies included in the meta-analysis

Aguinis, H., Gottfredson, R. K., & Wright, T. A. (2011). Best-practice recommendations for estimating interaction effects using meta-analysis. *Journal of Organizational Behavior*, *32*(8), 1033–1043. https://doi.org/10.1002/job.719

*Alamer, A. (2021). Construct validation of self-determination theory in second language scale: The bifactor exploratory structural equation modeling approach. *Frontiers in Psychology*, *12*, 732016. https://doi.org/10.3389/fpsyg.2021.732016

Alamer, A. (2022). Basic psychological needs, motivational orientations, effort, and vocabulary knowledge: A comprehensive model. *Studies in Second Language Acquisition*, *44*(1), 164–184. https://doi.org/10.1017/S027226312100005X

*Alamer, A., & Alrabai, F. (2023). The causal relationship between learner motivation and language achievement: New dynamic perspective. *Applied Linguistics*, *44*(1), 148–168. https://doi.org/10.1093/applin/amac035

*Alamer, A., & Lee, J. (2019). A motivational process model explaining L2 Saudi students' achievement of English. *System*, *87*, 102133. https://doi.org/10.1016/j.system.2019.102133

Alamer, A., Robat, E. S., Shirvan, M. E., & Ryan, R. (2025). Self-determination theory and language learning: A multilevel meta-analysis. *Educational Psychology Review*, *37*(2), 59–88. https://doi.org/10.1007/s10648-025-10038-y

Al-Hoorie, A. H. (2018). The L2 motivational self system: A meta-analysis. *Studies in Second Language Learning and Teaching*, *8*(4), 721–754. https://doi.org/10.14746/ssllt.2018.8.4.2

Al-Hoorie, A. H., Hiver, P., & In'nami, Y. (2024). The validation crisis in the L2 motivational self system tradition. *Studies in Second Language Acquisition*, *46*(2), 307–329. https://doi.org/10.1017/S0272263123000487

Al-Hoorie, A. H., Hiver, P., & In'nami, Y. (2025). Looking beyond the L2 motivational self system: Lessons from two "lost" decades. *Studies in Second Language Acquisition*, *47*(4), 1193–1204. https://doi.org/10.1017/S0272263125101319

Al-Hoorie, A. H., McClelland, N., Resnik, P., Hiver, P., & Botes, E. (2026). The ideal L2 self versus ability beliefs: Are they really distinct? *Journal of Multilingual and Multicultural Development (ahead-of-print)*, *47*(1), 660–678. https://doi.org/10.1080/01434632.2024.2401103

Al-Hoorie, A. H., Oga-Baldwin, W. L. Q., Hiver, P., & Vitta, J. P. (2022). Self-determination mini-theories in second language learning: A systematic review of three decades of research. *Language Teaching Research*, 13621688221102686. https://doi.org/10.1177/13621688221102686

Alqahtani, D. A. (2024). An investigation into the relationship between Saudi college EFL learners' motivational orientations, learning autonomy, and achievement. *Theory and Practice in Language Studies*, *14*(9), 2900–2910. https://doi.org/10.17507/tpls.1409.25

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, *45*(2), 357–377.

*Amin, E. A.-R. (2019). A correlational study between some motivational constructs and EFL writing performance in a blended learning environment. *International Journal of English Linguistics*, *9*(3), 238. https://doi.org/10.5539/ijel.v9n3p238

Assink, M., & Wibbelink, C. J. M. (2016). Fitting three-level meta-analytic models in R: A step-by-step tutorial. *Quantitative Methods for Psychology*, *12*(3), 154–174. https://doi.org/10.20982/tqmp.12.3.p154

Aydin, G., & Michou, A. (2020). Self-determined motivation and academic buoyancy as predictors of achievement in normative settings. *British Journal of Educational Psychology*, *90*(4), 964–980. https://doi.org/10.1111/bjep.12338

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Benware, C. A., & Deci, E. L. (1984). Quality of learning with an active versus passive motivational set. *American Educational Research Journal*, *21*(4), 755–765. https://doi.org/10.3102/00028312021004755

Berges-Puyó, J. G. (2023). Motivational factors in learning an L2: A study on intrinsic/extrinsic motivation, classroom materials and teachers' behaviors. *International Journal of Social Science and Education Research Studies*, *3*(10). https://doi.org/10.55677/ijssers/V03I10Y2023-20

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2021). *Introduction to meta-analysis*. Wiley.

Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis. *Psychological Bulletin*, *140*(4), 980–1008. https://doi.org/10.1037/a0035661

Cheon, S. H., & Reeve, J. (2015). A classroom-based intervention to help teachers decrease students' amotivation. *Contemporary Educational Psychology*, *40*, 99–111. https://doi.org/10.1016/j.cedpsych.2014.06.004

Chirkov, V., Ryan, R.M., Kim, Y. & Kaplan, U. (2003). Differentiating autonomy from individualism and independence: A self-determination theory perspective on internalization of cultural orientations and well-being. *Journal of Personality and Social Psychology*, *84* (1), 97–110.

Crookes, G., & Schmidt, R. W. (1991). Motivation: Reopening the research agenda. *Language Learning*, *41*(4), 469–512. https://doi.org/10.1111/j.14671770.1991.tb00690.x

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer US. https://doi.org/10.1007/978-1-4899-2271-7

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

DeVoe, S.E. & Iyengar, S.S. (2004). Managers' theories of subordinates: A cross-cultural examination of manager perceptions of motivation and appraisal of performance. *Organizational Behavior and Human Decision Processes*, *93*(1), 47–61. https://doi.org/10.1016/j.obhdp.2003.09.001

Dörnyei, Z. (1990). Conceptualizing motivation in foreign-language learning. *Language Learning*, *40*, 45–78. https://doi.org/10.1111/j.1467-1770.1990.tb00954.x

Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Lawrence Erlbaum Associates Publishers.

Dörnyei, Z. (2009). The L2 motivational self system. In Z. Dörnyei & E. Ushioda (Eds.), *Motivation, language identity and the L2 self* (pp. 9–42). Multilingual Matters. https://doi.org/10.21832/9781847691293-003

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot–based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, *56*(2), 455–463. https://doi.org/10.1111/j.0006-341X.2000.00455.x

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, *315*, 629–634. https://doi.org/10.1136/bmj.315.7109.629

Froiland, J. M., & Worrell, F. C. (2016). Intrinsic motivation, learning goals, engagement, and achievement in a diverse high school. *Psychology in the Schools*, *53*(3), 321–336. https://doi.org/10.1002/pits.21901

*Fryer, L. K., & Oga-Baldwin, W. L. Q. (2019). Succeeding at junior high school: Students' reasons, their reach, and the teaching that h(inders)elps their grasp. *Contemporary Educational Psychology*, *59*, 101778. https://doi.org/10.1016/j.cedpsych.2019.101778

Gardner, R. C. (1985). *Social psychology and second language learning: The role of attitudes and motivation*. Edward Arnold.

Gass, S., Loewen, S., & Plonsky, L. (2021). Coming of age: The past, present, and future of quantitative SLA research. *Language Teaching*, *54*(2), 245–258. https://doi.org/10.1017/S0261444819000430

Goetze, J., & Driver, M. (2022). Is learning really just believing? A meta-analysis of self-efficacy and achievement in SLA. *Studies in Second Language Learning and Teaching*, *12*(2), 233–259. https://doi.org/10.14746/ssllt.2022.12.2.4

Guay, F., Chanal, J., Ratelle, C. F., Marsh, H. W., Larose, S., & Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school children. *British Journal of Educational Psychology*, *80*(4), 711–735. https://doi.org/10.1348/000709910X499084

Henry, A., & Liu, M. (2023). Can L2 motivation be modelled as a self-system? A critical assessment. *System*, *119*, 103158. https://doi.org/10.1016/j.system.2023.103158

Henry, A., & Liu, M. (2024). Jingle–jangle fallacies in L2 motivational self system research: A response to Al-Hoorie et al. (2024). *Applied Linguistics*, *45*(4), 738–746. https://doi.org/10.1093/applin/amae041

Higgins, J. P., Thompson, S. G., & Deeks, J. J. (2003). Measuring inconsistency in meta-analyses. *BMJ*, *327*, 557–560. https://doi.org/10.1136/bmj.327.7414.557

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Hiver, P., & Al-Hoorie, A. H. (2020). Reexamining the role of vision in second language motivation: A preregistered conceptual replication of You, Dörnyei, and Csizér (2016). *Language Learning*, *70*(1), 48–102. https://doi.org/10.1111/lang.12371

Howard, J. L., Bureau, J. S., Guay, F., Chong, J. X. Y., & Ryan, R. M. (2021). Student motivation and associated outcomes: A meta-analysis from self-determination theory. *Perspectives On Psychological Science*, *16*(6), 1300–1323. https://doi.org/10.1177/1745691620966789

Hu, Y. (2026). Evaluating methodological and reporting practices of L2 meta-analyses: A second-order review. *Studies in Second Language Acquisition*, 1–30. https://doi.org/10.1017/S0272263126101764

Huang, F., & Zhang, H. (2025). The relationship between boredom and second language achievement: A multilevel meta-analysis. *Studies in Second Language Acquisition*, *47*(2), 488–511. doi:10.1017/S0272263125000142

Huedo-Medina, T. B., Sánchez-Meca, J., Marín-Martínez, F., & Botella, J. (2006). Assessing heterogeneity in meta-analysis: Q statistic or I^2 index? *Psychological Methods*, *11*(2), 193–206. https://doi.org/10.1037/1082-989X.11.2.193

In'nami, Y., Mizumoto, A., Plonsky, L., & Koizumi, R. (2022). Promoting computationally reproducible research in applied linguistics: Recommended practices and considerations. *Research Methods in Applied Linguistics*, *1*(3), 100030. https://doi.org/10.1016/j.rmal.2022.100030

Lamb, M. (2004). Integrative motivation in a globalizing world. *System*, *32*(1), 3–19. https://doi.org/10.1016/j.system.2003.04.002

Larsson, T., Plonsky, L., Sterling, S., Kytö, M., Yaw, K., & Wood, M. (2023). On the frequency, prevalence, and perceived severity of questionable research practices. *Research Methods in Applied Linguistics*, *2*(3), 100064. https://doi.org/10.1016/j.rmal.2023.100064

*Lee, J. (2020). Effects of linguistic and affective variables on middle school students' writing performance in the context of English as a foreign language: An approach using structural equation modeling. *Reading and Writing*, *33*(5), 1235–1262. https://doi.org/10.1007/s11145-019-10007-2

León, J., Núñez, J. L., & Liew, J. (2015). Self-determination and STEM education: Effects of autonomy, motivation, and self-regulated learning on high school math achievement. *Learning and Individual Differences*, *43*, 156–163. https://doi.org/10.1016/j.lindif.2015.08.017

Li, Q. (2014). Differences in the motivation of Chinese learners of English in a foreign and second language context. *System*, *42*, 451–461. https://doi.org/10.1016/j.system.2014.01.011

*Li, J. (2022). Adaptation and validation of the vocabulary learning motivation questionnaire for Chinese learners: A construct validation approach. *System*, *108*, 102853. https://doi.org/10.1016/j.system.2022.102853

Li, J., King, R. B., & Wang, C. (2022). Profiles of motivation and engagement in foreign language learning: Associations with emotional factors, academic achievement, and demographic features. *System*, *108*, 102820. https://doi.org/10.1016/j.system.2022.102820

Little, R., & Rubin, D. (2019). Statistical analysis with missing data, third edition (1st ed.). Wiley. https://doi.org/10.1002/9781119482260

*Liu, Y., Cheong, C. M., Ng, R. H. W., & Tse, S. K. (2024). The role of L1 self-efficacy in L2 reading comprehension: An exploration of L1–L2 cross-linguistic transfer. *International Journal of Bilingual Education and Bilingualism*, *27*(7), 883–897. https://doi.org/10.1080/13670050.2023.2290478

Liu, M., & Henry, A. (2025). Resolving the crisis in L2 motivational self system research: Constructive dialogue and argument-based validation. *Studies in Second Language Acquisition*. https://doi.org/10.1017/S0272263125000166

*Luo, Z., Shao, X., & Ma, X. (2024). Enhancing learners' performance in contest through knowledge mapping algorithm: The roles of artificial intelligence and blockchain in scoring and data integrity. *Journal of Organizational and End User Computing*, *36*(1), 1–21. https://doi.org/10.4018/JOEUC.336277

Masgoret, A.-M., & Gardner, R. C. (2003). Attitudes, motivation, and second language learning: A meta-analysis of studies conducted by Gardner and associates. *Language Learning*, *53*(S1), 167–210. https://doi.org/10.1111/1467-9922.00227

McClelland, N., & Larson-Hall, J. (2025). Why you should stop using the ideal L2 self and the L2 motivational self-system to measure motivation (reaction to Al-Hoorie, Hiver & In'nami, 2024). *Studies in Second Language Acquisition*, *47*(4), 1121–1132. https://doi.org/10.1017/S0272263124000779

Nagle, C. (2025). With "crisis" comes opportunity: Using invariance testing to understand and improve measurement models (a response to Al-Hoorie et al., 2024). *Studies in Second Language Acquisition*, *47*(4), 1184–1192. https://doi.org/10.1017/S0272263125100892

*Noels, K. A., Clément, R., & Pelletier, L. G. (1999). Perceptions of teachers' communicative style and students' intrinsic and extrinsic motivation. *The Modern Language Journal*, *83*(1), 23–34. https://doi.org/10.1111/0026-7902.00003

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Noels, K. A., Pelletier, L. G., Clément, R., & Vallerand, R. J. (2000). Why are you learning a second language? Motivational orientations and self-determination theory. *Language Learning*, *50*(1), 57–85. https://doi.org/10.1111/0023-8333.00111

Noels, K. A., Vargas Lascano, D. I., & Saumure, K. (2019). The development of self-determination across the language course. *Studies in Second Language Acquisition*, *41*(4), 1–31. https://doi.org/10.1017/S0272263118000189

Ntoumanis, N., & Standage, M. (2009). Morality in sport: A self-determination theory perspective. *Journal of Applied Sport Psychology*, *21*(4), 365–380. https://doi.org/10.1080/10413200903036040

Oga-Baldwin, W. L. Q., Al-Hoorie, A. H., & Hiver, P. (2025). Is "the L2 learning experience" simply intrinsic motivation by another name? A content validity analysis. *Studies in Second Language Acquisition*, *47*(4), 1170–1183. https://doi.org/10.1017/S0272263125100880

Oga-Baldwin, W. L. Q. (2024). Validation crisitunity: A response to Al-Hoorie, Hiver, and In'nami (*2024*). *Studies in Second Language Acquisition*, 1–13. https://doi.org/10.1017/s0272263124000597

Oga-Baldwin, W. L. Q., Abigail, P., & Kimberly, A. N. (2022). Taking root: Self-determination in language education. *The Journal for the Psychology of Language Learning*, *4*(1). https://www.jpll.org/index.php/journal/article/view/145

Oga-Baldwin, W. L. Q., & Fryer, L. K. (2018). Schools can improve motivational quality: Profile transitions across early foreign language learning experiences. *Motivation and Emotion*, *42*(4), 527–545. https://doi.org/10.1007/s11031-018-9681-7

Oga-Baldwin, W. L. Q., & Nakata, Y. (2015). Structure also supports autonomy: Measuring and defining autonomy-supportive teaching in Japanese elementary foreign language classes. *Japanese Psychological Research*, *57*(3), 167–179. https://doi.org/10.1111/jpr.12077

Oga-Baldwin, W. L. Q., & Nakata, Y. (2017). Engagement, gender, and motivation: A predictive model for Japanese young language learners. *System*, *65*, 151–163. https://doi.org/10.1016/j.system.2017.01.011

Oga-Baldwin, W. L. Q., & Nakata, Y. (2020). How teachers promote young language learners' engagement: Lesson form and lesson quality. *Language Teaching for Young Learners*, *2*(1), 101–130. https://doi.org/10.1075/ltyl.19009.oga

Oga-Baldwin, W. L. Q., Nakata, Y., Parker, P., & Ryan, R. M. (2017). Motivating young language learners: A longitudinal model of self-determined motivation in elementary school foreign language classes. *Contemporary Educational Psychology*, *49*, 140–150. https://doi.org/10.1016/j.cedpsych.2017.01.010

Oxford, R., & Shearin, J. (1994). Language learning motivation: Expanding the theoretical framework. *The Modern Language Journal*, *78*, 12–27. https://doi.org/10.1111/j.1540-4781.1994.tb02011.x

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Systematic Reviews*, *10*(1), 89. https://doi.org/10.1186/s13643-021-01626-4

Papi, M., & Teimouri, Y. (2014). Language learner motivational types: A cluster analysis study. *Language Learning*, *64*(3), 493–525. https://doi.org/10.1111/lang.12065

Papi, M., & Teimouri, Y. (2025). Manufactured crisis: A response to Al-Hoorie et al. (2024). *Studies in Second Language Acquisition*, *47*(4), 1096–1107. https://doi.org/10.1017/S0272263124000494

Peterson, R. A., & Brown, S. P. (2005). On the use of beta coefficients in meta-analysis. *Journal of Applied Psychology*, *90*(1), 175–181. https://doi.org/10.1037/0021-9010.90.1.175

Plonsky, L. (2024). Study quality as an intellectual and ethical imperative: A proposed framework. *Annual Review of Applied Linguistics*, *44*, 4–18. https://doi.org/10.1017/S0267190524000059

Plonsky, L., & Oswald, F. L. (2014). How big is "big"? Interpreting effect sizes in L2 research. *Language Learning*, *64*(4), 878–912. https://doi.org/10.1111/lang.12079

Ryan, R. M. (Ed.). (2023). *The Oxford handbook of self-determination theory*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780197600047.001.0001

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (Eds.). (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press. https://doi.org/10.1521/978.14625/28806

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

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Siddikova, N. (2023). The motivation as a contributing factor in language learning. *Current Research Journal of Pedagogic*, *4*(2), 43–54. https://doi.org/10.37547/pedagogics-crjp-04-02-07

Spinath, B., & Spinath, F. M. (2005). Development of self-perceived ability in elementary school: The role of parents' perceptions, teacher evaluations, and intelligence. *Cognitive Development*, *20*, 190–204. https://doi.org/10.1016/j.cogdev.2005.01.001

Stang, A. (2010). Critical evaluation of the Newcastle-Ottawa scale for the assessment of the quality of nonrandomized studies in meta-analyses. *European Journal of Epidemiology*, *25*(9), 603–605.https://doi.org/10.1007/s10654-010-9491-z

Sterne, J. A. C., & Egger, M. (2001). Funnel plots for detecting bias in meta-analysis. *Journal of Clinical Epidemiology*, *54*(10), 1046–1055. https://doi.org/10.1016/S0895-4356(01)00377-8

Sudina, E. (2021). Study and scale quality in second language survey research, 2009–2019: The case of anxiety and motivation. *Language Learning*, *71*, 1149–1193. https://doi.org/10.1111/lang.12468

Sugita-McEown, M., Noels, K. A., & Chaffee, K. E. (2014). At the interface of the socio-educational model, self-determination theory and the L2 motivational self system models. In K. Csizér & M. Magid (Eds.), *The impact of self-concept on language learning* (pp. 19–50). Multilingual Matters. https://doi.org/10.21832/9781783092383-004

*Sugita-McEown, M., Noels, K. A., & Saumure, K. D. (2014). Students' self-determined and integrative orientations and teachers' motivational support in a Japanese as a foreign language context. *System*, *45*, 227–241. https://doi.org/10.1016/j.system.2014.06.001

Sugita-McEown, M., & Oga-Baldwin, W. L. Q. (2019). Self-determination for all language learners: New applications for formal language education. *System*, *86*, 102124. https://doi.org/10.1016/j.system.2019.102124

*Sun, B., O'Brien, B. A., Arshad, N. A. B., & Sun, H. (2024). The contribution of intrinsic motivation and home literacy environment to Singaporean bilingual children's receptive vocabulary. *Reading and Writing*, *37*(7), 1849–1877. https://doi.org/10.1007/s11145-022-10409-9

*Taboada Barber, A., Klauda, S. L., & Stapleton, L. M. (2020). Cognition, engagement, and motivation as factors in the reading comprehension of dual language learners and English speakers: Unified or distinctive models? *Reading and Writing*, *33*(9), 2249–2279. https://doi.org/10.1007/s11145-020-10034-4

Tahmouresi, S., & Papi, M. (2021). Future selves, enjoyment and anxiety as predictors of L2 writing achievement. *Journal of Second Language Writing*, *53*, 100837. https://doi.org/10.1016/j.jslw.2021.100837

Takahashi, C., & Im, S. (2020). Comparing self-determination theory and the L2 motivational self system and their relationships to L2 proficiency. *Studies in Second Language Learning and Teaching*, *10*(4), 673–696. https://doi.org/10.14746/ssllt.2020.10.4.2

Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., & Koestner, R. (2014). A self-determination theory approach to predicting school achievement over time: The unique role of intrinsic motivation. *Contemporary Educational Psychology*, *39*(4), 342–358. https://doi.org/10.1016/j.cedpsych.2014.08.002

*Tsang, A. (2025). Relationships between formal and informal input, listening motivation, and listening proficiency among young EFL learners in Hong Kong. *International Review of Applied Linguistics in Language Teaching*, 0–19. https://doi.org/10.1515/iral-2024-0250

Viechtbauer, W. (2010). Conducting Meta-Analyses in R with the metafor Package. *Journal of Statistical Software*, *36*(3), 1–48. https://doi.org/10.18637/jss.v036.i03

*Wang, Y. N., & Low, H. M. (2024). Effects of motivation on Chinese EFL students to read English text on social media. *Education and Information Technologies*, *29*(6), 7465–7486. https://doi.org/10.1007/s10639-023-12040-9

*Yau, J. C. (2022). Interface among motivation, strategy application, comprehension, and attribution: An examination of Taiwanese adolescent readers of English-as-a-foreign-language. *English Teaching & Learning*, *46*(2), 101–114. https://doi.org/10.1007/s42321-021-00090-6

Yeung, A. S., Lau, S., & Nie, Y. (2011). Primary and secondary students' motivation in learning English: Grade and gender differences. *Contemporary Educational Psychology*, *36*(3), 246–256. https://doi.org/10.1016/j.cedpsych.2011.03.001

Yousefi, M., & Mahmoodi, M. H. (2022). The L2 motivational self-system: A meta-analysis approach. *International Journal of Applied Linguistics*, *32*(2), 274–294. https://doi.org/10.1111/ijal.12416

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