UNDER PRESSURE: FAMILY FINANCIAL SUPPORT AND THE AMBIDEXTROUS USE OF CAUSATION AND EFFECTUATION

ABSTRACT

Using causal and effectual decision-making logics ambidextrously leads to positive firm-level outcomes, such as enhanced new venture performance. However, what makes an entrepreneur more or less likely to apply this ambidextrous use? We address this unanswered question by introducing family financial support as a corresponding antecedent. Taking a family embeddedness perspective, we further theorize that our proposed relationships are weaker when the entrepreneur exhibits a strong internal locus of control. Analyzing a sample of 1,460 student entrepreneurs from 19 countries confirms our general reasoning and offers valuable contributions to different streams of literature.

INTRODUCTION

Entrepreneurs who use causal and effectual decision-making logics ambidextrously in the new venture creation process—meaning that they engage in high levels of both simultaneously—have attracted scholarly attention that continues to grow (Berends et al., 2014; Matalamäki, 2017; Reymen et al., 2017; Smolka et al., 2018). This is largely because this kind of ambidexterity leads to various favorable outcomes, such as opportunity generation (Maine, Soh & Dos Santos, 2015), enhanced business model transformation (Reymen et al., 2017), or, most importantly, better firm performance (Smolka et al., 2018; Yu et al., 2018b); at the same time, the challenges in implementing it are considerable: for instance, due to resource scarcity as a limiting factor (Gupta, Smith & Shalley, 2006; Yu et al., 2018a).

Therefore, the related pressing question is: What makes entrepreneurs more or less likely to apply the ambidextrous use of causation and effectuation? Unfortunately, research that aims to answer this question is virtually non-existent (see also Smolka et al., 2018). Addressing this critical blind spot in the literature would not only help to explain the emergence of this key phenomenon per se, but would also illuminate how its favorable outcomes can ultimately be achieved.

In order to do this, we introduce family financial support (i.e., the financial support that the entrepreneur receives from his or her family to start a new venture) as a corresponding antecedent for three main resource-related reasons. Firstly, the literature seems to suggest that

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the availability of resources is a key driver of causation and effectuation, and particularly their ambidextrous use (Sarasvathy, 2001; Yu et al., 2018b); the latter is largely because it helps to overcome resource scarcity (Gupta et al., 2006). However, the extant literature has so far provided neither explicit theorizing nor empirical testing in that regard. It has not yet been established why precisely this should be the case, what the underlying mechanisms are, and whether this can be confirmed empirically. Secondly, financial capital is the essential resource in the founding process for which causation and effectuation compete (Sarasvathy, 2001, 2008; Yu et al., 2018b), and it affects the entrepreneur's decision-making (Mullins & Forlani, 2005). Thirdly, financial capital provided by the family constitutes a very important—if not the most important—funding source in the founding process, especially for young entrepreneurs (e.g., Miller, Steier & Le Breton–Miller, 2016; Steier, 2003).

We use 'family embeddedness' as a conceptual lens because it addresses the close intertwining of family and business and, relatedly, the family's impact on entrepreneurial decision-making and outcomes (Aldrich & Cliff, 2003; Cruz, Justo & De Castro, 2012; Zahra, 2003). Interestingly, it suggests that while raising financial resources from family members can have positive implications, such as favorable interest rates (Steier & Greenwood, 2000), it can also have negative ones: for example, the requirement to fulfill not only financial but also non-financial obligations (Arregle et al., 2015; Kohli & Künemund, 2003). Therefore, family embeddedness allows us to theorize whether family financial support is actually positively or negatively related to causation, effectuation, and their ambidextrous use, and why.

Moreover, we escalate our theorizing by introducing the entrepreneur's internal locus of control as a contingency factor. This is because, whilst accounting for boundary conditions when investigating the ambidextrous use of causation and effectuation is important in general (Yu et al., 2018b), the literature is aware that the degree to which a family can influence an individual depends on his or her personal characteristics (Le Breton-Miller & Miller, 2009).

Internal locus of control, in turn, encapsulates to what extent individuals are receptive and responsive to pressures from third parties such as family members (Levenson, 1973; Monsen & Urbig, 2009; Rotter, 1966); therefore, it should alter the magnitude of our main relationships.

Specifically, we first theorize that greater family financial support is positively related to using (a) a causal logic and (b) an effectual logic separately, whereby we delve deeply into the effectuation construct by considering all of its four subdimensions (i.e., experimenting, affordable loss, flexibility, and precommitments, see Chandler et al., 2011). Then, we develop arguments as to why greater family financial support is linked to a higher likelihood of employing the different corresponding ambidextrous use combinations. Finally, we turn to the different moderation effects of the entrepreneur's internal locus of control.

Multi-level, mixed-effect linear regressions on a sample of 1,460 student entrepreneurs from 19 countries[1] confirm that greater family financial support is positively related to causation, almost all dimensions of effectuation, its aggregated form, and several ambidextrous use combinations. While we find general support for internal locus of control as a moderator when considering causation and effectuation separately, we cannot confirm moderation effects related to any ambidextrous use combination.

This study advances the causation and effectuation literature in several significant ways. The core contribution is the introduction of family financial support as a key antecedent of using causation and effectuation ambidextrously. More specifically, we link previously unconnected core constructs by theorizing about the underlying mechanisms. By doing so, we explain the emergence of the ambidextrous use of causation and effectuation as the main entrepreneurial outcome of interest, whereby we suggest—and empirically confirm—that it is multifaceted and complex, driven by family-related, firm-related, and individual-related

[1] From the 2011 GUESSS dataset. GUESSS (Global University Entrepreneurial Spirit Students' Survey) investigates student entrepreneurship across the world; see www.guesssurvey.org.

factors. Relatedly, on a more general conceptual level, we also provide a nuanced and differentiated view of the role of resources, because having more resources—when they are provided by the family—not only has an 'enabling' but also a 'pressuring' function. Furthermore, we advance family embeddedness literature, for instance by developing a novel theoretical link between family embeddedness dynamics and the entrepreneur's decision-making logics and by contributing to the discussion of whether family embeddedness dynamics are positive or negative. Lastly, we advance research into the determinants of new venture performance (Hmieleski & Ensley, 2007; Stam & Elfring, 2008) with our post-hoc moderated mediation analyses, which show that family financial support relates to new venture performance in different ways.

THEORETICAL FOUNDATIONS

Causation and effectuation as decision-making logics

Causation represents rational behavior directed toward a pre-existing goal and a planning-oriented 'think first' approach (Mintzberg & Westley, 2001; Perry, Chandler & Markova, 2012). Causation processes "take a particular effect as given and focus on selecting between means to create that effect" (Sarasvathy, 2001, p. 245) and thus refer to many-to-one mappings (Sarasvathy & Kotha, 2001). Causation typically includes developing a business plan based on extensive research and analysis (Fisher, 2012). Effectuation explains entrepreneurial activities under 'Knightian uncertainty' (Sarasvathy & Kotha, 2001) with an 'act first' approach, in the sense of an emergent, non-predictive strategy (Dew et al., 2009a; Mintzberg & Westley, 2001; Wiltbank et al., 2006). Effectuation processes "take a set of means as given and focus on selecting between possible effects that can be created with that set of means" (Sarasvathy, 2001, p. 245), implying one-to-many mappings (Sarasvathy & Kotha, 2001). Chandler et al. (2011) operationalize effectuation as a formative construct with

four dimensions. *Experimentation* refers to the process of entrepreneurs testing different products or business models before determining the actual business. *Affordable loss* is the entrepreneur's notion of focusing on means that are available, and which he or she is able or willing to lose (Sarasvathy, 2001). *Flexibility* means acknowledging the unexpected (Brettel et al., 2012), with entrepreneurs viewing unanticipated events as surprises that represent opportunities (Smolka et al., 2018). *Precommitments* means the striving for "strategic alliances rather than competitive analyses" with third parties (Sarasvathy, 2001, p. 252).

Regarding antecedents, more predictable firm and market conditions likely induce causation, since it is more effective than effectuation in such a context; effectuation seems more appropriate with higher uncertainty (Perry et al., 2012; Sarasvathy, 2001). Moreover, expert entrepreneurs are more likely to use effectuation than novice entrepreneurs (Dew et al., 2009a). Additionally, a performance-based culture seems to support a causal logic, and a socially supportive culture an effectual logic (Laskovaia, Shirokova & Morris, 2017). However, there is still a strong need to identify further antecedents (Arend, Sarooghi & Burkemper, 2015; Grégoire & Cherchem, 2019; Jiang & Tornikoski, 2019). Regarding outcomes, both causal and effectual decision-making logics, when examined separately, contribute to R&D project performance (Brettel et al., 2012) and, importantly, enhance new venture performance (e.g., Deligianni, Voudouris & Lioukas, 2017; Read, Song & Smit, 2009; Smolka et al., 2018) as well as SME performance (Shirokova et al., 2020).

The ambidextrous use of causation and effectuation

Causation and effectuation are complementary logics that "can occur simultaneously, overlapping and intertwining" (Sarasvathy, 2001, p. 245), with entrepreneurs frequently using them in tandem (Sarasvathy, 2001, 2008). This has led to a rapidly increasing stream of qualitative (e.g., Galkina & Lundgren-Henriksson, 2017; Reymen et al., 2017) and quantitative (e.g., Berends et al., 2014; Smolka et al., 2018; Yu et al., 2018b) research.

Whilst some scholars have labeled this phenomenon as 'synergistic use' (Smolka et al., 2018) or 'simultaneous use' (e.g., Laine & Galkina, 2017; Matalamäki, 2017), we follow others who have applied the term 'ambidextrous use' (e.g., Alsos & Clausen, 2014; Yu et al., 2018b). The reason is that organizational ambidexterity refers to the simultaneous use of exploration and exploitation, meaning that organizations (or individuals) engage in high levels of both at the same time (Gibson & Birkinshaw, 2004; He & Wong, 2004; Rosing & Zacher, 2017).[2] Entrepreneurs engaging in high levels of both causation and effectuation simultaneously, in turn, is precisely our focus here. In fact, the organizational ambidexterity literature has established two preconditions for ambidexterity: that exploration and exploitation are orthogonal to each other (e.g., Cao, Gedajlovic & Zhang, 2009; Lubatkin et al., 2006) and non-substitutable, meaning that a high level of one cannot substitute for a lack of the other (e.g., Gibson & Birkinshaw, 2004; Jansen, Simsek & Cao, 2012). Causation and effectuation fulfill these prerequisites; scholars agree that they are orthogonal (e.g., Chandler et al., 2011; Perry et al., 2012; Reymen et al., 2015), and because the ability of effectuation processes to contribute to new venture performance is "contingent upon the presence of at least a threshold level of causation processes, and the other way around" (Smolka et al., 2018, p. 578), non-substitutability is given as well (see also Yu et al., 2018b). Moreover, organizational ambidexterity refers to a specific period of time, such as the past three years (He & Wong, 2004; Lubatkin et al., 2006). In the context of causation and effectuation, the same is true; Sarasvathy (2001) generally refers to the process of new venture creation, and Chandler et al. (2011, p. 381) to the "start-up phase". We thus focus on 'the ambidextrous use of causation and effectuation' defined as "the entrepreneur's simultaneous engagement in high levels of both causation and effectuation in the founding process."

[2] 'Ambidexterity' may refer to: exploration and exploitation, cost leadership and differentiation (Porter, 1980), competition and collaboration (Li, Nguyen & Yu, 2016), or causation and effectuation (e.g., Alsos & Clausen, 2014; Yu et al., 2018b); it can also exist on the individual level (Mom et al., 2018).

Using causation and effectuation ambidextrously complements their respective deficiencies and avoids dangerous extremes (Yu et al., 2018b); it enables benefit to be drawn from both approaches and the resulting synergistic effects (Smolka et al., 2018). Through these mechanisms, it may enhance new venture performance as a crucial outcome (Galkina & Lundgren-Henriksson, 2017; Smolka et al., 2018; Yu et al., 2018b). Importantly, the ambidextrous use of causation and effectuation has been found to explain variance in new venture performance over and beyond the respective main effects (Smolka et al., 2018). Other potential positive outcomes are improved opportunity generation (Maine et al., 2015) and business model transformation or innovation (Reymen et al., 2017; Sitoh, Pan & Yu, 2014). Negative potential effects include reaching paradoxical outcomes (Yu et al., 2018b) or conflicts because different structures and processes are required (Ebben & Johnson, 2005).

Unfortunately, there is a dearth of studies about the antecedents of the ambidextrous use of causation and effectuation. As a notable exception, Jiang and Tornikoski (2019) suggest that entrepreneurs combine causation and effectuation when they perceive different types of uncertainties. Still, those authors conclude that uncertainty "might not be the most appropriate construct" (p. 38) and that we know relatively little about when and why entrepreneurs employ effectuation and causation (see also Arend et al., 2015; Read et al., 2016). This is also because factors which predict organizational ambidexterity do not seem transferrable. The reason is that most of them are organizational-level or group-level factors (see Asif, 2017 for a taxonomy), such as the organizational context (Gibson & Birkinshaw, 2004; Tushman & O'Reilly, 1996); as such, they cannot predict the decision-making logics of entrepreneurs in the founding process where the organization does not yet exist. There are also a few individual-level antecedents, such as the tenure of managers (Mom, Fourné & Jansen, 2015) or their leadership approach (see Asif, 2017); however, they also relate to how individuals behave inside an already extant organization.

Family financial support and family embeddedness

We introduce family financial support as an antecedent for three main resource-related reasons. Firstly, the *availability of means in terms of resources* is assumed to play a crucial role for causation (i.e., by choosing the best means to reach a pre-determined goal), effectuation (i.e., by using a given set of means to achieve an unspecified outcome), and their ambidextrous use (see Sarasvathy, 2001, 2008). The latter is because, for instance, it allows resource scarcity to be overcome (Gupta et al., 2006; Rogan & Mors, 2014; Yu et al., 2018b). However, it is unclear why resources should be relevant exactly, what the underlying theoretical mechanisms are, and whether an association can be confirmed empirically. Secondly, the available *financial capital* is the essential resource in the founding process (Sarasvathy, 2001, 2008); it is regarded as the *conditio sine qua non* for new venture creation (Steier, 2003), for which causation and effectuation compete (Chandler, McKelvie & Davidsson, 2009; Stinchcombe, 1965). Also, sources of new venture financing have been found to affect the entrepreneur's decision-making (Mullins & Forlani, 2005). Thirdly, the financial capital for new venture creation is most likely provided by the *entrepreneur's family*. In fact, financial support by the family likely constitutes a very important—if not the most important—source of financial capital in the founding process, particularly in the early or (pre-)seed funding stage (see, for instance, Agrawal, Catalini & Goldfarb, 2015; Cumming & Hornuf, 2018; Miller et al., 2016; Parker, 2009; Steier, 2003; Steier & Greenwood, 2000). This is particularly true for young entrepreneurs, since they typically have not yet accumulated the financial resources necessary to start a new venture (Sieger & Minola, 2017). Therefore, self-financing—another common source of new venture financing—is scarcely a possibility. Moreover, securing a bank loan is difficult, due to the lack of securities, and attracting other forms of external financing is inhibited because an entrepreneurial track record is often missing. Relatedly, Miller et al. (2016, p. 450) state that further studying

"familial sources of venture capital […] would greatly illuminate our understanding of entrepreneurship."

To develop our theory, we draw on the family embeddedness perspective for several reasons. On a general level, family embeddedness—as a form of social embeddedness—describes how family and business are inextricably intertwined and investigates the family's impact on entrepreneurial decision-making and outcomes (Aldrich & Cliff, 2003; Cruz et al., 2012; Zahra, 2003). One of its core topics is the role of family resources in the resource-mobilization process of entrepreneurs and the related consequences (Aldrich & Cliff, 2003; Mari, Poggesi & De Vita, 2016; Pittino, Visintin & Lauto, 2018). On a more specific level, family embeddedness suggests that family financial support represents raising financial resources through 'embedded' or 'strong' ties (Granovetter, 1985; Uzzi, 1996). On the one hand, strong family ties facilitate access to family financial capital, characterized by quick mobilization and lower transaction costs (Au & Kwan, 2009), favorable interest rates (Steier & Greenwood, 2000), or being 'patient' (Rodriguez, Tuggle & Hackett, 2009). On the other hand, strong family ties "contain an implicit principle of reciprocal obligations" (Aldrich, 1999, p. 82), and family norms "revolve at one pole of exchange: long-term generalized reciprocity" (Stewart, 2003, p. 385). Thus, favorable behavior has to be reciprocated (Kohli & Künemund, 2003); in other words, behavior towards others depends on a structure of mutual expectations (Granovetter, 1992). These are often enforced by group pressure or behavioral norms that tie the entrepreneur to the family's will (Bird & Wennberg, 2016). These obligations also exist in the case of altruism, since people's actions are guided by an explicit or implicit obligation to treat others as they are treated (Schulze et al., 2001). Hence, an entrepreneur who relies on family financial support is not only obliged to reciprocate by paying back money and potential interest (for debt capital), or by ensuring an adequate return and avoiding the loss of the investment (for equity capital), which would also be the case

when using other sources of financing, but also by fulfilling non-financial obligations due to social indebtedness, a sense of duty, and a moral burden (Arregle et al., 2015; Kohli & Künemund, 2003). Importantly, the financial and non-financial obligations arising from family embeddedness dynamics can be linked to the entrepreneur's cognition and behavior (Granovetter, 1985); we thus argue that greater family financial support not only implies stronger financial but also especially stronger non-financial obligations that, in turn, affect the likelihood of the entrepreneur's (ambidextrous) use of causation and effectuation.

HYPOTHESIS DEVELOPMENT

Causation

We argue that the greater family financial support, the more likely it is that the entrepreneur will adopt a causal decision-making logic in the founding process. Firstly, because greater family financial support implies a rising threat to the family's financial well-being and, perhaps even more importantly, to family relationships, entrepreneurs have a stronger incentive to conduct extensive analyses of markets, opportunities, and competitors to predict the future and gain control (Sarasvathy, 2001), to eliminate surprises (Dew et al., 2009a), and to overcome the unexpected (Brettel et al., 2012). These aspects are all core to causation (Sarasvathy, 2001).

Secondly, in the not unlikely case of failure (Shepherd, Douglas & Shanley, 2000), not only would money be lost, which would apply equally in the case of other financing sources, but the unsuccessful entrepreneur would also fail to fulfill non-financial obligations (Arregle et al., 2015). Specifically, he or she would deviate from the family's norms and expectations by violating the norm of reciprocity (Kohli & Künemund, 2003; Portes, 1998), which would reduce his or her legitimization (Stewart, 2003) and trustworthiness (Lumpkin, Martin & Vaughn, 2008). Moreover, it would threaten family relationships and 'family peace',

ultimately putting the family system's survivability at stake (Gouldner, 1960). As such, failure not only implies financial, but also social and relational costs, that do not occur with family-external sources of financing. Therefore, with greater family financial support, entrepreneurs will increasingly strive to minimize their venture's risk of failure. Causation, in turn, is a very appropriate means of doing so. In fact, planning in terms of competitive analyses or sophisticated business plans implies learning effects during the planning process (Castrogiovanni, 1996), improved effectiveness of actions (Wiltbank et al., 2006), and facilitated acquisition of additional (financial) resources (Delmar & Shane, 2004); accordingly, causation in general (Smolka et al., 2018) and planning in particular (Brinckmann, Grichnik & Kapsa, 2010) have been positively linked to new venture performance. We argue that entrepreneurs are aware of these outcomes through, for example, entrepreneurship education, mentors and coaches, or books and articles; therefore, stronger pressure to be successful, induced by greater family financial support, should make them engage more in causation.

Thirdly, with greater family financial support, entrepreneurs will also increasingly seek to mitigate the severe consequences of failure, should it occur. Causation is appropriate here because while the family's money will be lost, family relationships and family peace might yet be partly salvaged when the entrepreneur demonstrates that he or she has made well-substantiated and rational decisions (e.g., through extensive analyses and planning). Thus, the family might attribute failure, at least in part, to forces outside the entrepreneur's control, such as competitors or chance, and be more tolerant. As such, applying causation could be a 'safety net', allowing the entrepreneur to plead 'extenuating circumstances'.

Lastly, with greater financial support, family members are likely to impose stronger behavioral norms (Bird & Wennberg, 2016), demanding justification and legitimization (Stewart, 2003). A business plan will help gain legitimacy for actions and the new venture as

such because it conveys the new venture's feasibility and viability (Delmar & Shane, 2004). Furthermore, engaging in causation is very time consuming (Sarasvathy, 2001) and, thus, provides a strong signal of the entrepreneur's commitment, further increasing his or her legitimization.

Hypothesis 1. *Greater family financial support is positively related to the entrepreneur's use of causal reasoning.*

Effectuation's subdimensions and aggregated effectuation

We theorize that greater family financial support is positively linked to the entrepreneur's engagement in all subdimensions of effectuation and, logically, aggregated effectuation. Firstly, because greater family financial support and the corresponding family embeddedness-related dynamics pose a greater threat to family wealth and particularly peace (Arregle et al., 2015; Kohli & Künemund, 2003; Portes, 1998), entrepreneurs have a stronger incentive to reduce uncertainty and to control the future (Sarasvathy, 2001). This can be achieved by increasingly experimenting with given means, since it allows the retrieval of new information that reduces uncertainty (Arend et al., 2015; Deligianni et al., 2017; Dimov, 2010). Moreover, affordable loss reasoning implies thinking in worst-case scenarios and setting a corresponding reference point (Dew et al., 2009a). It processes endogenous, given, and controllable information (Dew et al., 2009b), which leads to concreteness and enhances control over an unpredictable future (Sarasvathy, 2001). In addition, stronger flexibility reasoning enables entrepreneurs to embrace and leverage contingencies as a "path of new outcomes" (Read et al., 2011, p. 144), which generates stability and allows for coping with uncertainty (Deligianni et al., 2017). Precommitments imply that entrepreneurs secure and leverage partnerships with clients or suppliers (Chandler et al., 2011), which enables them to reduce uncertainty and to exert control over the future (see also Brettel et al., 2012; Sarasvathy, 2001).

Secondly, all subdimensions are appropriate to reduce the likelihood of failure (Deligianni et al., 2017; Smolka et al., 2018), which becomes increasingly important with greater family

financial support, since not only money but—unlike with other financing—the family system as a whole is also endangered. More specifically, experimentation is a low-cost method of probing into the future that mitigates potential misjudgments (Chandler et al., 2011); it allows for potential failure to be anticipated early on, as well as for a reduction of risk through diversification (Deligianni et al., 2017). Affordable loss induces a loss-avoidance standpoint (Smolka et al., 2018), with entrepreneurs looking more towards potential downsides than towards expected returns (Sarasvathy, 2001). This leads them to avoid high-risk investments with high failure rates (Dew et al., 2009b). Flexibility allows entrepreneurs to shape opportunities through the creative use of surprise or improvisation (Vera & Crossan, 2005). Thus, they are more likely to move to better business alternatives and to abandon unsuccessful endeavors quickly, instead of sticking to obsolete assumptions and pursuing dead-ends (Deligianni et al., 2017). Precommitments reasoning spreads risk between several stakeholders (Brettel et al., 2012), whereby entrepreneurs generally strive for win-win situations (Sarasvathy, 2001). When partners give feedback, this also creates a valuable test-market without owning all of the means to do so (Chandler et al., 2011). Therefore, engaging in all subdimensions of effectuation, as well as aggregated effectuation, increases the likelihood that entrepreneurs can reciprocate favorable behavior (Stewart, 2003) and fulfill not only financial but also non-financial obligations (Arregle et al., 2015), which reduces the odds of losing personal legitimization and trustworthiness (Lumpkin et al., 2008) and damaging family relationships (Gouldner, 1960). When entrepreneurs are aware of and anticipate these positive implications, which we assume, they will thus show greater corresponding engagement with greater family financial support.

Thirdly, all subdimensions effectively mitigate the consequences of failure, which is more pressing with greater family financial support (as the family system is increasingly at stake). The exploratory trial-and-error approach of experimentation implies that the new venture

"fail[s] cheap" (Smolka et al., 2018, p. 590), which reduces harm to the family's financial well-being and family relationships. Furthermore, because all the metaphorical eggs have not been put into the one metaphorical basket, family supporters might be more likely to grant 'extenuating circumstances', which helps to salvage family relationships. Affordable loss reasoning implies rather small investments in a cautious step-by-step manner (Harms & Schiele, 2012), which limits downside risk (Deligianni et al., 2017) and decreases the likelihood of overspending (Brettel et al., 2012) and escalation of commitment (Dew et al., 2009b); therefore, failure becomes more survivable. Flexibility allows the entrepreneur to invest less time (Brettel et al., 2012) and fewer resources (Sapienza et al., 2006), reducing the entrepreneur's and the family's downside risk. Also, when the failed entrepreneur has tried to take advantage of contingencies, rather than sticking to obsolete plans or assumptions, the criticism and blame from family members is likely to be less harsh. Precommitments mitigate the damage to family wealth and to family relationships because responsibilities, costs, and the burden of having failed are shared with others (Brettel et al., 2012; Deligianni et al., 2017).

Lastly, because justification and legitimization become more important with greater family financial support (Stewart, 2003), experimentation is more likely, since it allows key decisions to be justified (Chesbrough, 2010). Precommitments are more likely because having family-external partners early on—for instance, through partnerships including pre-orders (Chandler et al., 2011; Sarasvathy, 2008)—sends a positive signal about the future development of the venture and thus provides increased legitimization (Deligianni et al., 2017).

Hypothesis 2. *Greater family financial support is positively related to the entrepreneur's use of (a) experimentation reasoning, (b) affordable loss reasoning, (c) flexibility reasoning, (d) precommitments reasoning, and (e) aggregated effectual reasoning.*

The ambidextrous use of causation and effectuation

We argue that with greater family financial support, the likelihood of entrepreneurs engaging in the ambidextrous use of causation and effectuation should be higher. Firstly, as discussed, greater family financial support and the related family embeddedness dynamics imply a greater need to reduce uncertainty and seek control over the future; this, in turn, can be addressed by increasingly engaging in different types of ambidextrous use. For instance, entrepreneurs can combine taking control of the future through prediction (i.e., causation) with trial-and-error learning through experimenting (Deligianni et al., 2017); the information gleaned via the latter will lead to more reliable predictions and, thus, a reduction in uncertainty. Using causation and affordable loss ambidextrously implies that the predictions of the future are based on a focal reference point, namely losing the family's money in a worst-case scenario (Dew et al., 2009a), and rely on aspects within the entrepreneur's control, which enhances the concreteness and controllability of causal activities (Sarasvathy, Simon & Lave, 1998). Uncertainty is also reduced when entrepreneurs apply causation and leverage contingencies through flexibility reasoning. While still following a plan, there is a certain amount of flexibility within given boundaries, which allows the exploration of a wider range of options (Read et al., 2011; Reymen et al., 2015). Using causal and precommitments reasoning ambidextrously will lead to a reduction of uncertainty, because precommitments provide more focus in the process of working together with stakeholders (Rothaermel & Deeds, 2006), which should enhance the predictive power of causation-related activities.

Secondly, as mentioned previously, greater family financial support increases the pressure to be successful because of financial and particularly non-financial family embeddedness-based implications in case of failure (Aldrich & Cliff, 2003; Kohli & Künemund, 2003); these negative implications, in turn, loom less large when using other forms of financing. We argue that increased ambidextrous use of causation and effectuation is an appropriate response to

this pressure. This is because whilst there might be downsides under certain circumstances (Yu et al., 2018b), it normally allows entrepreneurs to exploit the benefits of both logics, ultimately leading to enhanced firm performance (Smolka et al., 2018). More specifically, sticking to an existing business plan can be dangerous, as external conditions may change (Brinckmann et al., 2010); therefore, entrepreneurs could combine planning according to long-term objectives with short-term experiments (Frese, 2009), which allows them to identify potential misjudgments early in the planning (Chandler et al., 2011). Moreover, planning may benefit from a loss-avoidance standpoint because when entrepreneurs look more towards potential downsides, they refrain from making overly risky investments (Dew et al., 2009b), which decreases the likelihood of failure. Using causation and flexibility ambidextrously allows entrepreneurs to take advantage of opportunities as they arise, whilst still focusing on a long-term goal (Zheng & Mai, 2013). Well-crafted plans will still be open to change due to unexpected events, and serve as guidelines that can be deviated from; this, in turn, should increase the odds of success (Smolka et al., 2018). The ambidextrous use of causation and precommitments implies that partners can give feedback to planned products and services (Chandler et al., 2011); this allows problems to be detected earlier, and plans to be adapted accordingly. Importantly, entrepreneurs should be aware of these positive outcomes and should therefore anticipate that engaging in the ambidextrous use increases not only the odds of being successful per se, but also the chances of being able to reciprocate favorable behavior by fulfilling family embeddedness-induced obligations and repaying social indebtedness (see Arregle et al., 2015; Kohli & Künemund, 2003; Lumpkin et al., 2008). Therefore, when the pressure and the need to succeed are increased due to greater family financial support and the corresponding family embeddedness-related dynamics, the likelihood of engaging in the ambidextrous use of causation and effectuation should be higher.

Thirdly, as mentioned, failure to reciprocate would reduce the entrepreneur's legitimization and trustworthiness within the family (Lumpkin et al., 2008; Stewart, 2003) and would threaten the family system as a whole (Aldrich & Cliff, 2003; Gouldner, 1960). As these implications are much more severe than a ruined business relationship with a bank manager, for instance, greater family financial support and the related family embeddedness dynamics imply a stronger need to mitigate the unfavorable consequences of failure, in case it occurs. The ambidextrous use of causation and effectuation, in turn, addresses this increased need. Generally, family relationships are more likely to be saved when the entrepreneur has applied every possible type of ambidextrous use, literally having done everything he or she can; this will help towards being granted 'extenuating circumstances'. Not having done so, in turn, would be grossly negligent given the high stakes. Ambidextrously using causation and experimentation reduces the impact of failure because the latter will allow entrepreneurs to anticipate in good time that plans will not work; therefore, failure will be cheaper (see Smolka et al., 2018). Using causation and affordable loss ambidextrously implies that the business plan, for instance, will foresee several smaller and sequential investments (Harms & Schiele, 2012); thus, failure would be more survivable (Dew et al., 2009b). Moreover, a result of using causation and flexibility ambidextrously is that the causal activities will not negligently ignore important contingencies (Read et al., 2011). Family supporters should then be less likely to blame the entrepreneur in that regard, which might help save family relationships. The consequences of failure are also mitigated when causation and precommitments are used ambidextrously, because having plans backed up by the precommitments of others means that the entrepreneur is not the only one to blame for developing a business plan that led to failure.

Fourthly, greater family financial support induces an increasing need to legitimize decisions. This can be addressed, in turn, by ambidextrously using causation and experimentation, for instance; when writing a business plan is linked with simultaneous

experimentation, the decisions made in the business plan will be backed up with the results of the experiments, which should increase their legitimization (Chesbrough, 2010). Further to this, when the business plan demonstrates that precommitments with third parties have been established, this is an even stronger signal for the positive future of the new venture, reinforcing the justification and legitimization of related decisions (Stewart, 2003).

Lastly, greater family financial support will not only increase the need for ambidextrously using causation and effectuation but also the ability to do so. This is because causation and effectuation compete for scarce financial resources in the founding process (Chandler et al., 2009; Yu et al., 2018b), which means they tend to be mutually exclusive when resources are scarce (Gupta et al., 2006). We argue that greater family financial support helps to overcome this scarcity and, therefore, makes the ambidextrous use of causation and effectuation more likely. In fact, access to financial resources through family ties is a core aspect of family embeddedness (Aldrich & Cliff, 2003); such informal ties are indeed relevant for resource mobilization and individual-level ambidexterity (Rogan & Mors, 2014). More specifically, greater family financial support will allow entrepreneurs to invest not only in causation (e.g., in extensive analyses and business plan development) but also, for instance, in conducting experiments (e.g., by building a prototype) or in taking action to flexibly and actively leverage contingencies (Yu et al., 2018b) at the same time. To summarize, we formally state:

> ***Hypothesis 3.*** *Greater family financial support is positively related to the entrepreneur's ambidextrous use of (a) causal and experimentation reasoning, (b) causal and affordable loss reasoning, (c) causal and flexibility reasoning, (d) causal and precommitments reasoning, and (e) causal and aggregated effectual reasoning.*

The moderating effect of internal locus of control

We introduce the entrepreneur's internal locus of control as an individual-level moderator for several reasons. Firstly, contingency factors are important when investigating the ambidextrous use of causation and effectuation in general (Yu et al., 2018b). Secondly, and more specifically, our theorizing focuses on how the family-induced pressure to fulfil

financial and non-financial obligations affects the entrepreneur's decision-making logics; the degree to which a family can influence an actor, in turn, likely depends "on a number of characteristics of that person" (Le Breton-Miller & Miller, 2009, p. 1183). This aligns with the basic notions that individual and personal characteristics matter in an entrepreneur's decision-making (Sarasvathy, 2008; Shepherd, Williams & Patzelt, 2015) and that the individual entrepreneur should not be ignored (Rauch & Frese, 2007). Thirdly, internal locus of control indicates to what degree individuals are receptive and responsive to pressure from third parties (Levenson, 1973; Monsen & Urbig, 2009; Rotter, 1966); therefore, we expect it to alter the magnitude of our main relationships. In fact, Sarasvathy (2008) explicitly mentions internal locus of control as a potentially relevant factor in that context.

Firstly, we argue that when an entrepreneur's internal locus of control is strong, as compared to weak, the perceived pressure to reciprocate by fulfilling financial and non-financial obligations—induced by greater family financial support and the corresponding family embeddedness dynamics—will be lower. This is because an entrepreneur with a strong internal locus of control perceives that the performance of a behavior, such as being successful, which allows the fulfilment of financial and non-financial obligations, is up to him- or herself (i.e., controllability; see Ajzen, 2002; Levenson, 1973; Rotter, 1966). In other words, such an individual believes that achieving a certain outcome is under his or her own control and not under the control of powerful others—like family members who provided financial support—or chance (see Bandura, 1997), also because a strong internal locus of control signifies "mastery over the environment" (Levenson, 1973, p. 397). As such, achieving one's goals is contingent on one's own behavior and actions (Monsen & Urbig, 2009), with the entrepreneur perceiving "events in his life as being a consequence of his own acts" (Levenson, 1973, p. 399), which implies a corresponding causal relationship (Rotter, 1966). Therefore, an entrepreneur with a strong internal locus of control generally regards the

potential negative impact of uncontrollable outside forces as lower and less likely, and perceives that the uncertainty of reaching an outcome is lower (Levenson, 1973). Importantly, he or she will thus be "resistive to subtle attempts to influence" him or her (Rotter, 1966, p. 25). As a consequence, the perceived general social pressure from the family should appear lower (Sieger & Monsen, 2015), the imposed behavioral norms (Bird & Wennberg, 2016) will be weaker, and the obligation to reciprocate as well as social indebtedness, sense of duty, and moral burden (Kohli & Künemund, 2003) will appear less prominent; the same applies to the need to seek justification and legitimization (Stewart, 2003). Therefore, because entrepreneurs with a strong internal locus of control believe that they are already 'in control', the family embeddedness-driven need to seek control and to reduce uncertainty, induced by greater family financial support, will appear weaker. This implies that the relationships between greater family financial support and engaging in predicting the future (causation), exercising control over Knightian uncertainty (effectuation), or using both logics ambidextrously, will be weaker.

Secondly, we theorize that entrepreneurs with a strong internal locus of control will have more confidence in their ability to withstand the actual pressure exercised by the family. This is because they believe that they can influence outcomes through ability, effort, or skills (Levenson, 1973); they regard becoming a successful entrepreneur who can fulfill financial and non-financial obligations as "skill determined" (Rotter, 1966, p. 2) and are confident in having "hard work rewarded" (Levenson, 1973, p. 400). As such, they will be confident in their ability to 'return the favor' or 'shoulder the burden'. The first implication is that they regard the odds of failure as lower than individuals with a weak internal locus of control. As a result, their response to the stronger need to reduce the odds of failure—induced by greater family financial support—by engaging more in causation, effectuation, or particularly their ambidextrous use, will be weaker. In other words, stronger pressure to be successful will

result in less additional action to increase the odds of success (e.g., business planning, anticipating failure early by experimenting, reducing risk by considering affordable loss, being flexible in quitting dead-ends, diversifying risk through precommitments, or by combining all options ambidextrously) when internal locus of control is strong as compared to weak. The second implication is that entrepreneurs with a strong internal locus of control will perceive a lower need to respond to increasing family embeddedness-induced pressure to mitigate the consequences of failure (as they believe that failure as such is less likely). Thus, with greater family financial support, it is less important for those individuals, for instance, to justify decisions through causation activities, to experiment, to fail cheaply (Smolka et al., 2018), to follow an affordable loss principle to limit the downside risk (Sarasvathy, 2001), to be flexible in reducing costs (Deligianni et al., 2017), to rely on partners to limit the ultimate loss (Brettel et al., 2012), and to use all types of corresponding ambidextrous uses.

To conclude, when internal locus of control is strong as compared to weak, the family's pressure will not only appear to be lower in the first place, but entrepreneurs will also be more confident in withstanding the perceived pressure; this implies that the family embeddedness dynamics underlying our main relationships are less powerful. Therefore, we postulate that a strong internal locus of control weakens those relationships (see also Figure 1):

Hypothesis 4. *When the entrepreneur's internal locus of control is strong as compared to weak, the relationships between greater family financial support and (a) causal reasoning, (b) experimentation reasoning, (c) affordable loss reasoning, (d) flexibility reasoning, (e) precommitments reasoning, and (f) aggregated effectuation reasoning will be weaker (i.e., less positive).*

Hypothesis 5. *When the entrepreneur's internal locus of control is strong as compared to weak, the relationships between greater family financial support and the entrepreneur's ambidextrous use of (a) causal and experimentation reasoning, (b) causal and affordable loss reasoning, (c) causal and flexibility reasoning, (d) causal and precommitments reasoning, and (e) causal and aggregated effectual reasoning will be weaker (i.e., less positive).*

Insert Figure 1 here

METHOD

Sample and data collection

As other recent studies, we use the GUESSS 2011 dataset (e.g., Edelman et al., 2016; Smolka et al., 2018; Zellweger et al., 2016). At GUESSS, the Swiss core team develops an online survey in English.[3] In 2011, the email invitation was forwarded to 26 country delegates, who then sent it to their own students and national partner universities (who in turn forwarded it to their students). 489 universities took part, and 93,265 completed responses were collected.[4] Students who agreed to the statements, *"I am already self-employed in my own founded firm"* or *"I have already founded more than one company, and am active in at least one of them,"* received additional new venture-related questions, which reduced the sample to 2,324 key informants. A few obviously incorrect responses (e.g., where the firm was older than the entrepreneur) were excluded. Only responses where all necessary items were answered were used, which reduced the dataset to 1,460 student entrepreneurs from 19 countries.[5]

Measures

Dependent variables. To capture causation and effectuation, we followed other scholars (e.g., Deligianni et al., 2017; Smolka et al., 2018) and employed the scale of Chandler et al. (2011). It uses items on a 7-point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The prompt is, *"The following questions deal with the process of how you laid the foundations for your own company";* thus, it refers to a clearly defined period of time (i.e., the founding process), which is also in line with organizational ambidexterity research (e.g., He &

[3] The scholars involved are fluent in English, and are assisted by native speakers. Through back-translation with other bilingual native speakers, the German and French versions are also prepared. The same procedure is demanded of GUESSS country teams who translate the English survey into other languages. The translations are reviewed and checked for categorical and functional equivalence by the GUESSS core team.

[4] The universities started data collection between March and May 2011 and closed it between April and July 2011. Incentives such as cash or iPads were used. The response rate was 6.3% (Sieger, Fueglistaller & Zellweger, 2011), which is likely an underestimate, since not all universities necessarily invited all their students. Unfortunately, reliable estimates are not available for all universities.

[5] Argentina, Austria, Brazil, China, Finland, France, Germany, Greece, Hungary, Ireland, Liechtenstein, Mexico, the Netherlands, Portugal, Russia, Singapore, South Africa, Switzerland, and the United Kingdom. The means of founder age, gender, study level, firm age and size are almost identical to Smolka et al. (2018).

Wong, 2004; Lubatkin et al., 2006). The measure includes *causation* (5 items, α = 0.896), *experimentation* (3 items, α = 0.760), *affordable loss* (3 items, α = 0.870), *flexibility* (4 items, α = 0.730), and *precommitments* (2 items, Spearman-Brown coefficient = 0.789).[6] For *aggregated effectuation*, all items were combined into one construct (α = 0.816). To match our definition and understanding about orthogonality and non-substitutability, we used a multiplicative operationalization of the *ambidextrous use* as it implies that individuals are ambidextrous "when they engage in high levels of both […], as compared to low levels of one or both" (Rosing & Zacher, p. 4; see also He & Wong, 2004 and Simsek et al., 2009). When multiplying the respective constructs (i.e., the average of the respective items), we mean-centered the main variables to reduce multicollinearity (Cao et al., 2009).

Independent variable. Our scale for *family financial support* is the same that Edelman et al. (2016) and Sieger & Minola (2017) used to investigate outcomes of family financial support in the nascent entrepreneurship context in the same dataset (whereby ours was applied to active entrepreneurs). The prompt is, *"Please indicate to what extent the following statements about your family's support for your entrepreneurial activity apply to you";* the framing of the prompt as well as its location in the survey ensured that respondents were reliably referring to their already existing venture. We relied on three items capturing different forms of family financial support: namely, debt capital, equity capital, and favorable financial conditions. The prompt and items are based on existing definitions and operationalizations of family-provided financial support in the entrepreneurship context (Aldrich & Kim, 2007; Danes et al., 2009; Steier, 2003). Items were anchored from 1 (*not at all*) to 7 (*very much*). Thus, a higher value indicates greater family financial support as perceived by the entrepreneur, which corresponds to smaller financial support from any other

[6] For two-item measures, the Spearman-Brown coefficient is a more appropriate scale reliability index than Cronbach's Alpha (Eisinga, Te Grotenhuis & Pelzer, 2013), which was 0.788. We deleted one reverse-coded item from the original experimentation scale because of a mismatch of the direction even after recoding (as did Smolka et al., 2018). See the Appendix for all the constructs, items, and relevant indices of our study.

source. Put differently, the implicit comparison group of entrepreneurs who financed their venture with greater family financial support is that of entrepreneurs who financed their venture with less family financial support (whereby we do not further specify what these other sources of financing are). This is essential for capturing underlying family embeddedness-related dynamics and how they affect the entrepreneur's decision-making logics (Edelman et al., 2016; Sieger & Minola, 2017). We used the average of the three items (α = 0.728).

Moderator variable. The internal locus of control instrument of Levenson (1973) consists of three subdimensions (i.e., 'chance', 'powerful others', and 'self'), formed of three items each. All items were anchored from 1 (*strongly disagree*) to 7 (*strongly agree*). To capture the entrepreneurs' aggregated internal locus of control, we needed to reverse code the items pertaining to 'chance' and 'powerful others' (Sieger & Monsen, 2015). As a result, a higher average value of the nine items indicates a stronger internal locus of control (α = 0.767).

Control variables. At the individual level, we controlled for *founder's age* and *gender* (coded '0' for male and '1' for female) because the available human capital may depend on age (Gimeno et al., 1997) and because of gender differences in entrepreneurship (Justo, DeTienne & Sieger, 2015). We also controlled for *entrepreneurial experience* with a dummy variable ('1' if another venture had already been created, '0' if not) because expert entrepreneurs tend to rely on effectuation and novice entrepreneurs tend rather to rely on causation (Dew et al., 2009a). For that same reason, we also accounted for general *work experience* that is relevant to the venture ('1' in case it exists, '0' if it does not; see also Smolka et al., 2018). At the family level, family embeddedness dynamics likely depend on how close family members are to each other (Olson & Gorall, 2003); thus, we included a 4-item measure of *family cohesion* (see Sieger & Minola, 2017) based on Olson (1986).[7] At the

[7] "Family togetherness is important," "Family members feel very close," "When family gets together, everyone is present," and "Family members ask each other for help" (1 = *strongly disagree*; 7 = *strongly agree*). The items load unidimensionally with factor loadings between 0.802 and 0.900, an AVE of 0.700, and a Cronbach's Alpha of 0.854.

firm level, the relevance of causation and effectuation, respectively, may change over the firm's lifecycle (Reymen et al., 2015); therefore, we considered *firm age* (in years) and *firm size* (number of full-time equivalent employees – FTE; see Laskovaia et al., 2017). Moreover, since the ability to implement desired logic(s) depends on the degree of decision-making power, we added the entrepreneur's *share of equity* (in percent). Additionally, we used a dummy variable that indicates whether there is a *family co-founder* ('1' if yes, '0' if no), as this might affect family embeddedness dynamics, due to increased bargaining power (Sieger & Minola, 2017). To consider the competitive environment, we used dummy variables for different *industry sectors* ('0' if the firm is not active in the sector; '1' if it is; see also Fisher, 2012).[8] At the country level, we identified three cultural dimensions that may affect causation and effectuation: *assertiveness*, *power distance*, and *uncertainty avoidance,* and used the corresponding GLOBE indexes (House et al., 2004; Laskovaia et al., 2017). Finally, to account for wealth-related differences that likely affect the availability of financial resources, we added *GDP per capita* (Wennekers et al., 2005).[9]

Data quality tests

To mitigate social consistency and desirability motives—which are also among the causes of common method bias (Podsakoff et al., 2003; Spector, 2006)—the variables were spread across the long survey to prevent respondents from anticipating the research questions and adapting their responses accordingly. The respondents were also assured of strict confidentiality and anonymity (Podsakoff et al., 2003). In addition, a few reverse-coded items were used, and all items were formulated neutrally. These *a priori* measures should thus also mitigate potential common method bias concerns (Harrison, McLaughlin & Coalter, 1996). Harman's Single-Factor Test (Harman, 1967) shows that our items load on 14 factors,

[8] Only sectors which accounted for at least ten percent of all responses: communications/information technology (IT) (16.2 percent); wholesale and retail trade (11.2 percent); advertising/marketing/design (10.1 percent).

[9] 2011 data retrieved from the International Monetary Fund (IMF)'s World Economic Outlook database (http://www.imf.org/external/index.htm)

accounting for 65.33 percent of the total variance; the largest factor explains 14.71 percent. A confirmatory factor analysis (CFA) with the independent, dependent, and moderator variables reveals a good fit ($\chi^2(341) = 1141.47$; CFI = 0.955; RMSEA = 0.040).[10] The results for a factor structure where all items load on one factor only are significantly worse (χ^2 (377) = 11098.97; CFI = 0.403; RMSEA = 0.140; difference in $\chi^2 = 9957.50$; df = 36, $p < 0.001$). These results indicate that the measures are empirically distinguishable; therefore, common method bias might not be a serious concern. Regarding multicollinearity, the Variance Inflation Factors (VIF) did not exceed 1.49, which is below the threshold of 3 (Hair et al., 2006).[11] The correlations between items and constructs are below 0.65 (Tabachnick & Fidell, 2013), except between—as expected—aggregated effectuation and its formative elements, as well as between firm and founder age. We tested for potential recall bias by median-splitting our sample by firm age (i.e., the time distance to the completion of the founding process) and did not find any significant mean differences in all our dependent variables.[12]

RESULTS

Table 1 reports the means, standard deviations, and Pearson correlations. The standard deviations indicate that there is sufficient heterogeneity and mitigate homogeneous sample bias concerns. The correlations between the main terms of the independent, moderator, and dependent variables, respectively, are clearly below 0.3 in magnitude, which indicates no

[10] CFI = comparative fit index; RMSEA = root mean square error of approximation. For a good model fit, CFI should be 0.95 or higher (Hu & Bentler, 1999); RMSEA should be below 0.06 (Browne & Cudeck, 1993).

[11] These results are based on OLS regressions in STATA, because when estimating multi-level mixed effects linear regressions in STATA, as we do in our main analyses, VIFs are not reported.

[12] Late respondents are more akin to non-respondents than are earlier respondents (Oppenheim, 1966). Thus, when there are no statistically significant differences between early and late respondents, there should also be no significant differences between respondents and non-respondents, mitigating non-response bias concerns (see also Armstrong & Overton, 1977). Since we could not reliably identify early and late respondents due to the varying start and end dates of the survey, we could not perform such an analysis.

shared variance concerns (Cohen, 1988). As in other studies, the correlations between causation and aggregated effectuation as well as its subdimensions are rather high.[13]

Insert Table 1 here

Our individual-level observations (level 1) are nested within countries (level 2); we thus estimate multi-level, mixed-effects linear regressions ('mixed' command in STATA) to avoid biased and inefficient parameter estimates (Rabe-Hesketh & Skrondal, 2008). Family financial support is positively and significantly related to causation ($\beta = 0.091$; $p < 0.001$; see Model 1 in Table 2), experimentation ($\beta = 0.128$; $p < 0.001$; Model 2), flexibility ($\beta = 0.038$; $p = 0.029$; Model 4), precommitments ($\beta = 0.088$; $p = 0.001$; Model 5), and aggregated effectuation ($\beta = 0.064$; $p < 0.001$; Model 6). This supports Hypotheses 1, 2a, 2c, 2d, and 2e. Hypothesis 2b (affordable loss) has to be rejected ($\beta = 0.030$; $p = 0.259$; Model 3). Family financial support is significantly and positively related to the ambidextrous use of causation and experimentation ($\beta = 0.169$; $p < 0.001$; Model 7 in Table 3) and causation and aggregated effectuation ($\beta = 0.080$; $p = 0.013$; Model 11), supporting Hypotheses 3a and 3e. Hypothesis 3d (causation and precommitments) finds partial support ($\beta = 0.083$; $p = 0.097$; Model 10). Hypothesis 3b (causation and affordable loss: $\beta = 0.048$; $p = 0.322$; Model 8) and Hypothesis 3c (causation and flexibility: $\beta = 0.035$; $p = 0.294$; Model 9) do not find support.

Insert Tables 2 and 3 here

We find a significant and negative family financial support-internal locus of control interaction term for causation ($\beta = -0.046$; $p = 0.044$; Model 12 in Table 4), experimentation ($\beta = -0.055$; $p = 0.020$; Model 13), and aggregated effectuation ($\beta = -0.039$; $p = 0.010$; Model

[13] Smolka et al. (2018), who use the same dataset, find a correlation of 0.578 ($p < 0.01$). Studies using other datasets but also the measure of Chandler et al. (2011) report correlations of 0.665 ($p<0.01$; Yu et al., 2018b), 0.54 ($p<0.001$; Laskovaia et al., 2017), and 0.47 ($p<0.01$; Alsos & Clausen, 2014). Organizational ambidexterity studies also commonly report high correlations (e.g., Cao et al., 2009 with 0.47, $p<0.001$).

17). This supports Hypotheses 4a, 4b, and 4f. Hypothesis 4c finds partial support ($\beta = -0.048$; $p = 0.055$; Model 14), whereby the main relationship between family financial support and affordable loss is not significant (Model 3 in Table 2). Hypothesis 4d (flexibility) finds partial support as well ($\beta = -0.031$; $p = 0.059$; Model 15). Hypothesis 4e (precommitments) has to be rejected ($\beta = -0.025$; $p = 0.315$; Model 16). Finally, all moderation hypotheses pertaining to the ambidextrous use of causation and effectuation (Hypotheses 5a to 5e) must be rejected, because the interaction term is never significant.[14]

Insert Table 4 and Figure 2 here

In large samples, effect sizes may be even more insightful than *p*-values. Thus, similar to Autio, Pathak & Wennberg (2013), we calculated corresponding odds ratios (OR).[15] The OR of the significant main effects ranged between 1.07 and 1.19. For the significant interaction effects, they ranged between 0.91 and 0.94. This is acceptable compared to other recent studies (e.g., Barkema & Schijven, 2008; Laspita et al., 2012; Zellweger et al., 2016), whereby even small effect sizes can have substantial theoretical and practical value (Aguinis et al., 2005). The interaction plots of the (marginally) significant interaction effects (Figure 2) consistently show that when internal locus of control is strong, the relationship between family financial support and the respective dependent variable is weaker (less positive).

Robustness tests

Firstly, the relevance of family financial support may be contingent on family wealth (Rodriguez et al., 2009). While such a variable was not available, the GUESSS survey asked respondents to evaluate the performance of their parents' business, where one existed, as a

[14] The *p*-values are 0.195 (causation & experimentation), 0.688 (causation & affordable loss), 0.205 (causation & flexibility), 0.351 (causation & precommitments), and 0.189 (causation & aggregated effectuation). The detailed results are not reported due to reasons of space. The complete results table is available upon request.

[15] OR < 1 indicate a negative association between two variables; OR > 1 a positive association. An OR of 2 means that when the independent variable increases by one unit, it is twice as likely that the dependent variable increases by one unit. We performed multi-level mixed effects logistic regressions with median splits of our dependent variables because OR cannot be reported in linear regressions.

proxy for parental wealth (Sieger & Minola, 2017).[16] We ran all models in this subsample (N = 588) with parents' firm performance as an additional control variable and confirmed all significant main effects (Models 1-2, 4-7, 10-11) and all significant interactions of internal locus of control (Models 12-15 and 17). Several interaction effects when using ambidextrous use combinations as dependent variables are significant as well. We then removed the parents' firm performance variable and found identical results; this indicates that the results change due to the sample construction and not because of parental wealth as such. Secondly, the financing structure of a new venture might change over time (Berger & Udell, 1998); we thus created two subsamples through a median split of the firm age variable and estimated all our models separately. All significant results remained identical in terms of direction of the coefficients and the *p*-value thresholds met. Thirdly, we scrutinized our family financial support variable in various ways: for instance, by using the three items separately; by creating a dummy variable through a mean split; by using a dummy variable coded '0' for all respondents who indicated '1' for all three items, and coded '1' for respondents who indicated '7' for all items; by excluding all respondents who always indicated '1' and, alternatively, excluding all those who always ticked '7'. In all these tests, the previously significant relationships remained (marginally) significant (whereby the *p*-value thresholds met varied slightly), and the coefficients did not change in direction. Moreover, we performed an out-of-sample test with the GUESSS 2013 dataset where a one-item measure of family financial support and a 10-item version of the causation and effectuation scale of Chandler et al. (2011) were available. The relationship between family financial support and the ambidextrous use of causation and aggregated effectuation (N = 5,301) is positive and significant ($p < 0.05$). Fourthly, to check the validity of the family embeddedness reasoning and whether our results

[16] Based on Dess & Robinson (1984) and Eddleston, Kellermanns & Sarathy (2008), respondents rated parents' business performance in comparison to competitors over the last three years in four dimensions: development of sales, market share, profit, and creation of jobs, with 1 = *worse* and 7 = *better*. The four items load unidimensionally; factor loadings = 0.794 - 0.921; AVE = 0.780; Cronbach's Alpha = 0.902.

are robust when considering other types of support also, we used an extended variable to capture the family's support, not only in terms of financial but also human and social capital (8 items, $\alpha = 0.884$). The main effects remained very stable in terms of the *p*-value thresholds met and the direction of coefficients. Fifthly, we added the squared term of family financial support, but it was not significant ($p > 0.1$); this indicates no curvilinear relationship. Sixthly, while we addressed differences in the level of uncertainty in the entrepreneur's environment (Sarasvathy, 2001) indirectly with our control variables on the industry, culture, and economy level, we also added the 'government instability' indicator—provided by the World Bank—to capture uncertainty related to political issues. All significant relationships did not change direction and remained significant at the same *p*-value thresholds. Seventhly, we investigated our significant interaction effects by creating two respective subsamples through a median split of the internal locus of control variable. The main relationships are always stronger (i.e., more positive) in the 'weak' than in the 'strong' subsample (i.e., with coefficients greater in magnitude and lower *p*-values).[17]

Post-hoc analysis

We included new venture performance as ultimate dependent variable (Smolka et al., 2018; Yu et al., 2018b)[18] and tested for corresponding moderated mediation (Hayes, 2018a, b) in all models where family financial support was significant and where a moderation effect of internal locus of control was confirmed (Models 12, 13, 15, and 17).[19] The conditional indirect effect of family financial support is positive in all models. These effects are stronger for entrepreneurs who are low in internal locus of control (16 percentile) than for those who are moderate (50 percentile) or high (84 percentile). The indexes of moderated mediation are

[17] The detailed results of all the robustness tests are available upon request.

[18] The measure is identical to the one concerned with parents' business performance used above, except that it refers to the performance of the new venture compared to competitors since its establishment. The four items load unidimensionally (factor loadings: 0.708 - 0.886; AVE = 0.695; Cronbach's Alpha = 0.848).

[19] See http://afhayes.com/spss-sas-and-mplus-macros-and-code.html. We used the PROCESS 3.2 macro, Model 7, with 10,000 bootstraps, seed of 209. All detailed results are available upon request.

negative and the bootstrap confidence intervals are statistically different from zero, confirming moderated mediation. The direct relationship between family financial support and new venture performance is positive and significant ($\beta = 0.076$; $p < 0.001$).

DISCUSSION

Our study reveals positive and significant relationships between greater family financial support and causation, experimentation, flexibility, precommitments, and aggregated effectuation; the same is true for the ambidextrous use of causation and experimentation, causation and precommitments (marginally significant), as well as causation and aggregated effectuation. A negative and (partly marginally) significant moderation effect of internal locus of control is found in all main relationships except for precommitments. Surprisingly, we could not confirm any moderation effect with regard to the different ambidextrous use types.

The non-significant relationship between greater family financial support and the ambidextrous use of causation and affordable loss is likely because the former is not related to affordable loss as a main term either. This indicates that the pressure of not losing the family's money is so strong that entrepreneurs cannot afford to lose more when family financial support is greater—as a result, ambidextrous use with causation might also be unaffected. Ambidextrously using causation and flexibility might not be significantly related because flexibility includes aspects that seem quite diametrically opposed to causation. Therefore, it seems very difficult to engage in these logics simultaneously. Lastly, we reveal the interesting picture that entrepreneurs with a strong internal locus of control are less likely to respond to greater family financial support with causation or effectuation than those with a weak internal locus of control; however, they are equally likely to respond with their ambidextrous use. This could signal, for instance, that the ambidextrous use is a 'must-do' response to pressure by the family; applying causation or effectuation separately seems to be less relevant.

Contributions and implications for causation and effectuation literature

Our core contribution is the introduction of family financial support as antecedent to the ambidextrous use of causation and effectuation. It addresses the critical blind spot in the literature about what makes entrepreneurs more or less likely to apply this impactful combination of decision-making logics and enables us to contribute to the burgeoning literature about a central topic in effectuation research (Matalamäki, 2017). More specifically, even though scholars are aware that resources in general, and financial resources in particular, might play an important role in determining whether causation, effectuation, or especially their ambidextrous use is applied (Mullins & Forlani, 2005; Sarasvathy, 2001, 2008), the corresponding relationships have neither been explicitly theorized upon nor empirically tested. To put this differently, such links have been alluded to or have been more or less implicitly assumed, but a solid 'theoretical bridge' has been missing. With our study, we build this bridge by establishing a theoretical and empirical link between family financial support (as a very, if not the most, central financial resource) and, most importantly, the ambidextrous use of causation and effectuation. More precisely, we do so by developing novel theorizing about family embeddedness-related dynamics as underlying mechanisms, and by testing our proposed relationships on a global sample of entrepreneurs; this allows us to explain how and why this crucial phenomenon comes into existence. Here, we are able to draw a picture that is both comprehensive and nuanced, because we consider effectuation's formative elements, all the possible ambidextrous use combinations, and internal locus of control as a contingency factor. This leads us to suggest that the emergence of the ambidextrous use of causation and effectuation is multifaceted and complex, driven by family-related (i.e., obligations), firm-related (i.e., financing aspects), and individual-related (i.e., internal locus of control) factors. Referring to the latter, whilst a moderation effect cannot be confirmed, we note that there is a

negative and significant direct relationship with the ambidextrous use of causation and experimentation (β = -0.189; p = 0.042).

There are two important, related contributions alongside our core contribution. Firstly, on a general conceptual level, our theorizing and findings advocate a nuanced view of the role of resources in the context of causation and effectuation. On the one hand, our study suggests that having more (family-provided) resources is conducive to causation, effectuation, and their ambidextrous use, which is in line with what the extant literature would suggest (Gupta et al., 2006). On the other hand, we show that the reasons as to why this is the case are more multifaceted than one might intuitively expect. In fact, the implications of family embeddedness induced by greater family financial support can be positive or negative; therefore, the direction of the corresponding relationships is not fully intuitive *ex ante*. Our theorizing illuminates why they should actually be positive; more specifically, alongside the established 'enabling' function, family-provided financial capital also has a very important 'pressuring' function due to family embeddedness dynamics which, however, ultimately leads to stronger engagement in causation, effectuation, and their ambidextrous use. Secondly, our study also reveals how greater family financial support relates to causation and effectuation separately. This extends the scope of previously identified antecedents and thus addresses the strong need to extend the corresponding knowledge (e.g., Arend et al., 2015; Grégoire & Cherchem, 2019).

These contributions have crucial implications for future research about the antecedents of the ambidextrous use of causation and effectuation. On the one hand, family financial support as antecedent deserves additional attention. Our study calls for a more differentiated understanding of its potential 'double-edged sword' nature, which enables and pressures entrepreneurs at the same time. Studying factors that affect the balance between upsides and downsides and how this balance relates to key outcomes, such as new venture performance,

would be insightful. In addition, one could investigate explicitly whether, and why, the related family embeddedness dynamics differ, depending on the entrepreneur's gender (Powell & Eddleston, 2013). Furthermore, the relevance of family financial support as such and the prevalence of corresponding financial and non-financial obligations might vary depending on economic, institutional, or cultural boundary conditions (Laskovaia et al., 2017). Therefore, whilst we control for country-level variance, examining such factors explicitly might be of value (Welter, 2011). Relatedly, it may prove promising to examine our relationships in specific contexts such as social or environmental entrepreneurship (York, O'Neil & Sarasvathy, 2016), or to account for the university environment (Bergmann et al., 2018). Lastly, the concept of bricolage is a very relevant alternative to causation and effectuation (see Fisher, 2012). Future research could therefore investigate whether, and to what extent, family financial support is related to bricolage and compare the effects with those related to causation and effectuation, respectively (see also An et al., 2019). In general, scholars should consider the complex interplay of factors on the family, firm, and also individual level in their future efforts.

On the other hand, there are number of potentially promising alternative antecedents whose investigation, however, is beyond the scope of this single study. For instance, scholars could investigate whether, and to what degree, similar relationships could be found for other forms of financing, such as bank loans, business angels, or venture capital. More specifically, they could examine the corresponding financial and potential non-financial obligations and compare them to the obligations induced by family financial support. From our family embeddedness perspective, and given our findings that show that applying causation, effectuation, and their ambidextrous use is more likely with greater (as compared to smaller) family financial support, we believe that the general pattern should be similar, but different in magnitude. This is because the strength of the ties with the respective supporters and, as a

consequence, the severity of the respective non-financial obligations, will vary (see Aldrich & Cliff, 2003; Granovetter, 1985); therefore, we expect the strongest positive relationships for family financial support (due to very strong family ties), positive but weaker ones for business angel support, for instance (as there might not only be a business-related relationship, but also a more personal one), and even weaker but still positive ones for bank financing (as the ties with the bank manager should be comparably weak). A related question is whether this implies that entrepreneurs with greater family financial support are more eager to be successful than those with less or no support of this kind. From a strict family embeddedness perspective, we would say that this seems to be the case, largely because the underlying family embeddedness dynamics are less (or not) applicable to other forms of financing, as just illustrated. Whether and to what degree this is actually correct, however, is ripe for future research. Another interesting financial antecedent is crowdfunding (see Short et al., 2017). It could be insightful to investigate whether (and, if so, how) this drives the ambidextrous use of causation and effectuation. Still, as friends and family members play a crucial role in crowdfunding (e.g., Polzin, Toxopeus & Stam, 2018), our variable likely already includes family financial support provided through crowdfunding. Moreover, potential non-financial antecedents are human and social capital, no matter whether these are provided by family or non-family members. Other alternative predictors might also be found on the team level, such as the composition of entrepreneurial teams (Schjoedt et al., 2013), and on the individual level, with examples being personality variables, entrepreneurial experience, or founder social identities (Fauchart & Gruber, 2011; Sieger et al., 2016). These individual-level variables could also serve as alternative moderators in our research model.

Moreover, our study also affects future research on the ambidextrous use of causation and effectuation as such. We encourage scholars to actually apply the term ‘ambidextrous use’; this could reduce ambiguity and lead to greater consistency in the literature. Furthermore, in

line with other scholars, we advocate a multiplicative corresponding operationalization (Smolka et al., 2018; Yu et al., 2018b). Moreover, we support the view that considering effectuation's subdimensions separately allows more theoretical and empirical depth (see also Arend et al., 2015; Palmié et al., 2018). Furthermore, whilst our theorizing and empirical findings strongly suggest that the ambidextrous use of causation and effectuation has positive outcomes, there might also be negative ones (Yu et al., 2018b). Future research could investigate under which conditions entrepreneurs might become 'lost in decision-making' with 'many-to-many mappings'.

Contributions and implications: family embeddedness literature

By developing detailed theorizing about how family embeddedness dynamics affect the decision-making logics of entrepreneurs, and particularly the ambidextrous use of causation and effectuation, this study expands the scope of previous research. In particular, we support and complement Rogan & Mors (2014) who found that informal external ties are positively related to managers' ambidextrous behavior. Our study differs in that it focuses explicitly on financial support through embedded family ties and the related family embeddedness dynamics, and it also refers to a different type of ambidexterity. On a general level, we support the notion that the provision of resources is a key aspect of family embeddedness (see, for instance, Aldrich & Cliff, 2003; Mari et al., 2016; Pittino et al., 2018), and that the impact of family embeddedness dynamics might differ, depending on the personal characteristics of the entrepreneur (Le Breton-Miller & Miller, 2009).

Our study also addresses the fundamental question of whether family financial support and the related family embeddedness dynamics are good or bad. With a novel spin, our theorizing and findings suggest that the 'negative' aspects of family embeddedness, such as the obligation to reciprocate and the severe consequences in case of failure to do so, actually lead to positive outcomes (i.e., enhanced ambidextrous use of causation and effectuation and,

ultimately, better performance). While family embeddedness dynamics might lead to weaker entrepreneurial intentions (Sieger & Minola, 2017) or to a smaller scope of start-up activities (Edelman et al., 2016), we offer a more nuanced view: some individuals might be 'scared off' of new venture creation, but those who are not and can 'stand the heat' are more likely to be successful. This points to a unique *"less quantity, but more quality"* effect. Future research on family embeddedness should consider this aspect when predicting different entrepreneurial outcomes (e.g., entrepreneurial intentions or behavior, new venture growth, or performance); this could also be studied in more established, older firms (see Zellweger et al., 2019).

Moreover, we hope that our study inspires future research on the general family-entrepreneurship interface. For instance, research into whether (and, if so, how) differences in the entrepreneur's structural, cognitive, political, and cultural-normative embeddedness in the family might affect our results could be of considerable interest (see Le Breton-Miller & Miller, 2009). Our study also calls for a deeper examination of whether (and, if so, to what extent) family embeddedness dynamics sparked by greater family financial support relate to family-to-business enrichment (Powell & Eddleston, 2013), work-family enrichment (Greenhaus & Powell, 2006), or work-family balance (Eddleston & Powell, 2012), and how these links affect the entrepreneur's decision-making logics (and ultimately, success).

Contributions and implications for literature on new venture performance

Our study is also of value to research into the antecedents of new venture performance, one of the core themes in entrepreneurship (Hmieleski & Ensley, 2007; Stam & Elfring, 2008). While a connection between the ambidextrous use of causation and effectuation and new venture performance has already been established (Smolka et al., 2018; Yu et al., 2018b), we draw a more comprehensive and in-depth picture by revealing a direct link between greater family financial support and performance, and indirect links through causation, effectuation, and their ambidextrous use (which are, in turn, partly contingent on the entrepreneur's internal

locus of control). With this, we also respond to Miller et al.'s (2016) call for further research into the effects of financial support from the family and recommend future studies to account for this factor when explaining new venture performance. Additionally, they could also investigate alternative mediators, such as organizational ambidexterity.

Contributions to practice

This study should raise entrepreneurs' awareness of the potential downsides of family financial support, and we hope that this induces them to talk openly with family supporters about expectations and obligations *ex ante*. Because we demonstrate that despite the potential disadvantages, family financial support 'forces' one to do everything possible to be successful, entrepreneurs should realize that family financial support is 'tough but helpful'; therefore, they should carefully evaluate whether they are able and willing to 'stand the heat'.

Limitations and additional research avenues

There are some limitations to the study, which might open up additional research avenues. Firstly, we cannot confirm causality because of cross-sectional data. Still, it should exist as expected; as (family) financial support is a *conditio sine qua non* for new venture creation, it is impossible to engage in causation, effectuation, or their ambidextrous use without it in the first place. Studies using longitudinal data would certainly be welcome. Relatedly, even though student data seems appropriate, since students have not yet typically accumulated the financial resources required to start a new venture (Sieger & Minola, 2017), and because GUESSS datasets have already been successfully used to study antecedents and outcomes of causation and effectuation (e.g., Laskovaia et al., 2017; Smolka et al., 2018), replicating our findings in a sample of the general adult population could be insightful. In addition, we cannot exclude potential survivor bias (because the sample does not include failed entrepreneurs) and success bias (as more successful entrepreneurs might have been more likely to respond).

Secondly, our family financial support variable does not measure absolute amounts of money, percentages of new venture financing, or interest rates. This should not be problematic, however, because the interpretation of absolute numbers is highly subjective. When 20 percent of the investment has been financed with family money, some might perceive this to be large, some might not. Thus, family embeddedness dynamics will differ, even though the absolute number is identical; using specific numbers or percentages would therefore not allow us to establish a solid link to family embeddedness dynamics. Relatedly, because family money is a major source of new venture financing (Miller et al., 2016), the absolute amount of money provided should be highly correlated with its share in the total investment. Therefore, our measure should be a good proxy of both aspects. Also, whilst our measure captures greater versus smaller family financial support, it does not reveal which other financing sources play a role. This should not be problematic because, for instance, the new ventures in our sample are largely very young and small (mean firm age = 5.12 years; mean full-time equivalent employees = 3.06). Hence, the financial capital that has been needed to create them should not be very high, which makes it rather unlikely that venture capitalists or business angels would already have been attracted; this implies that the variance and heterogeneity among other financing sources is likely low. Also, our related robustness tests support our findings; nevertheless, future studies might still provide further insights by using a specific comparison group or by controlling for other financing sources. Moreover, as with other family embeddedness studies, we did not measure financial and non-financial obligations explicitly; developing such measures would be of considerable value.

Thirdly, given the definition and operationalization of the ambidextrous use, we assume that entrepreneurs indeed used causation and effectuation 'simultaneously' in that period. Still, developing items that capture the 'simultaneous' use in a very strict sense would be helpful. Relatedly, the founding process could be divided into distinct phases where the

simultaneous combination of causation and effectuation might vary (Jiang & Tornikoski, 2019; Reymen et al., 2015); assessing potential differences across these phases would be promising. Moreover, a specific 'decision event' might involve elements of both causation and effectuation in the sense of a 'within-decision ambidextrous use' (Reymen et al., 2015); delving deeper into the 'across-versus-within decisions' distinction could thus be promising.

Fourthly, the absolute family financial wealth and what share of this had been invested is unknown. We assume that greater family financial support and the share of family wealth being invested are strongly and positively correlated. Still, this might not be true in every family. Despite the successful robustness test on founders with entrepreneurial parents, future research investigating this relationship could prove promising. Also, the family's experience with entrepreneurial investments is unknown; studies could thus be done in business families following a portfolio approach (Zellweger, Nason & Nordqvist, 2012).

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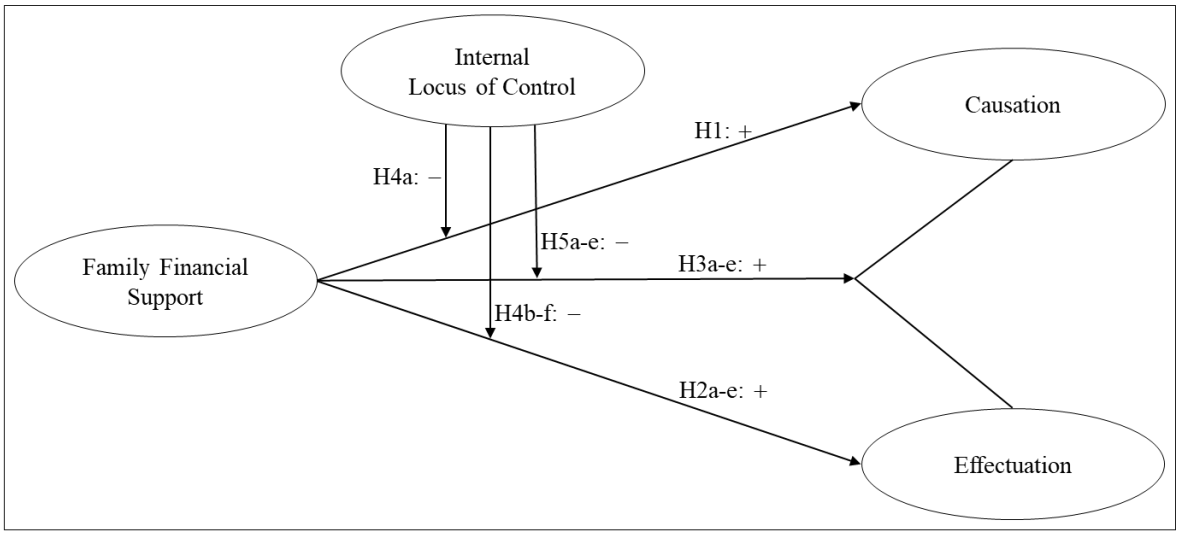

Note: The formative constructs of effectuation are not displayed in order to improve readability and clarity.

FIGURE 1: Conceptual model

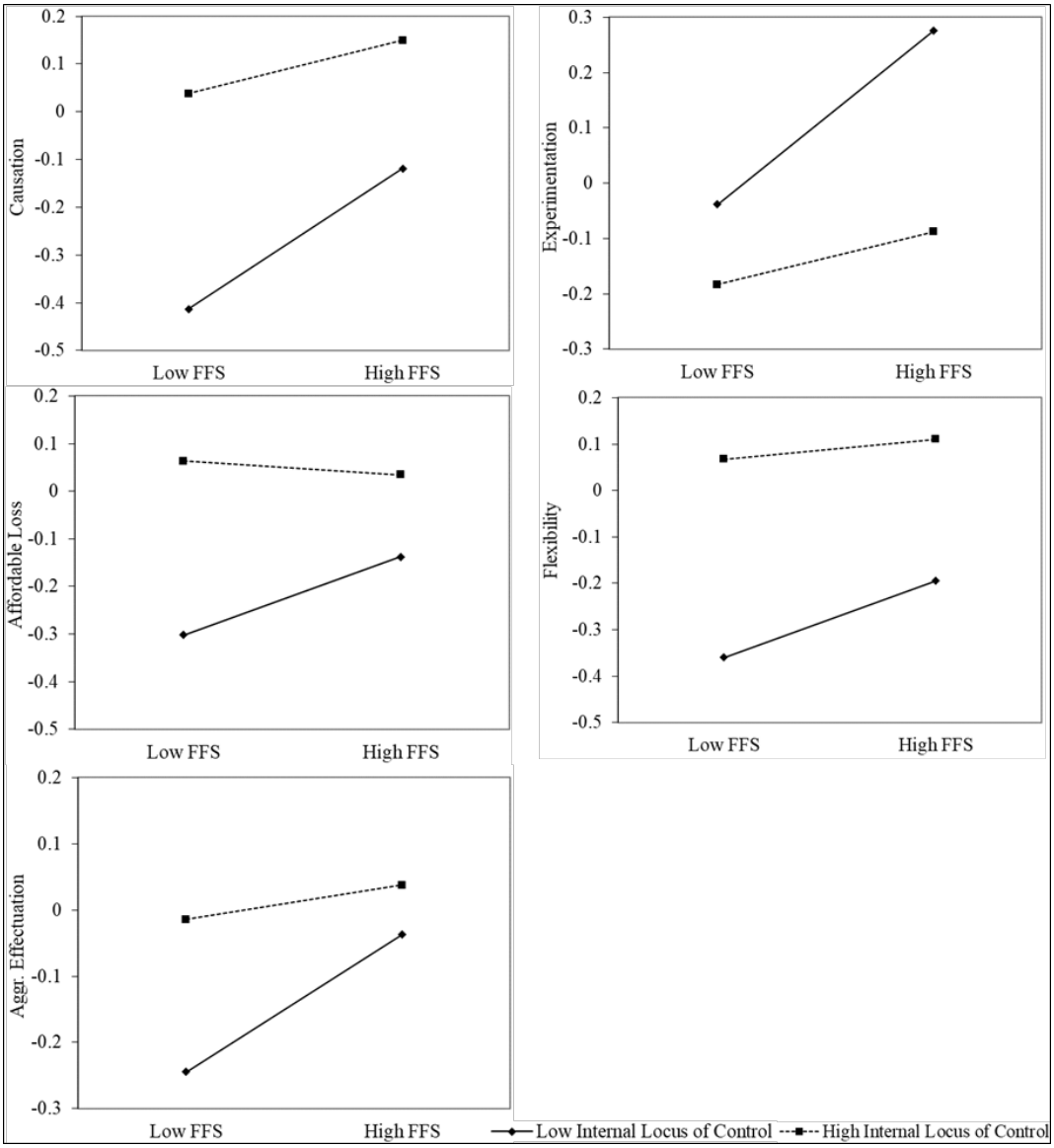

FIGURE 2: Interaction plots

TABLE 1: Means, standard deviations, and Pearson correlations

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Family Financial Support	2.21	1.70	1												
2 Causation	4.32	1.63	.150**	1											
3 Experimentation	3.48	1.69	.174**	.522**	1										
4 Affordable Loss	5.09	1.67	0.024	.243**	.171**	1									
5 Flexibility	5.40	1.09	.073**	.365**	.229**	.454**	1								
6 Precommitments	4.45	1.75	.140**	.496**	.376**	.245**	.432**	1							
7 Aggr. Effectuation	4.68	1.04	.145**	.576**	.660**	.698**	.746**	.682**	1						
8 Causation x Experimentation	16.45	11.79	.202**	.775**	.902**	.244**	.329**	.474**	.712**	1					
9 Causation x Affordable Loss	22.63	12.31	.119**	.817**	.473**	.705**	.500**	.484**	.785**	.696**	1				
10 Causation x Flexibility	23.97	11.52	.149**	.922**	.501**	.363**	.657**	.558**	.735**	.751**	.853**	1			
11 Causation x Precommitments	20.61	12.82	.173**	.827**	.520**	.288**	.464**	.851**	.728**	.733**	.750**	.851**	1		
12 Causation x Aggr. Effectuation	21.19	10.97	.174**	.921**	.652**	.446**	.549**	.625**	.811**	.870**	.912**	.957**	.900**	1	
13 Internal Locus of Control	5.37	0.88	-.199**	.105**	-.057*	.068**	.152**	.069**	.077**	0.000	.107**	.146**	.099**	.100**	1
14 Founder Age	30.86	9.09	-.168**	0.041	.064*	-0.020	0.017	-0.008	0.022	.056*	0.024	0.039	0.020	0.039	.108**
15 Gender	0.28	0.45	-0.040	-0.001	-.074**	0.049	0.021	-0.029	-0.011	-0.048	0.039	0.021	-0.005	0.004	-0.044
16 Entrepreneurial Experience	0.24	0.43	0.023	.121**	.159**	-.083**	0.019	.064*	.055*	.148**	0.027	.097**	.096**	.100**	0.051
17 Work Experience	0.67	0.47	-.110**	.063*	0.033	.060*	.099**	.089**	.097**	0.046	.073**	.090**	.090**	.082**	.096**
18 Family Cohesion	5.45	1.37	.094**	.224**	.111**	.082**	.171**	.122**	.172**	.175**	.197**	.245**	.197**	.226**	.081**
19 Firm Age	5.12	5.61	-.072**	0.014	.126**	-.059*	0.004	0.008	0.031	.093**	-0.014	0.015	0.011	0.028	.084**
20 Firm Size (FTE)	3.06	8.18	.065*	.136**	.120**	-.056*	0.038	.106**	.069**	.139**	.066*	.122**	.133**	.124**	0.026
21 Share of Equity	70.46	30.02	-.105**	-.153**	-.123**	0.039	0.000	-.090**	-.060*	-.129**	-.077**	-.116**	-.118**	-.120**	.058*
22 Family Co-Founder	0.15	0.36	.204**	.113**	.076**	-.057*	-0.007	.094**	0.032	.092**	0.034	.079**	.108**	.083**	-0.002
23 GLOBE Assertiveness	4.34	0.24	-0.029	-.153**	-.229**	0.001	-0.041	-.072**	-.127**	-.219**	-.122**	-.149**	-.128**	-.170**	0.006
24 GLOBE Power Distance	5.05	0.48	.0590*	.227**	.133**	0.048	0.042	.164**	.134**	.194**	.196**	.201**	.217**	.220**	.081**
25 GLOBE Uncertainty Avoidance	4.28	0.78	-0.015	-.269**	-.214**	.066*	-0.023	-.147**	-.110**	-.259**	-.177**	-.238**	-.240**	-.249**	-0.007
26 GDP per Capita	26618	13477	-0.044	-.310**	-.261**	0.020	-.066*	-.226**	-.185**	-.315**	-.233**	-.288**	-.313**	-.312**	-.097**

Variables	Mean	S.D.	14	15	16	17	18	19	20	21	22	23	24	25	26
14 Founder Age	30.86	9.09	1												
15 Gender	0.28	0.45	0.030	1											
16 Entrepreneurial Experience	0.24	0.43	.115**	-.153**	1										
17 Work Experience	0.67	0.47	.249**	0.013	.078**	1									
18 Family Cohesion	5.45	1.37	.073**	.084**	0.013	0.008	1								
19 Firm Age	5.12	5.61	.685**	-.065*	.172**	.103**	.060*	1							
20 Firm Size (FTE)	3.06	8.18	.123**	-0.009	.103**	0.048	.084**	.143**	1						
21 Share of Equity	70.46	30.02	.073**	-0.019	-.117**	0.022	-.081**	0.033	-.185**	1					
22 Family Co-Founder	0.15	0.36	-0.035	-0.016	0.040	-.054*	.115**	0.032	.151**	-.246**	1				
23 GLOBE Assertiveness	4.34	0.24	-0.035	0.000	-0.035	-0.018	-.060*	-0.017	-.095**	.151**	-.074**	1			
24 GLOBE Power Distance	5.05	0.48	.223**	.072**	0.019	.120**	.197**	.179**	.090**	-0.033	.141**	-0.001	1		
25 GLOBE Uncertainty Avoidance	4.28	0.78	-.190**	-.100**	-0.025	-0.033	-.204**	-.178**	-.156**	.115**	-.182**	.296**	-.524**	1	
26 GDP per Capita	26618	13477	-.261**	-.066*	-0.021	-.093**	-.208**	-.218**	-.171**	.132**	-.209**	.323**	-.693**	.878**	1

Notes: *p<0.05, **p<0.01. N=1,460. S.D.=Standard deviation. Industry dummies are not reported seperately; respective correlations do not exceed |0.158|.

TABLE 2: Results of regression analyses – causation and effectuation

	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	Causation			Experimentation			Affordable Loss			Flexibility			Precommitments			Aggr. Effectuation		
	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z
Constant	-0.086	0.145	0.554	0.040	0.186	0.828	-0.075	0.097	0.440	-0.095	0.082	0.246	-0.159	0.182	0.381	-0.055	0.105	0.603
Independent Variable																		
Family Financial Support (FFS)	0.091***	0.024	0.000	0.128***	0.025	0.000	0.030	0.026	0.259	0.038*	0.017	0.029	0.088**	0.027	0.001	0.064***	0.016	0.000
Control Variables																		
Founder Age	-0.001	0.006	0.886	-0.010	0.007	0.127	0.000	0.007	0.956	-0.004	0.005	0.327	-0.019**	0.007	0.008	-0.007†	0.004	0.077
Gender	-0.127	0.090	0.160	-0.212*	0.094	0.024	0.130	0.100	0.193	0.025	0.065	0.698	-0.152	0.100	0.129	-0.043	0.060	0.473
Entrepreneurial Experience	0.413***	0.094	0.000	0.478***	0.098	0.000	-0.270**	0.104	0.009	0.039	0.068	0.565	0.261*	0.104	0.012	0.109†	0.062	0.082
Work Experience	0.146†	0.086	0.092	0.079	0.090	0.377	0.205*	0.095	0.031	0.221***	0.062	0.000	0.298**	0.095	0.002	0.196**	0.057	0.001
Family Cohesion	0.178***	0.029	0.000	0.066*	0.031	0.031	0.118***	0.032	0.000	0.134***	0.021	0.000	0.101**	0.033	0.002	0.108***	0.019	0.000
Firm Age	-0.025**	0.010	0.009	0.031**	0.010	0.002	-0.014	0.011	0.204	-0.001	0.007	0.872	-0.003	0.011	0.745	0.003	0.006	0.597
Firm Size (FTE)	0.010*	0.005	0.042	0.006	0.005	0.263	-0.008	0.005	0.155	0.002	0.004	0.525	0.010†	0.005	0.065	0.002	0.003	0.551
Share of Equity	-0.004**	0.001	0.009	-0.002	0.001	0.116	0.001	0.002	0.493	0.001	0.001	0.282	-0.001	0.002	0.422	0.000	0.001	0.836
Family Co-Founder	-0.069	0.116	0.550	-0.167	0.121	0.165	-0.237†	0.128	0.064	-0.133	0.083	0.109	-0.018	0.128	0.890	-0.146†	0.077	0.057
GLOBE Assertiveness	-0.249	0.336	0.458	-0.797†	0.445	0.073	-0.220	0.197	0.265	-0.028	0.176	0.876	0.302	0.429	0.482	-0.225	0.248	0.363
GLOBE Power Distance	0.404	0.375	0.281	0.171	0.530	0.747	0.285*	0.135	0.035	-0.049	0.171	0.776	0.266	0.500	0.595	0.176	0.286	0.538
GLOBE Uncertainty Avoidance	0.067	0.231	0.773	0.288	0.304	0.344	0.389**	0.120	0.001	0.273*	0.120	0.023	0.452	0.295	0.125	0.330†	0.170	0.052
GDP per Capita	-0.014	0.014	0.343	-0.028	0.018	0.120	-0.010	0.009	0.251	-0.017*	0.008	0.037	-0.035†	0.018	0.050	-0.021*	0.010	0.042
Industry Dummines included																		
Wald chi^2	125.49 ***			108.84 ***			67.59 ***			70.22 ***			70.38 ***			80.51 ***		
LR test versus linear regression: chi^2	17.17 ***			21.97 ***			0.00			3.03 *			33.16 ***			19.49 ***		
LR test of model fit: chi^2	14.17 ***			25.45 ***			1.27			4.59 *			10.72 ***			16.03 ***		

Notes: †p<0.10, *p<0.05, **p<0.01, ***p<0.001. N=1,460. Degrees of freedom (df)=20. For all models except Model 3, the AIC (Akaike's Information Criterion) is smaller than the AIC of the respective control model (i.e., the model with control variables only), which denotes improved model fit. LR test of model fit performed between the reported models and their respective control models using maximum-

TABLE 3: Results of regression analyses – ambidextrous use of causation and effectuation

	Model 7			Model 8			Model 9			Model 10			Model 11		
	Causation x Experimentation			Causation x Affordable Loss			Causation x Flexibility			Causation x Precommitments			Causation x Aggr. Effectuation		
	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z
Constant	1.699***	0.176	0.000	0.948***	0.179	0.000	0.667***	0.124	0.000	1.353***	0.184	0.000	1.109***	0.119	0.000
Independent Variable															
Family Financial Support (FFS)	0.169***	0.048	0.000	0.048	0.048	0.322	0.035	0.034	0.294	0.083†	0.050	0.097	0.080*	0.032	0.013
Control Variables															
Founder Age	-0.028*	0.013	0.026	-0.013	0.013	0.313	-0.015†	0.009	0.083	-0.002	0.013	0.887	-0.016†	0.008	0.065
Gender	0.018	0.180	0.920	0.220	0.183	0.230	0.280*	0.127	0.027	0.381*	0.189	0.044	0.216†	0.122	0.075
Entrepreneurial Experience	-0.203	0.188	0.279	-0.119	0.190	0.533	-0.021	0.132	0.873	-0.140	0.197	0.475	-0.111	0.127	0.381
Work Experience	-0.070	0.173	0.687	-0.171	0.175	0.327	0.036	0.121	0.766	0.081	0.181	0.654	-0.035	0.116	0.765
Family Cohesion	-0.017	0.059	0.772	-0.092	0.060	0.123	-0.015	0.041	0.716	-0.010	0.062	0.865	-0.034	0.040	0.391
Firm Age	0.050*	0.019	0.010	0.024	0.020	0.215	0.013	0.014	0.340	-0.001	0.020	0.956	0.023†	0.013	0.082
Firm Size (FTE)	0.001	0.010	0.924	0.004	0.010	0.710	-0.001	0.007	0.852	-0.005	0.010	0.644	0.000	0.007	0.993
Share of Equity	0.009**	0.003	0.001	0.003	0.003	0.321	0.002	0.002	0.328	0.009**	0.003	0.001	0.005**	0.002	0.006
Family Co-Founder	-0.400†	0.231	0.084	-0.627**	0.235	0.007	-0.355*	0.163	0.029	-0.324	0.242	0.181	-0.429**	0.156	0.006
GLOBE Assertiveness	-0.269	0.357	0.452	-0.383	0.362	0.290	-0.301	0.251	0.230	0.328	0.374	0.381	-0.209	0.241	0.386
GLOBE Power Distance	-0.187	0.245	0.445	-0.363	0.248	0.144	-0.257	0.172	0.136	-0.818**	0.257	0.001	-0.360*	0.165	0.029
GLOBE Uncertainty Avoidance	0.506*	0.217	0.020	-0.067	0.220	0.762	0.018	0.153	0.908	0.352	0.227	0.121	0.174	0.146	0.233
GDP per Capita	-0.037*	0.016	0.019	-0.040*	0.016	0.012	-0.028*	0.011	0.012	-0.047**	0.016	0.004	-0.036**	0.011	0.001
Industry Dummies included															
Wald chi^2	43.34 ***			55.15 ***			51.29 ***			34.09 **			58.23 ***		
LR test versus linear regression: chi^2	0.00			0.00			0.00			0.00			0.00		
LR test of model fit: chi^2	12.44 ***			0.98			1.10			2.74†			6.12 *		

Notes: †p<0.10, *p<0.05, **p<0.01, ***p<0.001. N=1,460. Degrees of freedom (df)=20. For all models except Models 8 & 9, the AIC (Akaike's Information Criterion) is smaller than the AIC of the respective control model (i.e., the model with control variables only), which denotes improved model fit. LR test of model fit performed between the reported models and their respective control models using maximum-likelihood estimates (MLE).

TABLE 4: Results of regression analyses – interaction effects (causation and effectuation)

	Model 12			Model 13			Model 14			Model 15			Model 16			Model 17		
	Causation			Experimentation			Affordable Loss			Flexibility			Precommitments			Aggr. Effectuation		
	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z	Coeff.	s.e.	P>z
Constant	-0.086	0.143	0.547	-0.009	0.180	0.962	-0.085	0.098	0.381	-0.094	0.078	0.229	-0.160	0.182	0.378	-0.065	0.104	0.533
Independent Variable																		
Family Financial Support (FFS)	0.102***	0.025	0.000	0.102***	0.026	0.000	0.034	0.027	0.212	0.052**	0.018	0.003	0.091**	0.028	0.001	0.065***	0.016	0.000
Moderator Main Effect																		
Internal Locus of Control (ILoC)	0.180***	0.047	0.000	-0.127**	0.048	0.009	0.134**	0.051	0.009	0.183***	0.033	0.000	0.084	0.052	0.104	0.076*	0.031	0.014
Interaction Term																		
FFS x ILoC	-0.046*	0.023	0.044	-0.055*	0.024	0.020	-0.048†	0.025	0.055	-0.031†	0.016	0.059	-0.025	0.025	0.315	-0.039*	0.015	0.010
Control Variables																		
Founder Age	0.000	0.006	0.979	-0.010	0.007	0.125	0.001	0.007	0.902	-0.004	0.005	0.398	-0.018**	0.007	0.009	-0.007†	0.004	0.096
Gender	-0.112	0.090	0.214	-0.227*	0.094	0.015	0.137	0.099	0.167	0.041	0.064	0.520	-0.145	0.100	0.147	-0.037	0.060	0.531
Entrepreneurial Experience	0.397***	0.094	0.000	0.497***	0.098	0.000	-0.279**	0.103	0.007	0.022	0.067	0.739	0.254*	0.104	0.015	0.104†	0.062	0.096
Work Experience	0.136	0.086	0.113	0.088	0.089	0.323	0.197*	0.095	0.038	0.210**	0.061	0.001	0.294**	0.095	0.002	0.193**	0.057	0.001
Family Cohesion	0.167***	0.029	0.000	0.075*	0.031	0.014	0.110**	0.033	0.001	0.124***	0.021	0.000	0.096**	0.033	0.003	0.104***	0.020	0.000
Firm Age	-0.027**	0.010	0.006	0.030**	0.010	0.003	-0.015	0.011	0.161	-0.002	0.007	0.748	-0.004	0.011	0.697	0.002	0.006	0.700
Firm Size (FTE)	0.010*	0.005	0.048	0.006	0.005	0.224	-0.008	0.005	0.144	0.002	0.004	0.579	0.010†	0.005	0.069	0.002	0.003	0.571
Share of Equity	-0.004**	0.001	0.004	-0.002	0.001	0.172	0.001	0.002	0.586	0.001	0.001	0.463	-0.001	0.002	0.369	0.000	0.001	0.737
Family Co-Founder	-0.070	0.115	0.545	-0.157	0.120	0.190	-0.238†	0.127	0.061	-0.137†	0.082	0.097	-0.017	0.128	0.892	-0.144†	0.077	0.060
GLOBE Assertiveness	-0.253	0.330	0.443	-0.715†	0.428	0.095	-0.213	0.197	0.279	-0.044	0.167	0.790	0.304	0.429	0.478	-0.210	0.243	0.388
GLOBE Power Distance	0.402	0.366	0.271	0.164	0.506	0.747	0.300*	0.135	0.026	-0.053	0.157	0.736	0.265	0.498	0.594	0.173	0.278	0.534
GLOBE Uncertainty Avoidance	-0.016	0.227	0.945	0.278	0.294	0.344	0.323**	0.122	0.008	0.194†	0.114	0.087	0.412	0.295	0.162	0.283†	0.167	0.091
GDP per Capita	-0.009	0.014	0.516	-0.027	0.018	0.124	-0.005	0.009	0.573	-0.013	0.008	0.106	-0.033†	0.018	0.067	-0.018†	0.010	0.072
Industry Dummines included																		
Wald chi^2	144.45 ***			125.14 ***			77.20 ***			103.91 ***			73.80 ***			92.50 ***		
LR test versus linear regression: chi^2	14.03 ***			21.26 ***			0.00			1.39			31.61 ***			17.23 ***		
LR test of model fit: chi^2	4.05 *			5.35 *			3.68 †			3.55 †			1.01			6.65 **		

Notes: †p<0.10, *p<0.05, **p<0.01, ***p<0.001. N=1,460. Degrees of freedom (df)=22. For all models except Model 16, the AIC (Akaike's Information Criterion) is smaller than the AIC of the respective control model (i.e., the model with control variables only), which denotes improved model fit. LR test of model fit performed between the reported models and their respective control models using maximum-

APPENDIX: Constructs, items, and indices

Construct	Item	Corrected Item-Total Correlation	Factor Loadings	Average Variance Extracted (AVE)	Cronbach's Alpha
Family Financial Support	*Please indicate to what extent the following statements about your family's support for your entrepreneurial activities apply to you.*	-	-	0.770	0.782
	My parents/family provide me with debt capital (capital that bears regular interest payments and that I have to repay).	0.595	0.844		
	My parents/family provide me with equity capital (capital without regular interest payment that may be lost in case the business fails).	0.594	0.903		
	The capital provided by my parents/family has favorable and flexible conditions (e.g., low interest rates or long pay back periods).	0.691	0.885		
Causation	*The following questions deal with the process of how you laid the foundations for your own company. Please indicate your level of agreement with the following statements.*	-	-	0.709	0.896
	I analyzed long run opportunities and selected what I thought would provide the best returns.	0.667	0.782		
	I designed and planned business strategies.	0.803	0.883		
	I organized and implemented control processes to make sure we meet objectives.	0.768	0.860		
	I researched and selected target markets and did meaningful competitive analysis.	0.769	0.859		
	I designed and planned production and marketing efforts.	0.716	0.823		
Effectuation[1]	*The following questions deal with the process of how you laid the foundations for your own company. Please indicate your level of agreement with the following statements.*	-	-	-	0.816
Experimentation	I experimented with different products and/or business models.	0.552	0.797	0.677	0.760
	The product/service that I now provide is substantially different than I first imagined.	0.551	0.796		
	I tried a number of different approaches until I found a business model that worked.	0.673	0.873		
Affordable Loss	I was careful not to commit more resources than I could afford to lose.	0.734	0.882	0.794	0.870
	I was careful not to risk more money than I was willing to lose with my initial idea.	0.804	0.919		
	I was careful not to risk so much money that the company would be in real trouble financially if things did not work out.	0.716	0.871		
Flexibility	I allowed the business to evolve as opportunities emerged.	0.523	0.755	0.564	0.730
	I adapted what I was doing to the resources we had.	0.543	0.766		
	I was flexible and took advantage of opportunities as they arose.	0.618	0.816		
	I avoided courses of action that restricted our flexibility and adaptability.	0.429	0.657		
Precommitments	I used a substantial number of agreements with customers, suppliers and other organizations and people to reduce the amount of uncertainty.	0.651	0.909	0.826	0.788
	I used pre-commitments from customers and suppliers as often as possible.	0.651	0.909		
Locus of Control[2]	*Please indicate your level of agreement with the following statements.*	-	-	-	0.767
Luck	When I get what I want, it is usually because I am lucky. (R)	0.584	0.822	0.667	0.747
	I have often found that what is going to happen will happen. (R)	0.566	0.809		
	It is not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune. (R)	0.579	0.819		
Powerful Others	My life is chiefly controlled by powerful others. (R)	0.734	0.893	0.775	0.848
	I feel like what happens in my life is mostly determined by powerful people. (R)	0.798	0.923		
	In order to make my plans work, I make sure that they fit in with the desires of people who have power over me. (R)	0.633	0.821		
Self	I am usually able to protect my personal interests.	0.534	0.807	0.638	0.708
	When I make plans, I am almost certain to make them work.	0.585	0.838		
	I can pretty much determine what will happen in my life.	0.474	0.749		
Required Value [3]		>0.4	>0.6	>0.5	>0.7

Notes: Principal component analysis, varimax rotation with Kaiser normalization. All items display unidimensionality on their respective construct. [1] *Unweighted summed index based on the associated items of Experimentation, Affordable Loss, Flexibility, & Precommitments.* [2] *Unweighted summed index based on the associated items of Luck, Powerful Others, & Self.* [3] *Factor loadings should exceed the value of 0.6 (Kline, 1998), the AVE of every construct needs to be higher than 0.5 (Christmann & Van Aelst, 2006), the corrected item-total correlations of the specific latent constructs should exceed 0.4, and Cronbach's Alpha should be larger than 0.7 (Nunnally & Bernstein, 1994).*