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Pathways of entrepreneurial passion: An exploratory examination of the theory of entrepreneurial passion with meta-analytical structural equation modeling

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Abstract

The theory of entrepreneurial passion states that passion fosters entrepreneurial behaviors and entrepreneurial effectiveness by the emergence of goal-related cognitions. To provide an exploratory examination of the theory, we applied meta-analytical structural equation modeling (MASEM) based on 124 primary studies and 43,331 individuals. In addition, we investigated the role of institutional, economic, and cultural boundary conditions to gain insights into the theory's generalizability. We found that entrepreneurial passion showed significant effects on entrepreneurial effectiveness that were mediated by the theory's hypothesized self-regulatory pathways of cognitions and behaviors. Notably, supplemental cognitions like entrepreneurial self-efficacy showed stronger mediation effects than the goal-related cognitions originally proposed by the theory of entrepreneurial passion. Moreover, the analyses of boundary conditions demonstrated a stronger effect of entrepreneurial passion in contexts characterized by higher obstacles to start a business, whereas the overall set of relationships showed remarkable robustness

across contexts. Taken together, our exploratory analysis supports the theory of entrepreneurial passion and identifies supplemental entrepreneurial cognitions as additional mediators and contextual factors as boundary conditions of the theory of entrepreneurial passion.

KEYWORDS

cognitions, entrepreneur, entrepreneurial behavior, entrepreneurial passion, meta-analysis

INTRODUCTION

Entrepreneurial passion, which is formed by positive feelings and entrepreneurial identity (Cardon et al., 2009), is an important factor in understanding how entrepreneurs achieve success (Newman et al., 2021; Zhao & Liu, 2023). Indeed, entrepreneurial passion is related to entrepreneurial intention (e.g., Biraglia & Kadile, 2017), promotes entrepreneurs' persistence (e.g., Cardon & Kirk, 2015), and has positive effects on venture growth (e.g., Adomako et al., 2023), innovation (e.g., Kiani, Yang, et al., 2021), and success (e.g., Chen et al., 2022).

Cardon et al. (2009) proposed a theory of entrepreneurial passion to explain how entrepreneurial passion contributes to success. According to their theory, entrepreneurial passion influences three broader categories of constructs, including goal-related cognitions, entrepreneurial behaviors, and ultimately entrepreneurial effectiveness. These categories form a sequential mediation, describing the self-regulatory cognitive and behavioral pathways through which entrepreneurial passion exerts its effects. Recent meta-analyses have investigated specific aspects of the theory of entrepreneurial passion. For example, Zhao and Liu (2023) compared different operationalizations of entrepreneurial passion and examined their effects on entrepreneurial outcomes, focusing on measurement approaches rather than the underlying theoretical structure. Pollack et al. (2020) analyzed passion at work by examining the effects of general passion, dualistic passion, and role-based passion on work-related variables, without specifically addressing entrepreneurial passion as a distinct theoretical construct. Riar et al. (2025) examined the role identities outlined by Cardon et al. (2009) and their direct antecedents and outcomes but did not assess the theory's proposed pathways leading to effectiveness. Importantly, all three prior meta-analytical studies rely on bivariate approaches, examining direct effects of or on entrepreneurial passion. Although informative, such approaches do not allow testing the core theoretical proposition of the theory of entrepreneurial passion, which describes self-regulatory pathways through which entrepreneurial passion links to entrepreneurial effectiveness. As a result, existing meta-analytical evidence remains fragmented and does not provide a holistic and theory-consistent examination of *how* the effect of entrepreneurial passion unfolds through cognitive and behavioral pathways. Accordingly, despite the theory's prominence and widespread use in the literature (Newman et al., 2021), there is no meta-analytic examination of the proposed mediating structure. In particular, the self-regulatory pathways assumed to connect entrepreneurial passion and effectiveness have not been examined within a comprehensive and integrated framework.

Furthermore, the theory's exclusive focus on the three proposed goal-related cognitions of goal challenge, goal commitment, and goal striving appears too narrow to fully capture the

underlying mechanisms. Indeed, a growing body of entrepreneurship research points to supplemental cognitions (e.g., self-efficacy and intentions) that are linked to entrepreneurial passion (e.g., Biraglia & Kadile, 2017; Turner & Gianiodis, 2018). Thus, the theory may benefit from considering a broader set of cognitive mechanisms that explain how entrepreneurial passion translates into entrepreneurial behaviors and effectiveness. Finally, Cardon et al.'s (2009) theory does not specify the boundary conditions under which the proposed relationships hold. Yet, prior research highlights that individual-level characteristics, such as entrepreneurial passion, may operate differently depending on institutional, economic, or cultural contexts (Chacar et al., 2010; Schmutzler et al., 2019; Stephan, 2021). Understanding boundary conditions is important for clarifying limitations and the generalizability of a theory (Arend et al., 2015). Taken together, what is missing is (1) a comprehensive, theory-driven, and integrated empirical examination of the self-regulatory pathways underlying the full mediation model proposed by Cardon et al. (2009), including a broader set of potential cognitive mechanisms, and (2) an examination of the boundary conditions influencing the effects of entrepreneurial passion on key outcomes.

In this study, we contribute to the entrepreneurial passion literature through a meta-analytical structural equation modeling (MASEM) integrating the results of 124 primary studies published in 117 articles ($N = 43{,}331$). We pursue two main objectives: first, examining the sequential mediation proposed by the theory of entrepreneurial passion and, second, evaluating the theory's generalizability by examining potential boundary conditions. Regarding the first objective, we build on the comprehensive body of primary studies on entrepreneurial passion and conduct an exploratory test of the theory of entrepreneurial passion. Specifically, we examine *how* entrepreneurial passion translates into entrepreneurial effectiveness and provide an empirically grounded account of the theory's proposed self-regulatory pathways. In line with the categories proposed by Cardon et al. (2009), our exploratory analysis focuses on the higher order categorical level of the model instead of the construct level, examining how entrepreneurial passion affects entrepreneurial behaviors and effectiveness through cognitions. Furthermore, we are stretching the scope of Cardon et al.'s (2009) theory by including supplemental entrepreneurial cognitions beyond the goal-related cognitions originally proposed. Particularly, we incorporate entrepreneurial self-efficacy and entrepreneurial intentions as supplemental cognitive mechanisms through which entrepreneurial passion operates. We note that our main analyses are exploratory in nature because we examine relationships at the category level rather than the construct level by aggregating theoretically related but conceptually distinct constructs. By adopting a category-level perspective, we capture a comprehensive understanding of the self-regulatory pathways. This approach is particularly valuable in an early, theory-driven phase of systematic integration, as it facilitates the development of a coherent theoretical sequence while balancing broader and more fine-grained forms of conceptualization to "remain both relevant and scientific" (Hirsch & Levin, 1999, p. 200). Regarding the second objective, we assess the theory's generalizability by examining boundary conditions in terms of institutional, economic, and cultural characteristics at the country level. We thus provide evidence for the generalizability of the relationships between entrepreneurial passion and the outcome variables, demonstrating under which conditions the theory's predictive validity is stronger or weaker (Figure 1).

Our findings support the theory of entrepreneurial passion, while also suggesting a meaningful stretch and insight into the psychological mechanisms linking entrepreneurial passion to behavior and success. First, our results are in line with the theory's core assumption: Entrepreneurial passion indirectly influences entrepreneurial behaviors and entrepreneurial

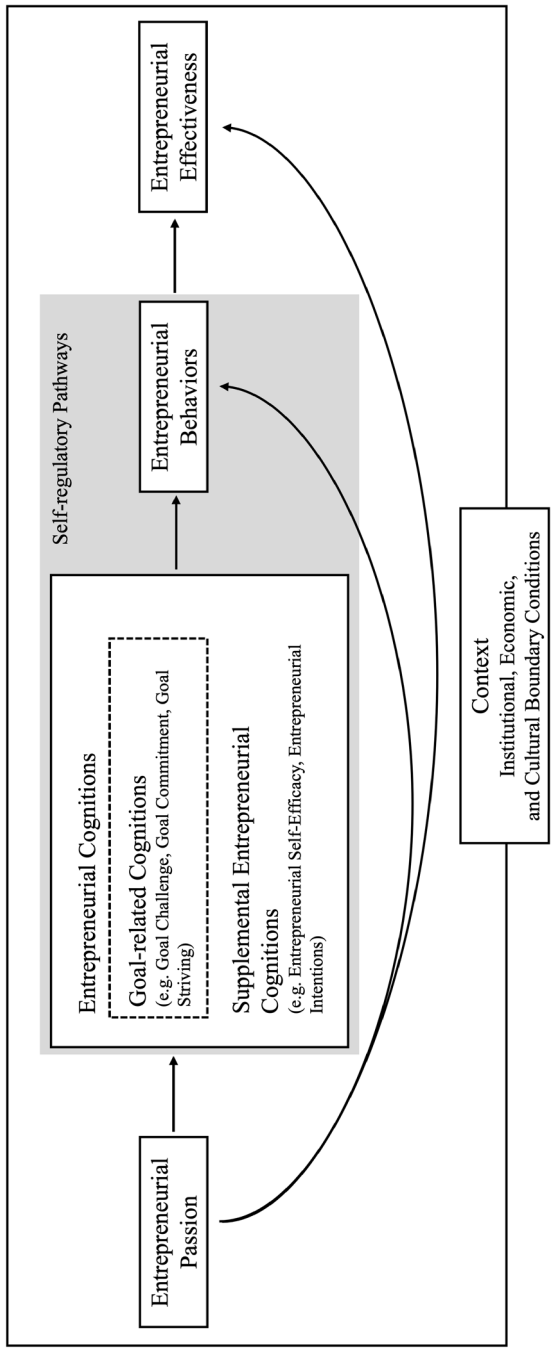

FIGURE 1 Conceptual model.

effectiveness via entrepreneurial cognitions. However, we find stronger support for a partial mediation model, suggesting additional direct effects of entrepreneurial passion on entrepreneurial behaviors and of entrepreneurial cognitions on entrepreneurial effectiveness. Although the effect of entrepreneurial passion on behaviors is consistent with the theoretical propositions (Cardon et al., 2009), our findings reveal a direct effect of entrepreneurial cognitions on effectiveness that has not been explicitly incorporated in the original model. Thus, the original conceptualization of the theory may not yet fully account for all mediating mechanisms. Accordingly, we contribute to a broader conceptualization that identifies which of the relationships between the categories proposed by Cardon et al. (2009) are empirically supported and which need to be added. Moreover, our findings point to considering a broader set of cognitions, as entrepreneurial passion exerts stronger effects through supplemental entrepreneurial cognitions (e.g., entrepreneurial self-efficacy) than through the original goal-related cognitions. This finding provides an advanced understanding of the pathways underlying the theory and suggests that the framework by Cardon et al. (2009) should be refined to incorporate a broader set of cognitive mechanisms through which entrepreneurial passion may operate. Second, our examination of boundary conditions reveals that the relevance of entrepreneurial passion varies across contexts. In environments where institutional and economic factors impede entrepreneurial activity, the effect of entrepreneurial passion becomes more pronounced, suggesting that entrepreneurial passion may serve as a compensatory mechanism when external support is lacking. Taken together, our study advances the theoretical understanding of the pathways clarifying *how* entrepreneurial passion drives entrepreneurial success as well as the conditions under which this is likely to occur.

THEORETICAL BACKGROUND

Already in the mid-20th century, Schumpeter (1951) discussed passion as a way to explain entrepreneurial behaviors and success. Over the past decades, entrepreneurial passion research has gained increasing attention. After Baum and Locke (2004) examined the positive effects of passion for work, Cardon et al. (2009) introduced a conceptualization of *entrepreneurial passion* that laid the foundation for a rapidly expanding field (Newman et al., 2021; Riar et al., 2025; Zhao & Liu, 2023). Cardon et al. (2009) defined entrepreneurial passion along two dimensions: entrepreneurial identity, reflecting the importance and salience of entrepreneurial activities, and intense positive feelings, such as enthusiasm or excitement. They distinguished three entrepreneurial role identities—founder, inventor, and developer—and noted that entrepreneurs often combine multiple identities and that transitions are fluid (Cardon et al., 2009). Indeed, research suggested that the three identities are strongly intercorrelated (Zhao & Liu, 2023). Given the conceptual overlap, we focus in this study on entrepreneurial passion as an overarching construct rather than specifically delineated role identities.

Understanding the pathways of entrepreneurial passion

Research showed that differences in entrepreneurial behavior, such as risk-taking or perseverance, can be explained by entrepreneurial passion (Cardon et al., 2009). Studies have demonstrated that entrepreneurial passion affects a wide range of outcomes, including intentions to start a business (e.g., Biraglia & Kadile, 2017; Turner & Gianiodis, 2018), the willingness to exert

effort and perseverance (e.g., Cardon & Kirk, 2015; Tripathi et al., 2020), and improvements in firm performance and success (e.g., Chen et al., 2022; Lex et al., 2022). In their conceptual study, Cardon et al. (2009, p. 517) described entrepreneurial passion as "full-blown emotional experiences" that trigger cognitive processes and initiate entrepreneurial behaviors in support of entrepreneurial goals. Accordingly, cognitive processes are a result of entrepreneurial passion and a psychological mechanism driving subsequent entrepreneurial behaviors leading to entrepreneurial effectiveness.

Cardon et al. (2009) drew on Carver and Scheier's (1998) self-regulation theory as a psychological framework to explain how entrepreneurial passion affects entrepreneurial effectiveness through cognitive and behavioral pathways. According to the theory of entrepreneurial passion, three specific self-regulatory or goal-related cognitions in terms of goal challenge, goal commitment, and goal striving explain how passion translates into entrepreneurial outcomes. However, insights from self-regulation theory suggest that cognitions can be stretched beyond the three goal-related cognitions emphasized by Cardon et al. (2009), as self-regulation operates through multiple, functionally distinct cognitive processes (Neal et al., 2017). Goal-directed action relies on forward thinking and self-regulatory processes, which in turn are supported by a broad set of cognitions, including mechanisms that regulate action and effort allocation like self-efficacy and intentions (Karoly, 1993). Self-efficacy represents a central self-regulatory mechanism that pertains to evaluations of whether a desired goal is attainable and therefore functions as a regulator of action (Bandura, 1989). It serves as an important component by guiding the adjustment of effort and action (Lord et al., 2010; Neal et al., 2017). Furthermore, intentions constitute a central self-regulatory mechanism for the implementation of behavior, as they prioritize a specific course of action. Forming intentions facilitates self-regulatory processes to maintain focus on implementing the intention while inhibiting alternatives, ultimately supporting the enactment of behavior (Neal et al., 2017).

Building on these notions, we suggest that relevant entrepreneurial cognitions are not limited to the goal-related cognitions proposed by Cardon et al. (2009)—goal challenge, goal commitment, and goal striving—as these reflect only part of the factors described by self-regulation theory (Inzlicht et al., 2021). Instead, research suggests that supplemental entrepreneurial cognitions also shape how entrepreneurial passion influences entrepreneurial behaviors and effectiveness (e.g., Biraglia & Kadile, 2017; Hou et al., 2019; Li et al., 2020). Self-regulation theory conceptualizes cognition as a broad and multifaceted system encompassing numerous cognitive mechanisms (Neal et al., 2017). Accordingly, our analysis includes a wide range of entrepreneurial cognitions—such as entrepreneurial self-efficacy (Biraglia & Kadile, 2017), intentions, and attitudes (Karimi, 2020)—that have been examined as outcomes of entrepreneurial passion. As Karoly (1993, p. 38) noted, self-regulatory cognitions include "the complete spectrum of goal-referent thinking, including knowledge, attitudes, and attributions relevant to all proximal volitional regulators." Adopting this broader perspective, we propose that supplemental entrepreneurial cognitions are essential for a comprehensive understanding of the pathways through which entrepreneurial passion exerts its effects.

Entrepreneurial passion and entrepreneurial cognitions

Consistent with the theory of entrepreneurial passion, research shows that passion triggers cognitions, which support goal attainment by activating processes that enable entrepreneurs to pursue their objectives (Cardon et al., 2009). Such cognitions can reflect goal setting but also

entrepreneurial intention or interest (e.g., Biraglia & Kadile, 2017; Mueller et al., 2017). We argue that these cognitions involve a broad set of self-regulatory mechanisms that support action initiation, effort allocation, and perseverance (Lord et al., 2010; Neal et al., 2017). We subsume this broad set of cognitions under the term entrepreneurial cognitions, defined by R. K. Mitchell et al. (2002, p. 97) as "the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth." According to this definition, entrepreneurial self-efficacy, intentions, or attitudes are entrepreneurial cognitions as they reflect entrepreneurs' perceived feasibility, prioritization, and evaluative judgments that regulate entrepreneurial action across different stages of the venture process (J. R. Mitchell et al., 2021; R. K. Mitchell et al., 2002).

Entrepreneurial passion plays a central role in shaping cognitive processes that guide entrepreneurial behavior (Cardon et al., 2009). Through intense positive feelings and identity centrality, entrepreneurial passion fosters both goal-related cognitions and supplemental entrepreneurial cognitions. Goal-related cognitions provide orientation and foster motivation, which in turn drive entrepreneurial behavior and venture growth (Drnovšek et al., 2016). Moreover, supplemental entrepreneurial cognitions including self-efficacy and intentions enhance the recognition and pursuit of opportunities (J. R. Mitchell et al., 2021; R. K. Mitchell et al., 2002). Prior studies confirm that cognitions are activated by entrepreneurial passion and initiate entrepreneurial behaviors (Biraglia & Kadile, 2017; Lex et al., 2022). Therefore, we derive the following hypothesis:

H1. Entrepreneurial passion positively influences entrepreneurial cognitions.

Entrepreneurial passion and entrepreneurial behaviors

According to Cardon et al. (2009), the experience of entrepreneurial passion creates the impetus for entrepreneurial behavior. This impetus arises from positive feelings that provide energy for action, whereas the identity component of entrepreneurial passion determines which behaviors are enacted. Entrepreneurial behaviors manifest in creative problem solving (i.e., innovation and the development of new ideas), persistence, and absorption (i.e., immersion in one's own work). Therefore, following Cardon et al. (2009), we define entrepreneurial behaviors as activities that contribute to the development of innovative and useful ideas or practices, such as innovative behavior (Pryor et al., 2024), general effort (Zhu et al., 2022), and persistence (Kiani, Ali, et al., 2021), or behaviors that reflect engaging in entrepreneurial work (Kosa & Mohammed, 2017). They refer to activities and behaviors aimed at achieving an entrepreneurial goal or outcome (Cardon et al., 2009). Research consistently shows that entrepreneurial passion has a direct positive effect on such entrepreneurial behaviors (e.g., Bao et al., 2017; Cardon & Kirk, 2015). For example, Cardon and Kirk (2015) demonstrated that entrepreneurial passion promotes persistence, regardless of how challenging the process is. This effect extends beyond persistence to a range of entrepreneurial behaviors, including exploratory, exploitative, organizational, and product innovation (Ahsan et al., 2022; Cai et al., 2020; Li et al., 2022).

Furthermore, research indicates that entrepreneurial passion also indirectly influences entrepreneurial behaviors through entrepreneurial cognitions (Kiani, Ali, et al., 2021; Montiel-Campos, 2017; Zollo et al., 2021). By activating cognitive mechanisms, such as goal commitment, entrepreneurial self-efficacy, or intentions, entrepreneurial passion initiates entrepreneurial behaviors (Biraglia & Kadile, 2017; Drnovšek et al., 2016). For example, Kiani, Ali, et al. (2021) showed that the interplay of entrepreneurial passion and entrepreneurial self-

efficacy promotes entrepreneurial persistence, highlighting the role of entrepreneurial passion as a driver of entrepreneurial cognitions and subsequent entrepreneurial behaviors. Similarly, Lex et al. (2022) found that entrepreneurial passion strengthens self-efficacy, which fosters effort and persistence. Thus, we derive the following hypothesis:

> **H2.** Entrepreneurial passion positively influences entrepreneurial behaviors through entrepreneurial cognitions.

Entrepreneurial passion and entrepreneurial effectiveness

Entrepreneurial cognitions and entrepreneurial behaviors influence entrepreneurial effectiveness in terms of opportunity recognition, venture creation, or venture growth (Cardon et al., 2009). Entrepreneurial effectiveness according to Cardon et al. (2009) is defined as the outcomes of entrepreneurial activity, reflected in innovation and perception of opportunities (Zhu et al., 2024), the general development of the venture through progress and change (Tripathi et al., 2020), and overall growth in terms of performance, sales, revenue, and related indicators (Lex et al., 2022). The underlying driver is the experience of entrepreneurial passion: Entrepreneurs who feel passionate about their activities engage in entrepreneurial behaviors that enhance entrepreneurial effectiveness (Chen et al., 2022). For example, Kiani, Ali, et al. (2021) showed that entrepreneurs who are passionate and experience high states of self-efficacy show higher persistence, which in turn leads to higher entrepreneurial effectiveness, for example, in the form of venture growth. In general, the rationale of the theory of entrepreneurial passion is that passion triggers cognitive and behavioral pathways that ultimately increase entrepreneurial effectiveness in the form of venture growth, innovation, and overall entrepreneurial performance and success (Drnovšek et al., 2016; Hatak et al., 2021; Kiani et al., 2020; Lex et al., 2022). In line with this theoretical rationale, we hypothesize:

> **H3.** Entrepreneurial passion positively influences entrepreneurial effectiveness through entrepreneurial cognitions and entrepreneurial behaviors.

Investigating potential boundary conditions of the theory of entrepreneurial passion

Little is known about the boundary conditions of the theory of entrepreneurial passion and the extent to which the theory of entrepreneurial passion can be applied to different contexts. In order to understand the boundaries and to make progress in understanding the generalizability of the theory, we explore several boundary conditions. Empirical research indicates that cross-national variations in entrepreneurial environments are largely shaped by formal institutions and levels of economic development (Stephan, 2022). However, the ways in which entrepreneurship is practiced, as well as its intensity, differ markedly across countries, and these variations can only be partially explained by institutional and economic conditions (Stephan, 2022). Cultural factors also play a pivotal role, underscoring the multifaceted nature of entrepreneurship (Krebs et al., 2025). Consequently, the entrepreneurship literature suggests that country-specific conditions, in particular institutional, economic, and cultural factors, influence the mechanisms underlying entrepreneurial effectiveness (Stephan, 2022). In this study, we focus

on these three contextual dimensions as they enable a comprehensive cross-country comparison (Stephan, 2022). We formulate a research question addressing the influence of institutional, economic, and cultural factors on the relationships proposed by the theory of entrepreneurial passion.

Institutional boundary conditions

Considering institutional boundary conditions, a range of contextual factors can either facilitate or constrain entrepreneurial behaviors and performance, and their impact often depends on the individual's connection with the surrounding environment (Schmutzler et al., 2019). For example, Chacar et al. (2010) found that stricter regulations, such as antitrust laws, have a negative effect on persistence, whereas a high degree of labor market flexibility has a positive effect. Other studies showed that the proportion of entrepreneurs willing to start a business is lower when institutional incentives for a successful market entry are lacking (Meyer et al., 2009). Political–institutional instruments can be employed to stimulate entrepreneurial activity by actively promoting entrepreneurship as a viable career path (Schmutzler et al., 2019). Conversely, certain institutional arrangements can impede entrepreneurial growth, including costly market entry barriers or limited access to financial resources (Chacar et al., 2010). We argue that the role of entrepreneurial passion differs under different institutional conditions—depending on the institutional instruments and the degree to which these are accessible to individuals. When society does not create incentives to start a business (e.g., startup-friendly laws), entrepreneurial passion is likely to become more important. The reason is that intrinsic drivers, such as entrepreneurial passion, can compensate for a lack of supportive institutional conditions and facilitate entrepreneurial behaviors. In our study, we refer to the World Bank Group (2025) indicators to investigate whether institutional factors modify the effect of entrepreneurial passion on the outcome variables. To provide a broad overview of institutional boundary conditions, we examine the influence of intangible and basic conditions, that is, the *rule of law*, *logistic performance index*, *regulatory quality*, and *access to electricity*.

Economic boundary conditions

Over the past few decades, a considerable body of research has examined the impact of entrepreneurship on country-specific conditions. Early studies concentrated primarily on economically advanced nations in Europe and North America (Bruton et al., 2008). Albeit economic boundary conditions can pose significant obstacles to entrepreneurship, more recent research has increasingly shifted its attention to economically weaker countries (e.g., Hain et al., 2016; Sautet, 2013). Weak economic environments, such as low levels of foreign direct investment or limited access to alternative sources of financing, create financial and competitive disadvantages that hinder entrepreneurial effectiveness (Chacar et al., 2010). Countries with weaker economic and institutional frameworks often inspire less confidence among investors, leading to lower investment flows and, consequently, weaker economic development (Hain et al., 2016). By contrast, access to financing can foster entrepreneurship, as entrepreneurs with multiple financing options may require less effort and perseverance to work on their business (Santos et al., 2020). However, people in economically weaker countries are frequently compelled to pursue entrepreneurship as a creative response to these constraints

(Sautet, 2013). In such contexts, entrepreneurial passion is likely to play a critical role, compensating for the lack of external support and driving individuals to act entrepreneurially despite unfavorable conditions. Accordingly, we argue that the availability of financial resources directly shapes entrepreneurial outcomes: When financing is abundant, entrepreneurs are more likely to engage in entrepreneurship and achieve higher performance levels, regardless of individual factors such as entrepreneurial passion (Chacar et al., 2010). In contrast, when the availability of financial support is weaker, the role of individual factors such as entrepreneurial passion becomes increasingly decisive. To capture such contextual effects, we draw on the World Bank Group (2025) indicators that represent economic conditions and investigate the moderation of *gross domestic product (GDP) per capita* and the *level of foreign direct investment* on the influence of entrepreneurial passion on entrepreneurial cognitions, behaviors, and effectiveness.

Cultural boundary conditions

Cultural boundary conditions primarily reflect the societal context in terms of "shared values, norms, and practices of a society" (Stephan, 2022, p. 279). In recent years, research on culture has focused on the dimensions proposed by the Global Leadership and Organizational Behavior Effectiveness (GLOBE; House et al., 2001) project. Building on the GLOBE dimensions of *performance orientation*, *future orientation*, *uncertainty avoidance*, *ingroup collectivism*, *institutional collectivism*, and *assertiveness*, we examine how cultural boundary conditions shape the influence of entrepreneurial passion on entrepreneurial cognitions, entrepreneurial behaviors, and entrepreneurial effectiveness. Prior studies have demonstrated that these dimensions explain cross-national differences in entrepreneurship and that cultural variation in ideals and goals constitutes a decisive factor, as cultural values must align with behavior to support entrepreneurship (Stephan & Pathak, 2016). For example, Schmutzler et al. (2019) showed that countries with high institutional individualism are more likely to foster entrepreneurial intentions than countries with high institutional collectivism. It is generally assumed that cultures with high individualism encourage more entrepreneurial activity because individualistic values are highly valued, thereby increasing engagement in entrepreneurship (Stephan, 2022). Yet, Stephan and Pathak (2016) showed that both individualism and collectivism can be relevant for entrepreneurship, highlighting that distinct cultural factors exert different, sometimes complementary, effects. Similarly, Stephan and Uhlaner (2010) demonstrated that a performance-oriented culture fosters the development of efficient formal institutions, which in turn enhance entrepreneurial opportunities. Building on this evidence, we assume that supportive cultural contexts (e.g., high performance orientation) facilitate entrepreneurship, whereas under more restrictive cultural conditions (e.g., high uncertainty avoidance), individual drivers such as entrepreneurial passion become more critical.

Taken together, prior research suggests that institutional, economic, and cultural contexts represent crucial boundary conditions that may shape the role of entrepreneurial passion. Building on this discussion, we formulate the following research question:

To what extent is the influence of entrepreneurial passion on entrepreneurial cognitions, entrepreneurial behaviors, and entrepreneurial effectiveness affected by institutional, economic, or cultural conditions?

METHOD

Literature search

In order to ensure a comprehensive and complete literature search, we used several methods to access the literature on entrepreneurial passion: First, we used the databases EBSCO, ScienceDirect, and Web of Science with the search terms "entrepr*" and "passion" in the title and abstract. Second, we scanned the reference lists of several conceptual articles to identify additional studies. Third, we contacted the Academy of Management and Babson College for overviews of conference proceedings, as well as all authors who were already included in our literature overview, to search for additional working papers and unpublished work. Four authors were able to provide unpublished work or conference papers, of which only two met our criteria. Fourth, we contacted the authors without a correlation table, of which three authors responded and provided the necessary information. Figure 2 represents the search process.

To ensure that the dataset reflects the most up-to-date evidence, we updated the sample following the initial extraction conducted in December 2024, which comprised 108 studies (k) drawn from 101 articles (n). As a result of the update, the final dataset, based on our literature search completed in July 2025, includes 124 studies (k) from 117 articles (n). Accordingly, the sample was expanded by 16 additional studies over a 7-month period.

Inclusion and exclusion criteria

We included quantitative academic articles, both published and unpublished, as well as conference proceedings. All included articles referred to entrepreneurial passion according to Cardon et al. (2009, 2013) and used the items of Cardon et al. (2013) to measure entrepreneurial passion, to provide an exploratory examination of the conceptual model according to Cardon et al. (2009) and its boundary conditions. We excluded articles that examined passion perceived by others, teams' entrepreneurial passion, if not included at the individual level, or articles that referred to harmonious and/or obsessive passion (Vallerand et al., 2003) and articles that developed their own scales. Articles that used the construct of entrepreneurial passion for a non-entrepreneurial context (e.g., general work passion) were also excluded, as were articles in languages other than English. Finally, we had to discard articles that met our criteria but did not examine any of our outcome variables in terms of entrepreneurial cognitions, entrepreneurial behaviors, or entrepreneurial effectiveness—for instance, risk preference, experience of negative affect, fear of failure, or entrepreneurial role model. Our final sample included 124 primary studies (k) from 117 articles (n, see Table A1 in Appendix S1).

Variable coding

For our conceptual model, we referred to the outcomes of the theory of entrepreneurial passion by Cardon et al. (2009), that is, entrepreneurial cognitions, entrepreneurial behaviors, and entrepreneurial effectiveness. In the following, we describe how the variables of the primary studies were assigned to the main categories.

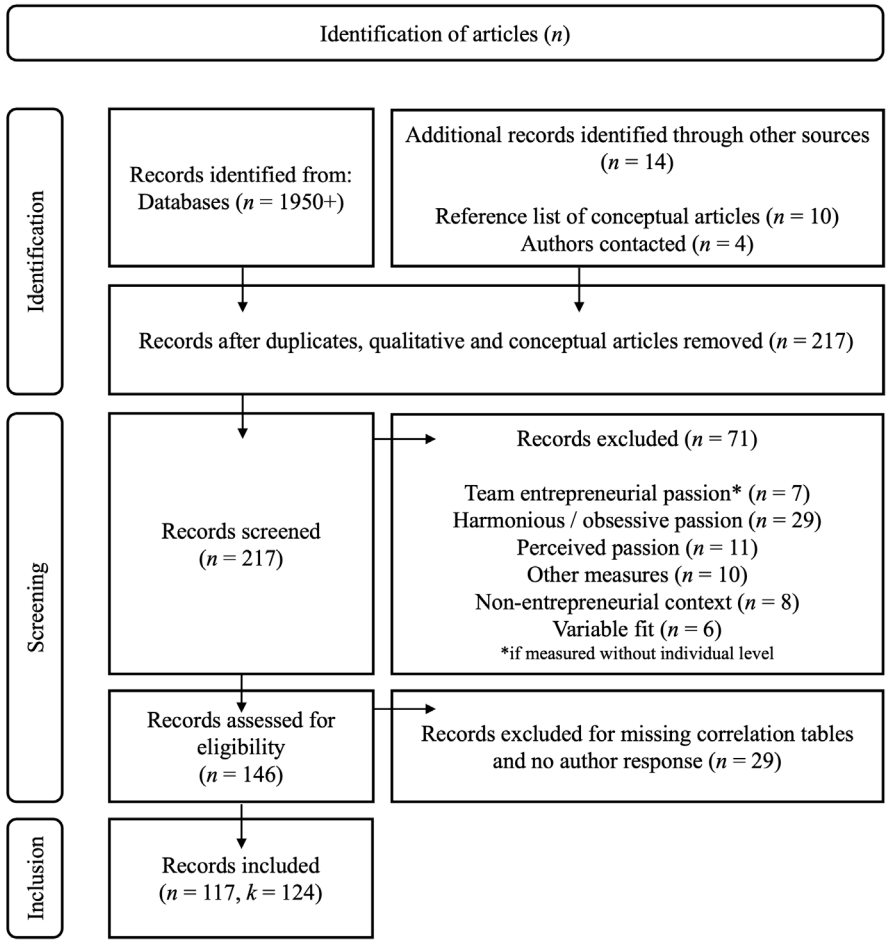

FIGURE 2 Research protocol for the identification of articles.

First, we coded the reported correlations according to the relationships relevant to our MASEM—that is, all correlations between entrepreneurial passion and dependent variables as well as between control variables (i.e., dispositions [e.g., hopefulness or resilience], age, experience, and education), resulting in 28 (i.e., 8 × 7/2) coded relationships that provided the relevant input in the form of the meta-analytic correlation matrix. The coding was based on theoretical considerations and the wording of the items in the primary studies. Appendix S2 provides an overview of all categories, constructs, and studies included.

We included correlations with *entrepreneurial passion* when a primary study had measured positive feelings and entrepreneurial identity separately or had presented an arithmetic combination of the two dimensions as a measure of entrepreneurial passion. In line with the theory of entrepreneurial passion and its proposed conceptual model (Cardon et al., 2009), we examined the pathways across the different roles along the entrepreneurial process. We note that the individual studies included in our MASEM distinguished between the roles to examine specific relationships of entrepreneurial passion and outcomes in each phase of the entrepreneurial process. By combining the individual studies, we therefore consider the specific roles and provide an exploratory examination of the theory of entrepreneurial passion (see also Zhao & Liu, 2023).

Furthermore, we included correlations with *entrepreneurial cognitions* if the measure of the primary study referred to entrepreneurship-related cognitions (Cardon et al., 2009). In addition to the variables goal commitment, goal challenge, and goal striving mentioned by Cardon et al. (2009), we coded entrepreneurial cognitions such as entrepreneurial intentions, attitudes toward entrepreneurship, and entrepreneurial self-efficacy (see Appendix S2). We included correlations with *entrepreneurial behaviors* when the measure referred to the intensity and persistence of people's entrepreneurial efforts and behaviors. For example, this was the case for entrepreneurial persistence, entrepreneurial effort, and feedback-seeking behavior. Finally, we included correlations with *entrepreneurial effectiveness* when the measure referred to behavioral outcomes such as entrepreneurial success, venture growth, firm profit, sales and assets, or innovation.

Second, we included correlations between the model variables and control variables to be included in our MASEM. These were correlations with age, education, entrepreneurial experience, and dispositions that had been included in the primary studies. These were variables that are fairly stable and have relevance beyond entrepreneurship, such as hopefulness, ambition, resilience, grit, proactivity, and innovativeness.

Third, we conducted a robustness test at various levels to examine the extent to which the theory can be generalized across different settings. We coded study characteristics that were later used to test the robustness of bivariate relationships between entrepreneurial passion and the dependent variables (i.e., entrepreneurial cognitions, behaviors, and effectiveness). Due to the highly heterogeneous sample in our primary studies, we based this on several categorical and continuous moderators such as the *sample type* (entrepreneurs vs. non-entrepreneurs, e.g., students) to show that students, as "potential entrepreneurs," are an important population for the theory of entrepreneurial passion, the *study designs* (i.e., experimental vs. survey), the *industries* (academia vs. non-academia), *cultural regions* (i.e., Anglo cultures and Confucian Asia), *journal quality* (SJR ranking and H-index), and *publication year*.

In order to test the robustness of the theory of entrepreneurial passion, we coded the original constructs according to Cardon et al. (2009). The constructs related to goal-related cognitions (goal commitment, goal challenge, and goal striving) were less frequent and resulted in a small number of available effect sizes (k). We additionally coded and tested our assumptions based on a broader set of relevant entrepreneurial cognitions. Particularly, we compared goal-related cognitions with all supplemental entrepreneurship-related cognitions, integrating, for example, entrepreneurial self-efficacy and intentions. For entrepreneurial behavior, we coded the constructs of creative problem solving, persistence, and absorption. For entrepreneurial effectiveness, we coded opportunity recognition, venture creation, and venture growth. We then compared effect sizes by examining the robustness of the bivariate relationships between entrepreneurial passion and the constructs. The coding was based on definitions of the variables entrepreneurial cognitions, behaviors, and effectiveness (e.g., Bao et al., 2017; Collewaert et al., 2016; Drnovšek et al., 2016) and on the conceptual model of Cardon et al. (2009). The coding was conducted independently by three of the co-authors. The agreement ratio at the aggregate level (i.e., overall entrepreneurial cognitions, behaviors, and effectiveness) was 85%. All coding was discussed with all co-authors until full agreement was reached.

Secondary data: Institutional, economic, and cultural variables

In addition to the correlational data extracted from the primary studies, we collected institutional, economic, and cultural data at the country level. The institutional variables were *rule of law*,

logistic performance index, *regulatory quality*, and *access to electricity*. These variables were downloaded from the World Bank Group (2025). The indicators for these variables were RL.EST and RL.PER.RNK (rule of law estimate and percentile rank), LP.LPI.OVRL.XQ (logistic performance index), RQ.EST and RQ.PER.RNK (regulatory quality estimate and percentile rank), and EG.ELC.ACCS.ZS (access to electricity). As economic indicators, we downloaded *GDP per capita* (indicator NY.GDP.PCAP.CD) and *foreign direct investment* (indicators BX.KLT.DINV.WD.GD.ZS). For all institutional and economic variables, we extracted the status of the variable 1 year before the year of publication in order to match the year of the data collection of the respective primary study. Finally, we used the GLOBE project website (House et al., 2002, 2004) to extract cultural dimensions at the country level. These were *performance orientation*, *future orientation*, *uncertainty avoidance*, *ingroup collectivism*, *institutional collectivism*, and *assertiveness*. Because the World Bank Group (2025) data are based on country-specific comparisons, we used data from the countries included in our study: Bangladesh, Belgium, Brazil, China, Ethiopia, Finland, Germany, Ghana, Greece, Hong Kong, India, Indonesia, Iran, Iraq, Italy, Malaysia, Mexico, Mongolia, Netherlands, Nigeria, Oman, Pakistan, Portugal, Saudi Arabia, South Africa, Tanzania, Taiwan, Thailand, Turkey, United Kingdom, United States, and Vietnam.

Meta-analytical procedure

As a first step, we conducted an MASEM (see Figure 3). Specifically, our model tested the effect of entrepreneurial passion on entrepreneurial effectiveness, mediated by entrepreneurial cognitions and entrepreneurial behaviors. In a second step, we analyzed the potential role of institutional, economic, and cultural boundary conditions on the relationships involving entrepreneurial passion. This analysis focused on the bivariate relationships between entrepreneurial passion and outcome variables because, first, missing data at the country level would have left several cells of the input meta-analytical correlation matrix empty and, second, testing separate MASEM would have implied having categorical moderator variables. Hence, addressing these moderators by means of a meta-regression provided high statistical power, as it used the full sample, given the dimensional nature of the moderator variables.

For our statistical analyses, we relied on recent approaches combining three-level random effects meta-analysis (Cheung, 2014; Steinmetz et al., 2016) with traditional MASEM (Brown & Peterson, 1993; Harrison et al., 2006; Viswesvaran & Ones, 1995) to synthesize the results of the primary studies. Three-level random effects meta-analysis is useful for dealing with multiple effect sizes per study that create dependence in the data. The three-level approach allows

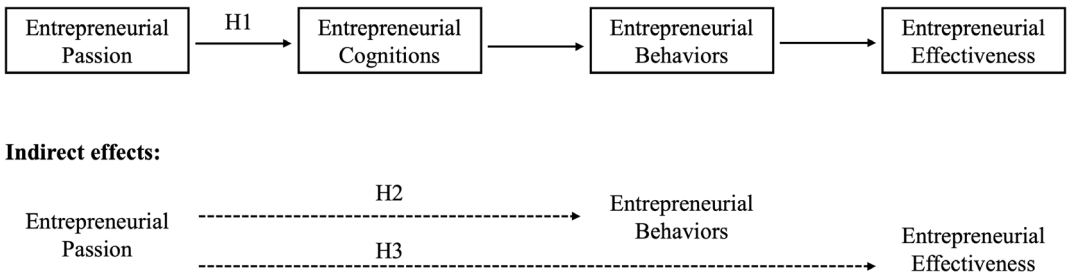

FIGURE 3 Conceptual model hypotheses.

researchers to account for within-study heterogeneity in correlations and incorporate each correlation instead of computing average correlations (Cheung, 2014). With regard to the application to MASEM, we followed the approach of Wilson et al. (2016) and constructed a meta-analytical correlation matrix as a basis for the MASEM by means of a three-level random effects regression. In this regression, the dependent variable was the vector of all coded correlations between entrepreneurial passion and other model variables, whereas the predictor was a categorical variable whose categories were the labels of these correlations (e.g., "passion behavior," reflecting the correlations between entrepreneurial passion and any coded entrepreneurial behavior). As this regression did not contain an intercept, the estimated coefficients represented the weighted cell means (i.e., the weighted average correlations) for each coded correlation—together representing the whole correlation matrix. We incorporated information about the varying sample sizes across the cells of the correlation matrix into the structural equation model by calculating the asymptotic covariance matrix of the correlations. This matrix contains the estimated sampling variances on the diagonal and the covariances among all correlations below the diagonal. The variances reflect the varying sample sizes across the cells of the correlation matrix. The asymptotic covariance matrix served to estimate the standard errors of the model parameters. The total sample size for the overall model was the sum of the sample sizes of the primary studies (Cheung, 2015a; Cheung & Chan, 2005; Wilson et al., 2016). In our case, the sample size was $N = 43{,}331$. The models were estimated with the weighted least squares estimator using the asymptotic covariance matrix as the weight matrix. We emphasize that this approach replaces the tradition of calculating the harmonic mean across cells to generate one single sample size for the model test and standard error estimation, but the asymptotic covariance matrix reflects the information about the varying *N*s being considered in the estimation of the standard errors. Accordingly, whereas the overall *N* represents the sum across studies, differences in cell-specific sample sizes are directly incorporated into the estimation via their sampling variances, ensuring that the total *N* does not inflate significance levels.

To examine the moderating effects of the institutional, economic, and cultural variables, we applied meta-regression analyses (i.e., three-level mixed effects models) and regressed the three relationships of interest (i.e., the correlation between entrepreneurial passion and entrepreneurial cognition, entrepreneurial passion and entrepreneurial behaviors, and entrepreneurial passion and entrepreneurial effectiveness) on the respective contextual variables. These regression models were estimated in isolation for each of the variables to avoid missing data accumulation and high type II error due to the high correlations (especially among the GLOBE dimensions). We conducted all analyses using the software R version 4.2.2 (R Core Team, 2024) with the packages tidyverse (Wickham et al., 2019) for data wrangling and metafor (Viechtbauer, 2010) and metaSEM (Cheung, 2015b) for conducting the meta-analyses.

Model building approach and model evaluation

Regarding the MASEM, our initial focus was to test the full sequential mediation model implied by Cardon et al.'s (2009) propositions. However, because a full mediation structure may be too restrictive and a partial mediation may be more realistic, we applied a systematic model building approach (Figure 4). The sequence started with the full mediation structure (M1). We relied on the chi-square model test as a statistical test of whether the restricted model with all direct effects fixed at zero was realistic, or in other words, whether the data predicted by this model

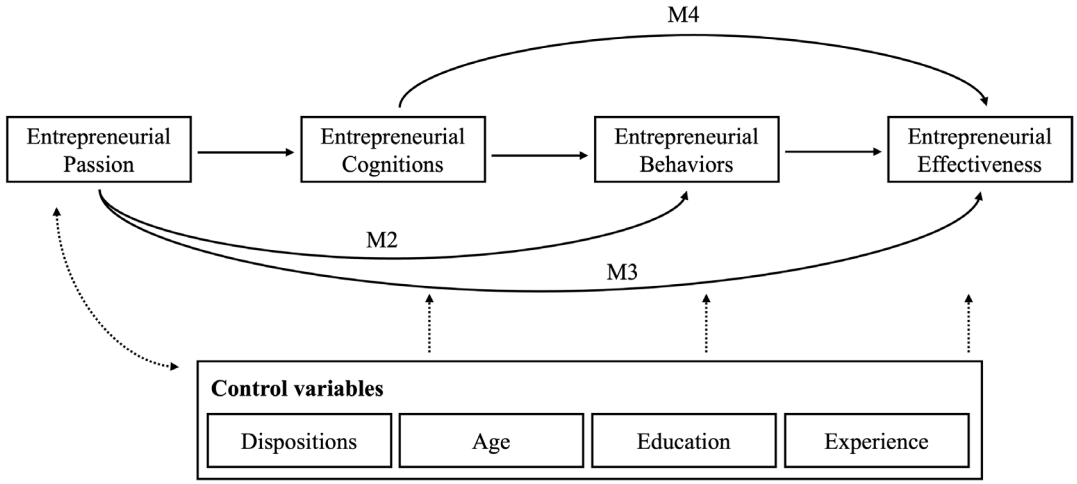

FIGURE 4 Model building steps. M, model.

deviated from the actual data by more than chance. This follows recent calls to strictly evaluate models (Kline, 2023) and is in line with common practice in econometrics to statistically test for so-called exclusion criteria (i.e., effects fixed at zero; Antonakis et al., 2010). In our case, a significant test of M1 implied that at least one of these full mediation restrictions was wrong and applied a systematic scheme to incorporate a direct effect at a time. In M2, the effect of entrepreneurial passion on entrepreneurial behaviors was added. Likewise, M3 added an effect of entrepreneurial passion on entrepreneurial effectiveness, and M4 added an effect of entrepreneurial cognitions on entrepreneurial effectiveness. At each step, the chi-square of the current model and the difference from the previous model were evaluated. As Figure 4 shows, we included control variables that represent plausible confounding factors for the effects within the target model. Their effects were estimated on all target variables.

RESULTS

Descriptive statistics

Overall, our meta-analysis used results published in 117 articles that conducted research on $k = 124$ independent samples with a total of $N = 43{,}331$ individuals. The majority of articles (94%) reported results of a single study, and six articles reported results of more than one study. These studies were conducted in more than 36 different countries, with the majority of studies coming from China ($k = 33$) and the United States ($k = 18$). Ten studies used samples from more than one country. In terms of industry, the majority of samples with $k = 54$ (44%) included individuals from mixed industries; $k = 52$ (42%) included individuals from academia; and the remaining studies of $k = 18$ (15%) employed individuals from a variety of industries (e.g., manufacturing or technology).

In the following, we use the abbreviated forms of the categories passion, cognitions, behaviors, and effectiveness to describe our results, including those in the attached tables. Table 1 shows the meta-analytical correlations between the model variables (including the control

TABLE 1 Meta-analytical correlation matrix.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Age							
(2) Education	.17** (.12, .22) $k = 41$ ($m = 43$), $N = 15{,}006$						
(3) Experience	.32** (.26, .37), 29 (38), 10,553	.07* (.01, .13), 18 (27), 9129					
(4) Dispositions	.03 (−.07, .13), 8 (10), 2029	.08 (−.02, .18), 8 (10), 2812	.14 (−.01, .29), 3 (4), 493				
(5) Passion	.04* (.00, .07), 63 (99), 20,206	.10** (.06, .14), 47 (74), 18,723	.09** (.05, .14), 41 (75), 16,743	.37** (.32, .43), 16 (47), 4891			
(6) Cognitions	.05* (.00, .10), 32 (51), 9797	.15** (.10, .20), 20 (50), 11,988	.13** (.08, .19), 23 (43), 9272	.33** (.27, .40), 11 (27), 3639	.42** (.39, .45), 79 (218), 29,123		
(7) Behaviors	.04 (−.01, .09), 31 (38), 9874	.10* (.04, .16), 19 (25), 7573	.11** (.04, .17), 19 (28), 7302	.38** (.29, .48), 5 (8), 1161	.35** (.31, .38), 54 (122), 16,466	.38** (.32, .43), 20 (42), 5457	
(8) Effectiveness	.09** (.03, .15), 22 (30), 7953	.17** (.09, .24), 14 (19), 5492	.08* (.02, .14), 16 (27), 6697	0.25** (.07, .42), 2 (3), 419	.25** (.21, .29), 39 (114), 13,003	.34** (.28, .40), 16 (32), 3503	.28** (.21, .34), 16 (30), 6789

Abbreviations: k, number of independent samples; m, number of meta-analyzed correlation coefficients.
*$p < .05$.**$p < .01$.

variables). Each cell of the matrix contains the meta-analytically derived average correlation, the confidence interval (CI), the number of studies (k), the number of correlation coefficients (m), and the total sample size (N) on which the weighted average was generated. All correlations between the target variables were substantial and statistically significant. Passion was positively related to cognitions ($\widehat{\rho} = .42$, $p < .01$), behaviors ($\widehat{\rho} = .35$, $p < .01$), and effectiveness ($\widehat{\rho} = .25$, $p < .01$). Likewise, cognitions were significantly related to behaviors ($\widehat{\rho} = .38$, $p < .01$) and effectiveness ($\widehat{\rho} = .34$, $p < .01$), providing initial support for the hypotheses.

Examining the theory of entrepreneurial passion with MASEM

Table 2 shows the results of our model building sequence. The full mediation model (M1) resulted in a significant chi-square test ($\chi^2(\text{df}) = 56.28(3)$, $p < .001$), indicating a significant misfit to the data. Adding a direct effect of passion on behaviors (i.e., M2) significantly improved the model fit ($\Delta\chi^2(\Delta\text{df}) = 24.23(2)$, $p < .001$), while still suggesting a significant misfit. For M3, we added a direct effect of passion on effectiveness, but because this estimate did

TABLE 2 Model building sequence.

Model	χ^2(df)	*p*-value	Comparison	$\Delta\chi^2$(Δdf)	RMSEA
M1: Full mediation	56.28** (3)	<.001			0.020
M2: Passion → Behaviors	24.23** (2)	<.001	M1	32.05** (1)	0.014
M3: Passion → Effectiveness	21.69** (1)	<.001	M2	2.52 (1)	0.022
M4: Cognitions → Effectiveness	3.36 (1)	.07	M2	20.87** (1)	0.007

Abbreviations: M, model; RMSEA, root mean square error of approximation.
**$p < .001$ (p-values ≥ .01 are reported to two decimals; .001 ≤ p < .01 to three decimals; $p < .001$ as "$p < .001$").

not significantly improve the model fit, we used M2 as a benchmark for the final estimate, that is, adding a direct effect of cognitions on effectiveness. This effect significantly improved the model ($\Delta\chi^2(\Delta df) = 21.69(1)$, $p < .001$) and also resulted in a nonsignificant overall test ($\chi^2(df) = 3.36(1)$, $p = .07$). It should be noted that the root mean square error of approximation (RMSEA) for all tested models, starting with the first and most misspecified model M1, showed values below the often recommended threshold of 0.06 (Hu & Bentler, 1999) and thus did not provide information for model selection.

Figure 5 shows the direct effects of the model variables, and Table 3 shows the full set of direct, indirect, and total effects of all variables (including control variables). As the figure shows, all direct effects were substantial and significant. Passion showed a positive direct effect on cognitions ($B = 0.34$, $p < .001$), supporting H1. In addition, passion showed a direct effect on behaviors ($B = 0.16$, $p < .001$). The results of the tests of H2 and H3, which postulate indirect effects of passion on behaviors (via cognitions) and effectiveness (via cognitions and behaviors), are shown in the lower part of Table 3 and assessed by means of the CIs. Both indirect effects were significant, thus supporting both mediation hypotheses. Finally, the last section of Table 3 shows the total effects of passion on behaviors ($B = 0.23$, 95% CI [0.17, 0.29]) and effectiveness ($B = 0.10$, 95% CI [0.06, 0.14]), respectively, across all indirect and direct effects.

Analyzing potential boundary conditions

Table 4 shows the results of all meta-regression models in which the bivariate relationships (i.e., the correlation between passion and cognitions, passion and behaviors, and passion and effectiveness) were regressed on the sets of institutional, economic, and cultural context variables. Because the context variables were standardized, a regression coefficient in the meta-regression thus indicates the change in the correlation between passion and the respective outcome variable associated with a standard unit increase in the context variable. Regarding the relationship between passion and cognitions, only the institutional context of access to electricity was a significant moderator ($B = 0.06$, $p = .04$), suggesting that the effect of passion on cognitions increases with the availability of basic infrastructure. We did not find any significant moderators for the relationship between passion and behaviors. For the relationship between passion and effectiveness, we found negative moderation effects of institutional and economic boundary conditions. Among the institutional moderators, both rule of law ($B = -0.10$, $p = .001$ for estimate; $B = -0.10$, $p < .001$ for percentile rank) and regulatory quality ($B = -0.10$, $p = .001$ for estimate; $B = -0.11$, $p < .001$ for percentile rank) significantly reduced

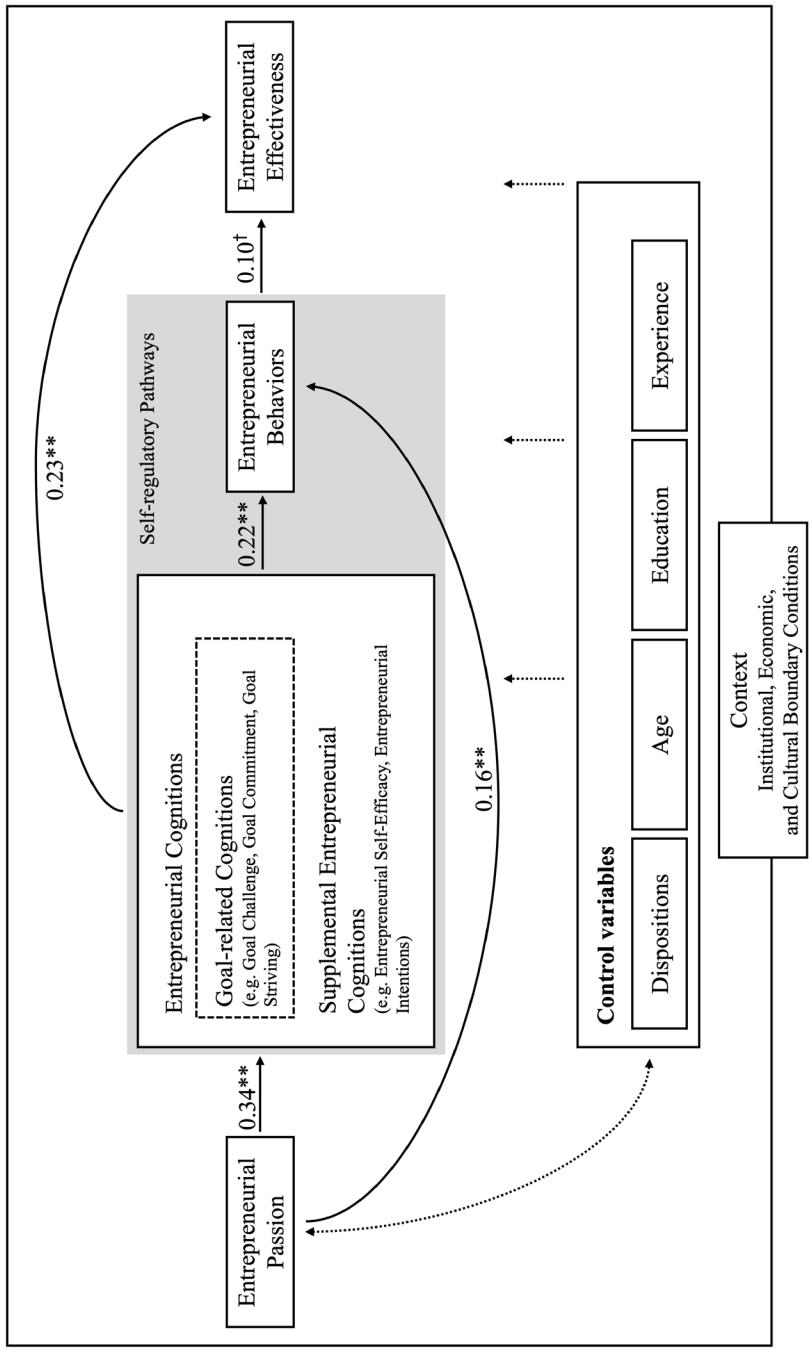

FIGURE 5 Results of the meta-analytical structural equation modeling. $^{\dagger}p < 0.10$, $^{**}p < 0.01$.

TABLE 3 Direct and indirect effects within the MASEM (Model 4).

Independent variable		Dependent variable	*B*	SE	CI_{low}	CI_{high}	*z*	*p*
Direct effects								
Age	→	Behaviors	0.00	0.03	−0.07	0.07	0.08	.94
Cognitions	→	Behaviors	0.22**	0.04	0.15	0.29	6.09	<.001
Dispositions	→	Behaviors	0.24**	0.06	0.12	0.35	3.93	<.001
Education	→	Behaviors	0.03	0.04	−0.04	0.10	0.84	.40
Experience	→	Behaviors	0.02	0.04	−0.06	0.10	0.57	.57
Passion	→	Behaviors	0.16**	0.03	0.10	0.22	5.18	<.001
Age	→	Cognitions	−0.01	0.03	−0.07	0.05	−0.36	.72
Dispositions	→	Cognitions	0.18**	0.04	0.11	0.25	4.85	<.001
Education	→	Cognitions	0.10**	0.03	0.05	0.15	4.04	<.001
Experience	→	Cognitions	0.07*	0.03	0.01	0.14	2.25	.02
Passion	→	Cognitions	0.34**	0.02	0.30	0.38	16.89	<.001
Age	→	Effectiveness	0.06	0.04	−0.02	0.13	1.48	.14
Behaviors	→	Effectiveness	0.10†	0.05	0.00	0.19	1.92	.06
Cognitions	→	Effectiveness	0.23**	0.05	0.14	0.32	4.94	<.001
Dispositions	→	Effectiveness	0.25**	0.08	0.09	0.40	3.14	.002
Education	→	Effectiveness	0.09*	0.04	0.01	0.17	2.28	.02
Experience	→	Effectiveness	−0.02	0.04	−0.11	0.06	−0.48	.63
Indirect effects (mediation hypotheses)								
Passion → Behaviors (H2)			0.08*		0.05	0.10		
Passion → Effectiveness (H3)			0.01*		0.00	0.02		
Total effects								
Passion → Behaviors			0.23**		0.17	0.29		
Passion → Effectiveness			0.10**		0.06	0.14		

Abbreviations: CI, confidence interval; MASEM, meta-analytical structural equation modeling.
†$p < .10$.
*$p < .05$.**$p < .01$ (p-values ≥ .01 are reported to two decimals; .001 ≤ $p < .01$ to three decimals; $p < .001$ as "$p < .001$").

the strength of the passion–effectiveness relationship. Regarding economic conditions, GDP per capita shows a similar negative effect ($B = -0.09$, $p = .002$). Thus, the effect of passion on effectiveness became weaker with higher institutional quality and stronger economic development, indicating that passion plays a greater role in institutional contexts characterized by weak legal systems and poor regulatory frameworks, as well as lower GDP levels. Our results showed no significant effects for cultural context conditions. Thus, passion promotes cognitions, behaviors, and effectiveness across all cultural contexts.

Robustness tests

As a final step in our analysis, we tested differences in the relationships across more specific constructs of the categories of cognitions, behaviors, and effectiveness. This is important for two

TABLE 4 Effects of the meta-regression analyses testing boundary conditions of target relationships.

	k	*m*	*N*	*B* (SE)	*p*	CI_{lb}	CI_{ub}
Passion–cognitions							
Institutions							
Rule of law estimate	66	167	22,832	0.00 (0.03)	.90	−0.05	0.05
Rule of law rank	66	167	22,832	0.01 (0.02)	.69	−0.04	0.06
Logistic performance index	22	66	7021	−0.02 (0.04)	.59	−0.09	0.05
Regulatory quality estimate	66	167	22,832	−0.01 (0.02)	.65	−0.06	0.04
Regulatory quality rank	66	167	22,832	−0.01 (0.02)	.81	−0.05	0.04
Access to electricity	66	167	22,832	0.06* (0.03)	.04	0.00	0.11
Economy							
GDP per capita	73	190	25,142	−0.02 (0.02)	.40	−0.06	0.02
Foreign direct investment	72	188	24,805	0.00 (0.02)	.98	−0.04	0.04
Culture							
GLOBE performance orientation	54	146	18,189	−0.03 (0.02)	.30	−0.07	0.02
GLOBE future orientation	54	146	18,189	−0.02 (0.02)	.41	−0.06	0.03
GLOBE uncertainty avoidance	54	146	18,190	−0.03 (0.02)	.22	−0.08	0.02
GLOBE ingroup collectivism	54	146	18,191	0.01 (0.03)	.60	−0.04	0.07
GLOBE institutional collectivism	54	146	18,192	−0.02 (0.02)	.43	−0.06	0.03
GLOBE assertiveness	54	146	18,193	−0.04 (0.02)	.08	−0.09	0.01
Passion–behaviors							
Institutions							
Rule of law estimate	48	100	13,248	−0.02 (0.03)	.50	−0.07	0.03
Rule of law rank	48	100	13,248	−0.02 (0.03)	.50	−0.07	0.03
Logistic performance index	16	43	3230	−0.03 (0.04)	.41	−0.11	0.04
Regulatory quality estimate	48	100	13,248	−0.03 (0.02)	.25	−0.08	0.02
Regulatory quality rank	48	100	13,248	−0.03 (0.02)	.23	−0.08	0.02
Access to electricity	48	100	13,248	−0.02 (0.02)	.47	−0.06	0.03
Economy							
GDP per capita	49	102	13,741	−0.03 (0.02)	.15	−0.07	0.01
Foreign direct investment	49	102	13,741	0.01 (0.03)	.79	−0.05	0.07
Culture							
GLOBE performance orientation	39	78	11,684	−0.02 (0.03)	.51	−0.07	0.04
GLOBE future orientation	39	78	11,684	0.01 (0.03)	.61	−0.04	0.07
GLOBE uncertainty avoidance	39	78	11,684	0.04 (0.03)	.14	−0.01	0.09
GLOBE ingroup collectivism	39	78	11,684	0.04 (0.03)	.21	−0.02	0.09
GLOBE institutional collectivism	39	78	11,684	0.02 (0.03)	.48	−0.03	0.07
GLOBE assertiveness	39	78	11,684	−0.05 (0.03)	.06	−0.10	0.00

(Continues)

TABLE 4 (Continued)

	k	*m*	*N*	*B* (SE)	*p*	CI_{lb}	CI_{ub}
Passion–effectiveness							
Institutions							
Rule of law estimate	36	102	10,609	−0.10** (0.03)	.001	−0.16	−0.04
Rule of law rank	36	102	10,609	−0.10** (0.03)	<.001	−0.16	−0.05
Logistic performance index	12	42	3604	−0.03 (0.04)	.42	−0.10	0.04
Regulatory quality estimate	36	102	10,609	−0.10** (0.03)	.001	−0.16	−0.04
Regulatory quality rank	36	102	10,609	−0.11** (0.03)	<.001	−0.16	−0.05
Access to electricity	36	102	10,609	−0.03 (0.03)	.36	−0.09	0.03
Economy							
GDP per capita	37	103	11,059	−0.09** (0.03)	.002	−0.15	−0.04
Foreign direct investment	37	103	11,059	0.03 (0.04)	.46	−0.04	0.10
Culture							
GLOBE performance orientation	24	72	8379	0.02 (0.03)	.49	−0.04	0.09
GLOBE future orientation	24	72	8379	−0.01 (0.03)	.68	−0.08	0.05
GLOBE uncertainty avoidance	24	72	8379	0.00 (0.04)	.92	−0.08	0.09
GLOBE ingroup collectivism	24	72	8379	0.05 (0.04)	.22	−0.03	0.12
GLOBE institutional collectivism	24	72	8379	0.02 (0.04)	.71	−0.07	0.10
GLOBE assertiveness	24	72	8379	−0.01 (0.04)	.84	−0.09	0.07

Abbreviations: *B*, regression weight linking the continuous moderators to the effect size; CI_{lb} and CI_{ub}, lower and upper bound of a 95% confidence interval; GDP, gross domestic product; GLOBE, Global Leadership and Organizational Behavior Effectiveness; *k*, number of independent samples; *m*, number of effect sizes; *N*, number of analyzed individuals.
*$p < .05$.**$p < .01$ (p-values ≥ .01 are reported to two decimals; .001 ≤ $p < .01$ to three decimals; $p < .001$ as "$p < .001$").

reasons. First, this step tested the robustness of our results against the well-known "apples-and-oranges" problem, which results from aggregating several specific constructs into an overall category (Borenstein et al., 2009). We tested whether the relationships between passion and behaviors differed for creative problem solving, persistence, and absorption and whether the relationships between passion and effectiveness differed for opportunity recognition, venture creation, and venture growth. Second, and more importantly, this step allowed us to assess whether the correlation between passion and cognitions differed when it came to specific goal-related cognitions (e.g., goal commitment and goal challenge) or supplemental entrepreneurial cognitions (e.g., entrepreneurial intention and self-efficacy). Thus, this step provides information about the meaningfulness of stretching the theory's focus on entrepreneurial cognitions beyond goal-related cognitions. Table C1 in Appendix S3 contains the results. Table C1 presents the regression coefficients from a no-intercept model, so that the coefficients can be interpreted as the mean relationship of the respective constructs. Differences between constructs were tested with a chi-square test. For effectiveness, the significant chi-square test was followed up with post hoc pairwise comparisons between the three constructs according to Cardon et al. (2009) (i.e., opportunity recognition, venture creation, and venture growth). To this end, we replaced the no-intercept model with a standard dummy regression, using the intercept as the reference category. The *z*-test of the individual regression coefficients was then used as a

test of pairwise differences and, for consistency, transformed into a chi-square statistic with 1 df. To adjust for multiple testing, *p*-values were alpha corrected by multiplying the original *p*-value by three (i.e., the number of comparisons).

The results show that the passion–cognitions relationship was statistically different for goal-related cognitions ($\widehat{\rho} = .34$, $p < .001$) and supplemental entrepreneurial cognitions ($\widehat{\rho} = .47$, $p < .001$) and significantly larger for the latter ($\chi^2(1) = 6.17$, $p = .01$). The relationships between passion and behaviors were similar ($\widehat{\rho} = .34$ for creative problem solving, $\widehat{\rho} = .35$ for persistence, $\widehat{\rho} = .46$ for absorption, and $\widehat{\rho} = .28$ for other entrepreneurial behaviors, all $p < .001$) and not statistically different from each other ($\chi^2(3) = 1.14$, $p = .77$). Finally, for the passion–effectiveness relationship, post hoc pairwise comparisons revealed a statistically significant difference between the effectiveness constructs opportunity recognition and venture growth ($\chi^2(1) = 13.14$, $p = .003$, p_alpha corrected $= .009$). The relationship was stronger for opportunity recognition ($\widehat{\rho} = .41$, $p < .001$) than for venture growth ($\widehat{\rho} = .17$, $p < .001$).

Finally, we tested the robustness of the relationships with passion across different (a) *study designs* of primary studies (experimental vs. survey), (b) *sample type* (i.e., entrepreneurs vs. non-entrepreneurs, e.g., students), (c) *industries* (i.e., academia, mixed, and an economically mixed category), (d) *cultural regions* (Anglo cultures, Confucian Asia, Latin America, Southern Asia, and a mixed category), and (e) *journal and publication characteristics* (i.e., publication year, SJR ranking, and H-index). Whereas the analysis using the GLOBE dimensions focused on specific cultural dimensions, the analysis of the cultural regions investigated whether regions rather than complex cultural configurations influence the relationships (Gupta et al., 2002). Tables C2 and C3 show the results of the meta-regression analyses for the categorical predictors (C2) and the quantitative predictors (C3). As Table C2 shows, only one of the factors resulted in a significant difference across the tested categories and constructs, which is the cultural clusters ($\chi^2(4) = 21.17$, $p < .001$). Interestingly, entrepreneurs versus non-entrepreneurs (e.g., students) showed no significant differences.

Table C3 shows the results of the meta-regressions for the quantitative predictors (publication year, SJR ranking, and H-index); the regression coefficients reflect the increase of the relationship between passion and the respective dependent variable associated with a one-unit change in the respective predictor. The results show that the passion–cognitions relationship was stronger in recent publications ($B = 0.01$, $p < .05$) and weaker for high SJR rankings ($B = -0.06$, $p = .01$). In addition, the passion–effectiveness relationship was also stronger in more recent publications ($B = 0.03$, $p = .004$) and weaker for high H-indexes ($B = -0.09$, $p = .02$). Overall, the relationships remained remarkably consistent across the set of varying conditions.

DISCUSSION

The purpose of the study is to provide an exploratory, theory-driven examination of Cardon et al.'s (2009) theory of entrepreneurial passion and its pathways from entrepreneurial passion to entrepreneurial effectiveness via goal-related cognitions and entrepreneurial behaviors. Specifically, we identify which of the proposed relationships are empirically supported within an integrated framework and which relationships need to be added. Beyond this, we stretch the theoretical framework by, on the one hand, incorporating supplemental cognitive mediators—such as entrepreneurial intentions and self-efficacy—to capture cognitive mechanisms holistically through which entrepreneurial passion translates into entrepreneurial effectiveness and,

on the other hand, analyzing boundary conditions of the theory in terms of institutional, economic, and cultural factors.

The results of our exploratory analyses provide support for the core assumptions of Cardon et al.'s (2009) theory that entrepreneurial passion indirectly influences entrepreneurial behaviors and entrepreneurial effectiveness via entrepreneurial cognitions. However, the partial mediation model in contrast to the full mediation model showed excellent fit, indicating the presence of additional direct effects. Specifically, the direct effect of entrepreneurial passion on entrepreneurial behaviors is consistent with the original theoretical propositions, whereas the direct effect of entrepreneurial cognitions on entrepreneurial effectiveness, which has not been proposed in the original model by Cardon et al. (2009), significantly improves the model fit. This highlights that the original conceptualization of the theory does not fully capture the range of mediating mechanisms, as our findings reveal additional relationships that are not reflected in the original theory. Our robustness checks further demonstrated that the role of cognitions stretches beyond goal-related mechanisms. The effects of passion on supplemental entrepreneurial cognitions, such as entrepreneurial intentions and self-efficacy, were statistically different and stronger than on goal-related cognitions. Among entrepreneurial behaviors, the effects for creative problem solving, persistence, and absorption were similar and not statistically different. For entrepreneurial effectiveness, the relationship was stronger for opportunity recognition than for venture growth, and statistically different, possibly reflecting the difference between subjective (opportunity recognition) and more objective (venture growth) outcome measures.

With regard to contextual moderators, our analysis revealed that institutional and economic conditions significantly shaped the role of entrepreneurial passion, whereas cultural factors did not. Among institutional conditions, access to electricity strengthened the passion–cognitions link, whereas the rule of law and regulatory quality weakened the passion–effectiveness relationship. Economic conditions, as captured by GDP per capita, also weakened the passion–effectiveness relationship. Together, these findings underscore that entrepreneurial passion matters more in environments where institutional or economic barriers impede entrepreneurial activity, highlighting its compensatory role under adverse conditions.

Theoretical implications

Our study contributes to the literature on entrepreneurial passion by providing exploratory, theory-driven evidence of the validity of Cardon et al.'s (2009) theory within a comprehensive and integrated framework. In doing so, we identify additional relevant relationships, offer a more differentiated understanding of the underlying self-regulatory pathways, examine the influence of boundary conditions, and demonstrate the general robustness of the theory. We address the implications for the literature in three overarching contributions below.

Contributing to a validation of the theory of entrepreneurial passion

Our study provides an exploratory examination of the theory of entrepreneurial passion and demonstrates additional mechanisms through which passion affects entrepreneurial effectiveness. Although the theory has been widely applied in entrepreneurship and psychology, it has not previously been empirically examined in its entirety. Consequently, the field lacked an understanding of *how* entrepreneurial passion translates into entrepreneurial effectiveness through

sequential self-regulatory pathways of entrepreneurial cognitions and behaviors. Our findings contribute to this debate (e.g., Riar et al., 2025) by providing an integrated, theory-driven examination of the model and offering empirical support for its core assumptions. At the same time, our results show that entrepreneurial passion operates through a broader set of self-regulatory cognitions than originally specified. By examining the proposed relationships, we identify which of the relationships suggested by Cardon et al. (2009) are empirically supported, while also revealing additional relationships between the categories that have not yet been considered in the theory of entrepreneurial passion. In particular, the presence of the direct effect of entrepreneurial cognitions on effectiveness points to a more complex structure than previously assumed. Rather than a pure sequential process, the findings indicate a pattern of partial mediation, suggesting that additional mechanisms contribute to the translation of entrepreneurial passion into outcomes.

Regarding the validation of the theory of entrepreneurial passion, it is also important to note that our robustness tests indicate that the effects hold across study design, sample type, industries, and cultural clusters, which points to an important contribution regarding the generalizability of the effects of entrepreneurial passion. An important insight concerns the use of heterogeneous samples. Research on entrepreneurial passion often involves both entrepreneurs and non-entrepreneurs (e.g., students). The comparable effect sizes across both groups indicate that the effects of entrepreneurial passion generalize beyond entrepreneurs, thereby supporting the general validity of the theory of entrepreneurial passion.

We also examined construct-specific effects of entrepreneurial passion on outcome variables. Because constructs of goal-related cognitions were highly specific ($k \leq 1$), these comparisons were only feasible for entrepreneurial behaviors and effectiveness. The results revealed no significant differences among constructs of entrepreneurial behaviors. However, we found stronger and statistically different effects of passion on entrepreneurial effectiveness in terms of opportunity recognition compared to venture growth. This pattern indicates that entrepreneurial passion may not directly translate into objective performance indicators such as growth but rather strengthens subjective perceptions of entrepreneurial effectiveness, particularly in terms of recognizing opportunities. Future research should further examine objective measures of entrepreneurial effectiveness and identify conditions under which entrepreneurial passion more strongly translates into tangible growth outcomes.

Stretching the theory of entrepreneurial passion in terms of mediating mechanisms

Our meta-analytical approach allowed us to assess whether mediation effects can be stretched to a broader set of self-regulatory cognitions beyond Cardon et al.'s (2009) original focus on goal challenge, goal commitment, and goal striving. We contrasted these goal-related cognitions with supplemental entrepreneurial cognitions such as self-efficacy and intention, both shown as essential drivers of entrepreneurial behaviors (e.g., Biraglia & Kadile, 2017; Chiengkul et al., 2023; Lex et al., 2022). We found statistically stronger effects for the supplemental entrepreneurial cognitions compared to goal-related cognitions. The observed pattern of partial mediation suggests that entrepreneurial passion does not exert its influence only through the mediation of goal-related cognitions specified in the original theory but operates through supplemental mechanisms. This finding underscores that the cognitive mechanisms need to be stretched beyond narrowly defined goal-related cognitions. Instead, entrepreneurial cognitions

represent a broader set of self-regulatory mechanisms that can influence entrepreneurial effectiveness, suggesting that the mediating role of cognitions in the theory of entrepreneurial passion should be more extensive than originally conceptualized and that the theory can be meaningfully stretched with respect to its self-regulatory cognitive mechanisms. From an applied psychological perspective, this stretch is theoretically grounded in self-regulation theory (Neal et al., 2017). Our findings thus contribute to a more comprehensive and differentiated understanding of *how* entrepreneurial passion translates into behavior and effectiveness by demonstrating the central role of a broader set of cognitive mechanisms and clarifying how these mechanisms jointly shape entrepreneurial outcomes.

Stretching the theory of entrepreneurial passion in terms of its boundary conditions

We examined how country conditions shape the impact of entrepreneurial passion on entrepreneurial cognitions, behaviors, and effectiveness. Our findings suggest that institutional barriers—such as weak legal systems and poor regulatory frameworks—amplify the role of entrepreneurial passion. In such contexts, passion provides motivational energy and identity-based commitment that enable entrepreneurs to persevere despite obstacles. By contrast, in supportive institutional environments, entrepreneurial passion plays a less critical role, as "efficient formal institutions create opportunities and access to resources for new firms" (Stephan & Uhlaner, 2010, p. 1357). This pattern suggests that entrepreneurial passion functions as a compensatory psychological mechanism, which facilitates entrepreneurs' action in contexts characterized by institutional constraints. Rather than uniformly driving effectiveness across settings, passion becomes particularly important where structural support is limited. Interestingly, access to electricity emerged as the only significant moderator of the passion–cognitions relationship. In countries with higher levels of electrification, entrepreneurial passion was more strongly linked to entrepreneurial cognitions. This finding suggests that basic infrastructure constitutes a necessary precondition for passion to translate into cognitive processes. We did not find any significant moderators for the passion–behavior relationship, suggesting that entrepreneurial passion robustly translates into behavioral engagement across contexts. However, rule of law and regulatory quality negatively moderated the passion–effectiveness link, highlighting the importance of entrepreneurial passion for entrepreneurial success in contexts with heavy regulatory burdens. Although financial barriers may often be managed by entrepreneurs, regulatory constraints, such as complex bureaucracy and unfair competitive conditions, are largely beyond their control. Under such conditions, entrepreneurial passion becomes particularly salient, as it fosters positive engagement and sustained motivation, enabling entrepreneurs to persist despite institutional adversity. Accordingly, entrepreneurial passion gains relevance in contexts characterized by weaker institutional conditions with less supportive environments. Economic boundary conditions also matter: GDP per capita, as a proxy for economic boundary conditions, negatively moderated the passion–effectiveness relationship. Thus, in economically strong countries, entrepreneurial passion is less critical, whereas in weaker economies, it becomes more decisive, likely because supportive structures and resources are more widely available in wealthier contexts.

With these findings, we respond to Riar et al.'s (2025) call for more research on entrepreneurial passion under extreme external conditions. Our results show that entrepreneurial passion is particularly important for driving entrepreneurial behaviors and effectiveness in

unattractive institutional and economic contexts, where external support is lacking. Taken together, two general principles emerge from our analysis. First, entrepreneurial passion functions as a valuable psychological resource when institutional support is lacking, helping entrepreneurs to persist under adverse conditions. Second, although the effects of entrepreneurial passion on cognitive and behavioral processes appear largely context independent—provided that basic infrastructure is in place—its translation into entrepreneurial effectiveness is contingent on institutional and economic conditions. Future research could further disentangle which specific institutional barriers most strongly shape this effect and examine how targeted policy interventions—such as reducing administrative burdens—might foster entrepreneurship in less supportive environments.

Practical implications

From a practical perspective, two key implications emerge from our findings. First, entrepreneurship education should aim at strengthening entrepreneurial passion through programs. This, in turn, can strengthen the central psychological drivers of entrepreneurial behavior and effectiveness, such as entrepreneurial self-efficacy and intentions. By doing so, programs can increase the likelihood that entrepreneurial passion translates into concrete entrepreneurial action. Second, our findings on institutional and economic moderators highlight that entrepreneurial passion is particularly important in challenging contextual conditions. Changing institutional or economic factors is oftentimes difficult and a lengthy process (Chacar et al., 2010; Meyer et al., 2009). Therefore, it is particularly important to foster entrepreneurial passion (e.g., through training, interventions, or programs) in contexts that pose challenging institutional and economic conditions (Gielnik et al., 2017).

Limitations and future research

Although our study adds value to the literature on entrepreneurial passion, there are several limitations. First, our meta-analysis builds on the theoretical model of Cardon et al. (2009), excluding alternative passion conceptualizations such as harmonious and obsessive passion (Vallerand et al., 2003). Also, we did not specifically consider different entrepreneurial role identities (e.g., founder, inventor, and developer), as these are highly intercorrelated (Zhao & Liu, 2023). Future research could extend our analysis by testing these more fine-grained conceptualizations.

Second, most of the primary studies were correlational in nature, limiting causal inferences. More experimental research is needed to establish the causal mechanisms underlying the effects of entrepreneurial passion.

Third, the analysis of the mediation model was exploratory in nature examining the relationships at the category level (entrepreneurial cognitions, behaviors, and effectiveness) rather than the construct level proposed by Cardon et al. (2009). We note that most primary studies focus on a single outcome within each category; therefore, the available evidence is sparse and unevenly distributed across specific constructs to estimate and formally test Cardon et al.'s (2009) original serial mediation model at the construct level. Furthermore, adopting a broader, multidimensional perspective alongside the narrower construct-level specification proposed by Cardon et al. (2009) can be useful for uncovering and better understanding the underlying

mechanisms and for advancing the conceptualization of entrepreneurial passion (Solinger et al., 2024). As Steinmetz and Block (2022) emphasize, MASEM yields valid average effect estimates as long as the aggregated variables share the same underlying causal structure (e.g., a mediation structure). Moreover, Cardon et al. (2009) explicitly describe their proposed constructs as not "definitive or complete" (p. 518). The discrepancy between the original theoretical framework and the predominant focus of existing primary studies thus further supports our decision to adopt the approach at the category level. We addressed this limitation by additionally conducting a bivariate analysis to map the complete theoretical model. Beyond that, the exploratory examination of entrepreneurial passion at the category level provides a structured basis for future research. We therefore encourage future empirical studies to more closely align with the original constructs and pathways proposed in the theory of entrepreneurial passion. Alternatively, future studies can build on our study with its exploratory analyses and formally test a stretched model including supplemental entrepreneurial cognitions.

Fourth, the included studies involve heterogeneous samples, including both entrepreneurs and students (as non-entrepreneurs). Robustness tests indicate that effect sizes are very similar across both groups, confirming the validity of including student samples, particularly for studies focusing on the passion–cognitions relationship.

Fifth, although we demonstrate that boundary conditions play a meaningful role, research in this area remains sparse (Kyriakopoulos et al., 2024) and geographically concentrated in China, Europe, and the United States. Cross-cultural investigations are needed, especially in Africa and Latin America, where entrepreneurial conditions often differ substantially. Such research would provide valuable insights into the cultural and contextual implications of entrepreneurial passion.

CONCLUSION

In summary, our exploratory examination with MASEM demonstrates that the theory of entrepreneurial passion seems both valid and robust, validating its core assumptions. At the same time, our findings point to the need to stretch and extend the theory. First, entrepreneurial passion influences entrepreneurial behaviors and effectiveness through supplemental cognitive mechanisms. Second, its effects become particularly salient under challenging institutional and economic conditions, highlighting its compensatory role in adverse contexts. Together, these insights advance the theoretical understanding of entrepreneurial passion and highlight the need for future research to further reveal psychological mechanisms through which entrepreneurial passion drives entrepreneurial outcomes and to examine how contextual contingencies shape its impact.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

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

ETHICS STATEMENT

Ethics approval was waived for this study because no patients' data were reported.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the authors used DeepL Pro and ChatGPT to improve the readability and language of the text. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the final content of the manuscript.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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