Long Range Planning xxx (xxxx) xxx

Contents lists available at ScienceDirect

Long Range Planning

journal homepage: www.elsevier.com/locate/lrp

Family CEO affect and R&D investments of family firms: The moderation effect of family ownership structure

Juan Bautista Delgado-García [a,b,*], Virginia Blanco-Mazagatos [a], M. Elena Romero-Merino [a], Celia Díaz-Portugal [a]

[a] Universidad de Burgos. Departamenteo de Economía y Administración de Empresas, Spain
[b] Universidad de Burgos. Centro Internacional de Investigación en Desarrollo Rural, Spain

ARTICLE INFO

Keywords:
Emotions
Affect
Innovation
Family CEO
Family ownership

ABSTRACT

The last decades have seen increasing interest in the determinants of heterogeneity in family firm innovation. In this study, we respond to recent calls to address the micro-level mechanisms behind innovation in family firms. Specifically, we analyze the effect of family CEO affect, namely positive and negative affective traits, on the R&D investment decisions of family firms. We also analyze the moderating effect of family ownership structure on the influence of CEO affect on these strategic decisions. Consistent with affect maintenance arguments, our findings of a sample of 142 Spanish family firms show that positive family CEO affect negatively influences the R&D investments of family firms, while negative affect positively influences these investments. The results also show that family CEO ownership and family CEO branch ownership strengthen the effects of family CEO affect on R&D investments, whereas ownership concentration in other family branches weakens these effects.

1. Introduction

Due to the relevance to economic growth and firm competitive advantage, strategic management research has paid significant attention to the determinants of innovation (Bhattacharya and Bloch, 2004; Díaz-Díaz et al., 2022; Subramanian and Nilakanta, 1996). The family business literature has also explored the antecedents of innovation, particularly the differences between family and non-family firms (e.g., Chrisman and Patel, 2012; Muñoz-Bullón and Sanchez-Bueno, 2011). Given that family members seek to prevent the loss of their socioemotional wealth (i.e., the utility that family-owners derive from the noneconomic aspects of the business), family firms have often been considered as traditional firms that follow conservative strategies (Gomez-Mejía et al., 2007). Accordingly, compared to other types of organizations, family firms are less likely to adopt risky strategies, such as R&D investments (Duran et al., 2016). Indeed, some studies provide evidence of the negative effect of family involvement in innovation inputs, such as R&D investments (Block, 2012; De Massis et al., 2013).

Other studies have explored what makes some family firms more innovative than others by analyzing the influence of specific family firm characteristics on innovation (Calabrò et al., 2019; De Massis et al., 2013), such as ownership structure, management, and control. However, as these issues are still not fully understood (De Massis et al., 2013; Duran et al., 2016), we follow recent calls in the

* Corresponding author. Universidad de Burgos. Departamenteo de Economía y Administración de Empresas, Spain.
E-mail addresses: jbdelgado@ubu.es (J.B. Delgado-García), vblanco@ubu.es (V. Blanco-Mazagatos), meromero@ubu.es (M.E. Romero-Merino), cdportugal@ubu.es (C. Díaz-Portugal).

https://doi.org/10.1016/j.lrp.2022.102230
Received 15 July 2021; Received in revised form 20 April 2022; Accepted 3 June 2022
Available online 7 June 2022

family business literature to address the micro-level mechanisms behind innovation in family firms. Specifically, we study how individual-level factors (e.g., emotions, cognitive bias) relate to macro-level phenomena (e.g., the innovative behavior of family firms) (Ashkanasy et al., 2017; De Massis and Foss, 2018).

Despite the increasing interest in the impact of individual actions, little is known about the role of CEOs in strategic decisions regarding family firm innovation (e.g., López-Fernández et al., 2016). The scarcity of studies on this topic is surprising given that the decisions and behaviors of CEOs significantly condition R&D investments (Duran et al., 2016). Notable exceptions include Duran et al. (2016) on the risk tolerance of family founder CEOs, Kraiczy et al. (2015) on CEO risk propensity in family firms, Kammerlander and Ganter (2015) on family CEOs' non-economic goals, and Stanley's (2010) study related to emotions and the risk-taking differences of family founders, nonfamily managers, and nonfamily founders. Therefore, in line with De Massis and Foss (2018) advocating for a microfoundational approach in family business research, we analyze whether and how family CEO positive and negative affect influence the innovation behaviors of family firms, particularly R&D investments.

Innovation investments involve risk and require the commitment of resources, leading managers to operate in conditions of uncertainty (De Massis et al., 2013; Duran et al., 2016; Lim, 2017). Psychology research has addressed the impact of affect on cognition and decision-making (e.g., Bower, 1981; Forgas, 1995; Schwarz and Bless, 1991), specifically the effect of affective valence (i.e., positive and negative affect) in the selective perception and interpretation of information (Forgas, 1995), and the choice of information-processing strategies (i.e., substantive and more elaborate, or heuristic, creative, and simplified) (Fiedler, 1990; Isen, 2000). Drawing on this literature and on affect maintenance arguments, Isen and colleagues (e.g., Isen and Geva, 1987; Isen and Patrick, 1983; Arkes et al., 1988; Mittal and Ross, 1998) developed alternative arguments on the role of affective valence in individual risk-taking propensities.

The strategic management literature has begun to explore the role of CEO affect[1] on strategic decisions and outcomes (e.g., Delgado-García and De la Fuente-Sabaté, 2010; Treffers et al., 2020) also involving risk-taking (Delgado-García et al., 2010Delgado--García et al., 2010). However, research analyzing affect in family businesses (Humphrey et al., 2021) and its effects on strategic decision-making in these firms is scarce. This is surprising for two reasons. First, affect plays an important role in family firms where family and economic relationships coexist (De Massis and Foss, 2018). Second, the effect of affect on cognition and behavior is particularly salient when the task is complex and/or important for the individual (e.g., Fiedler 1990; Forgas 1995). As family CEOs are strongly committed to their firms (Miller et al., 2014), and innovation management is a complex task (Duran et al., 2016; Kamath and Liker, 1990), the analysis of the effects of affect in strategic management can provide a more complete understanding of the particularistic dynamics of family firms.

In addition, studies on the role of family involvement and innovation management in family firms have highlighted the need to distinguish the effects of two key drivers of family firm behavior and heterogeneity: *willingness* (i.e., "the disposition of family members to engage in idiosyncratic behavior based on their goals, intentions, and motivations"), and *ability* (i.e., "family members' discretion to direct, allocate, add to, or dispose of a firm's resources" (Chrisman et al., 2015, p. 311). Accordingly, the positive and negative affect of family CEOs may influence their disposition to engage in innovation decisions (i.e., willingness), but family firm's ownership structure may influence their discretion (i.e., ability). Ownership structure is a source of CEO power in the firm (Finkelstein, 1992; Hambrick and Finkelstein, 1987), as well as a source of financial resources available to follow a strategic direction (De Massis et al., 2015). According to the psychology literature, the ownership structure influences the relationship between CEO affect and family firm innovation, since the influence of affect on cognition and behavior is especially relevant when the task is important for the individual (Fiedler, 1990; Forgas, 1995), ultimately related to family members' ownership (the higher the ownership, the greater the implications of strategic decisions on their wealth). In view of these considerations, we also analyze the effect of the ownership structure within the family on the relationship between family CEO affect and family firm innovation behavior. Specifically, we analyze the moderating effect of the ownership structure of family members (CEO ownership, family CEO branch ownership, and ownership of other family branches) on the influence of CEO affect on R&D investments.

Our study makes several contributions. First, we respond to recent calls for a microfoundational approach to research in family firms, and more specifically, a deeper analysis of the microfoundations of affect-related aspects that draw on emotional theories (such as the affect infusion model; Forgas, 1995) to provide enriched explanations of family firm behavior (De Massis and Foss, 2018; Miller et al., 2013). Affect is relevant in managerial decisions in any firm, but can be witnessed at its highest intensity in family firms (Brundin and Sharma, 2012), since family and economic relationships coexist (De Massis and Foss, 2018), and family CEOs are strongly committed to their firms (Miller et al., 2014). However, the effect of affect on family firms, and particularly on their strategic behavior, is almost entirely overlooked in the literature (De Massis and Foss, 2018; Humphrey et al., 2021). Therefore, our study extends research on the determinants of family firm R&D investments traditionally focused on analyzing family involvement in ownership, management, and control (De Massis et al., 2013). Specifically, our work introduces a new antecedent of R&D decisions in family businesses: family CEO affect. In addition, we distinguish between two key drivers as determinants of family firm innovation: willingness and ability. Drawing on this distinction, we contribute to the role of family ownership structure in R&D investments by considering the ownership of CEOs, their family branch, and other family branches as a driver of ability. Our findings also complement

[1] While the literature uses different terms, such affect, emotions, and moods, we follow studies (e.g., Forgas, 1995; Baron and Tang, 2011) using *affect* as a general term encompassing emotions and moods.

studies (e.g., Van Doorn et al., 2020) suggesting that family ownership dispersion among family branches may be an underemphasized dimension of the influence of CEO discretion in family firms. In a broader perspective, our study also contributes to research exploring the sources of family firm heterogeneity (Daspit et al., 2021). Furthermore, we extend upper echelons research by focusing on the role of CEO affect on strategic decision (Delgado-García et al., 2010; Treffers et al., 2020).

2. Theoretical framework

Family business research on innovation has focused on the question of whether and why family firms are more or less innovative than other types of organizations (Block et al., 2013; Chrisman and Patel, 2012; Muñoz-Bullón and Sanchez-Bueno, 2011), and the sources of innovation heterogeneity among family firms (Chrisman et al., 2015; De Massis et al., 2014). Innovation is associated with sustainable competitive advantages (D'Aveni et al., 2010; Kleinschmidt and Cooper, 1991; Porter, 1990), but also entails significant risk, high commitment of resources, and long-term decisions (Duran et al., 2016; De Massis et al., 2013). Family business research tends to focus on organizational factors to predict innovation behavior in family firms (Calabrò et al., 2019), often in a risk-oriented perspective and employing arguments based on the preservation of family objectives (Kraiczy et al., 2015).

However, a new individual-level perspective might advance knowledge of innovation in family firms (Kraiczy et al., 2015), as strategic decision-making in these firms is often centralized in the CEO (Duran et al., 2016; Miller et al., 2013). Specifically, CEOs have the potential to influence firm innovation by shaping the firm's strategy and resource allocation (and hence the innovation input) (Crossan and Apaydin, 2010; Duran et al., 2016; Kraiczy et al., 2015).

Drawing on this individual-level perspective, Kraiczy et al. (2015) show that the risk-taking propensity of CEOs conditions the new product portfolio innovativeness of family firms. The meta-analysis of Duran et al. (2016) finds that innovation input is higher when the CEO is founder of the family firm compared to other organizational forms. Moreover, the qualitative study of Kammerlander and Ganter (2015) shows that the specific noneconomic goals of family CEOs (amongst which personal affect associated with the family business) condition their influence on the family firm's adaptation to technological change.

Risk propensity varies among family CEOs depending on both the formulation of the problem and their personal characteristics (Tversky and Kahneman, 1981). Prior research has traditionally focused on CEO age, tenure, and formal education in relation to strategic decisions that involve different levels of risk (Hambrick et al., 1993; MacCrimmon and Wehrung, 1990). Based on these characteristics, and drawing on the psychology literature, strategic management research has begun to explore whether and how affect influences the strategic decisions and risk propensity of CEOs (Delgado-García et al., 2010Delgado-García et al., 2010; Treffers et al., 2020).

2.1. The role of affect in family firms

The literature on affect in family firms is scarce and mainly theoretical. Some studies focus on the emotional returns and costs of owning a family business (Astrachan and Jaskiewicz, 2008; Zellweger and Astrachan, 2008), others on affect-related constructs, such as socioemotional wealth (Berrone et al., 2012). The literature has traditionally argued that family firms "are characterized by a wide range of emotions that result from daily situations and are not static" (Kellermanns et al., 2014, p. 277). Morris et al. (2010) show that when family firms are in their early stage, family business founders experience different emotions to the nonfamily managers or founders of nonfamily firms. However, only a few studies explore the consequences of affect in family firm strategy and decision-making (Bee and Neubaum, 2014; Rafaeli, 2013; Stanley, 2010). For instance, Stanley (2010) draws on affective valence arguments to consider the implications of positive or negative affect of family and non-family founders on the different levels of risk-taking behaviors. Bee and Neubaum (2014) take a different approach to the role of affect in judgements and decision-making. Specifically, they draw on Lerner and Keltner's (2000) arguments on cognitive appraisal tendencies to consider that specific forms of affect may condition individual's decision-making, and in turn, family firm strategy. Instead, Morgan and Gomez-Mejía (2014) describe the consequences of family firm affect on strategic choices among other outcomes. The growing interest in this topic has led to calls for further research on the role of affect in family firms (Rafaeli, 2013) and the strategic choices of family managers (Stanley, 2010).

2.2. The effect of CEO positive and negative affect on family firm innovation

The relationship between affect and cognition has been the subject of intense interest in psychology research (Lazarus, 1999). Psychological models and theories have identified two different effects of affective valence on cognition and decision-making, which may influence individual's risk-taking: (1) the effect of affect on cognitive processes of selective perception based on the affective congruence principle; (2) the effect of affect on the choice of an information processing strategy: the choice between substantive (more elaborate), and heuristic (simplified and creative) processing strategies.

Regarding the former, i.e., affective congruency principle[2] (Rusting, 1998), individuals better process, perceive, attend to, learn, interpret, associate, and recall information that is consistent with their affective states and traits. Consistent with this affective congruency principle, positive affect leads individuals to perceive and interpret positive information better than negative information (Forgas, 1995; Rusting, 1998). Therefore, in any situation that is positive, neutral, or even ambiguous, positive affect leads individuals to evaluate the situation positively (Isen and Shalker, 1982; Isen et al., 1992). In fact, research has shown that positive affect generates positive expectations (Isen and Shalker, 1982), leading people to overestimate the frequency of positive events and underestimate the probability of negative events (Johnson and Tversky, 1983; Nygren et al., 1996; Wright and Bower, 1992; Zelenski and Larsen, 2002). Other studies have shown that positive affect favors riskier decisions, at least when the decision implies a low probability of a significant loss for the decision-maker (Arkes et al., 1988; Isen and Geva, 1987). Therefore, positive affect may lead family CEOs to anticipate to a greater extent the success of innovation investments.

In addition to the influence on congruency and risk-taking, the psychology literature argues that positive affect conditions more creative and innovative processing strategies (e.g., Fiedler, 1990; Forgas 1995, 2001; Isen, 2000). Positive affect has been found to broaden cognitive categories (Fredrickson and Branigan, 2005; Isen and Daubman, 1984), enhancing unusual or remote associations (Isen et al., 1985; Goschke, 2006) and cognitive connections between previously unrelated ideas or concepts (e.g., Amabile, 1983, 1988). Furthermore, individuals with high positive affect have a greater preference for variety (Isen, 2002; Kahn and Isen, 1993). Baron and Tang (2011) show that positive affect among entrepreneurs is significantly related to their creativity, and in turn, positively related to firm-level innovation. These arguments and findings reinforce the idea of the positive influence of positive affect on innovation decisions.

The psychology literature has also shown that negative affect increases individuals' estimation of the frequency of undesirable events and decreases the estimated probabilities of positive events (Johnson and Tversky, 1983; Wright and Bower, 1992; Zelenski and Larsen, 2002). Other studies (e.g., Chou et al., 2007; Mano, 1994; Yuen and Lee, 2003) show that negative affectivity favors risk aversion. Delgado-García et al. (2010) find that CEO negative affect is related to lower risk-taking in the firms they manage. Therefore, the negative affect of family CEOs may lead them to anticipate the lower success of innovation investments. In contrast to positive affect, research on the relationship between affect and cognition also suggests that negative affect favors more substantive and less flexible processing strategies (e.g., Fiedler, 1990; Forgas 1995, 2001). Negative affect narrows individual momentary thought-action repertoires by calling for specific action tendencies (Fredrickson and Branigan, 2005) that may not benefit innovation investments. Following these arguments, we propose:

H1a. Family CEO positive affect has a positive influence on family firm R&D investments.

H2a. Family CEO negative affect has a negative influence on family firm R&D investments.

Alternative hypotheses of the role of affect on risk-taking derive from affect maintenance arguments (Isen, 2000; Isen and Geva, 1987; Isen and Patrick, 1983; Isen et al., 1988). Consistent with the affect maintenance notion, individuals with positive affect are motivated to maintain it and therefore adopt a risk-averse position. Conversely, individuals with negative affect are willing to take greater risks because potential gains may alter their negative affect (Isen, 2000; Mittal and Ross, 1998).[3] Thus, the positive affect of family CEOs leads them to adopt a risk-averse position to avoid potential emotional losses caused by an unsuccessful strategic decision that may impact the fulfillment of their family and financial goals. The negative affect of family CEOs may lead them to perceive risky strategic decisions as an opportunity to meet their family and economic goals through a successful strategic decision, which may allow them to overcome their negative affect. Empirical studies have shown these opposite effects of positive and negative affect on risk-taking (Dunegan et al., 1992; Isen and Geva, 1987; Isen and Patrick, 1983), also in the context of strategic decision-making (Mittal and Ross, 1998). These arguments and empirical findings on affect maintenance lead us to posit:

H1b. Family CEO positive affect has a negative influence on family firm R&D investments.

H2b. Family CEOs negative affect has a positive influence on family firm R&D investments.

2.3. The role of family ownership on family firm R&D investments

Prior studies indicate that family ownership has relevant effects on innovation inputs, such as R&D spending (Block, 2012;

[2] This affective congruency principle operates through two mechanisms: affect-as-information, and affect priming. The affect-as-information mechanism proposes a direct route from affect to cognition and decisions (Forgas, 1995). According to this mechanism, the individual uses affect as a source of information, simply trying to respond to the question: How do I feel about the problem? (Schwarz and Clore, 1988). This use of affect as a judgmental heuristic simplifies decision-making (Clore and Parrott, 1991; Schwarz and Clore, 1988). The affect priming mechanism proposes a more indirect route to link affect to consistent memories and judgements. According to the network theory of affect (Bower 1981, 1991), each emotion has a specific node in memory associated with the events that occurred in the presence of that emotion. When an individual faces a particular stimulus, the corresponding emotional node is activated, as well as the associated memory structures. This theory allows for a consistent explanation of the congruency principle: affect primes cognition, so that when an individual has positive affect, it is easier for him or her to perceive and remember information with the same affective valence (Rusting, 1998).

[3] As Mano (1994) and Isen (2000) suggest, this argument can also be explained in terms of expected utility. The utility of a decision is equal to the probability of the positive outcome multiplied by the utility of that outcome plus the probability of the negative outcome (losing) multiplied by the negative utility (disutility) of that outcome (Edwards, 1961). Thus, positive affect increases the negative utility of a potential loss, reducing risk-taking propensity (Isen, 2000). Negative affect acts in the opposite way.

Chrisman and Patel, 2012; Muñoz-Bullón and Sanchez-Bueno, 2011). Innovation scholars have consequently paid considerable attention to understanding how family ownership affects firm innovativeness. However, the findings are limited and mixed (De Massis et al., 2012; Duran et al., 2016). Indeed, the literature has developed competing arguments on the link between family ownership and innovation inputs. On the positive side, family involvement in ownership provides a long-term perspective/orientation to family owners. Family owners view their firms as assets to pass on to their descendants rather than wealth to consume during their lifetime (Sánchez-Famoso et al., 2015; Rondi et al., 2019). This long-term perspective fosters patient capital, i.e., the capacity to invest in long-run return opportunities (Habbershon and Williams, 1999; Lim et al., 2010). Thus, family owners are expected to advocate for long-term expenditure, such as R&D investments (Chen and Hsu, 2009). Furthermore, families as main shareholders can be effective monitors, thus reducing the moral hazards associated with R&D investments (Muñoz-Bullón and Sánchez-Bueno, 2011). On the downside, family ownership may restrict the use of external financial resources (Muñoz-Bullón and Sánchez-Bueno, 2011). Family owners might be reluctant to incorporate non-family capital due to the desire to retain firm control (Chrisman and Patel, 2012). Furthermore, they may also limit the financial risk that comes with the use of debt given that a significant part of the family's wealth is invested in the firm (Munari et al., 2010). This reluctance toward external financing may block R&D projects that require substantial financial investments. Furthermore, failed R&D initiatives might damage a firm's reputation, thereby reducing the owning family's socioemotional wealth, due to the link between the firm and the family name (Chrisman and Patel, 2012). Finally, potentially higher agency costs that lead to inner family conflicts may negatively influence R&D investments (Rondi et al., 2019).

The arguments on the role of family ownership on innovation inputs do not usually consider that family owners may not be a homogeneous group and the incentives and motives to monitor family managers might vary (Van Doorn et al., 2020), thus overlooking the important heterogeneous effects of the family on family business innovation (De Massis et al., 2015; Rondi et al., 2019). According to De Massis et al. (2015), the heterogeneity of family firms regarding innovation may be explained by two key drivers: the family's willingness and the family's ability. On the one hand, family willingness relates to the favorable disposition to engage in distinctive behavior in accordance with the CEO's objectives. On the other hand, family ability can be understood as discretion and as resources (De Massis et al., 2015) where the former refers to the family's ability to exercise power and legitimacy to dominate the firm's decisions, and the latter to the availability of resources and the capabilities needed to pursue the goals and lead the firm in the preferred direction. As such, ownership can be understood as a source of family ability.

These ability and willingness arguments suggest that family ownership may have a moderating role rather than a direct effect on R&D investments. This approach is in line with studies considering the moderating role of ownership on family firm innovation behavior (Sánchez-Famoso et al., 2019; Van Doorn et al., 2020), particularly in the relationship between CEO characteristics and the innovation investments of family firms (Kraiczy et al., 2015).

2.3.1. The moderation effect of CEO ownership

The effect of family CEO affect on R&D investments may be conditioned by CEO ownership. In fact, both the family business and psychology literature suggests a moderating effect on the interaction between cognition and emotions.

The literatures provides mounting evidence that ownership structure influences the level of CEO managerial discretion or latitude of action (Crossland and Hambrick, 2011), also in the case of family firms (Kraiczy et al., 2015). According to the family business literature, family CEO ownership increases the discretion to dominate the firm's decisions (ability as discretion), and affects the resources available to follow the desired direction (ability as resources) (De Massis et al., 2015). Regarding ability as discretion, managerial latitude of action is stronger when executives' power is high (i.e., higher CEO ownership) (Finkelstein and Hambrick, 1990). Concentration of ownership in the hands of the family CEO is a source of CEO power (Daily and Johnson, 1997; Hambrick and Finkelstein, 1987), implying they are exempt from the internal constraints that limit decision-makers in firms where power is more diluted (Carney, 2005). In addition, ownership benefits CEO discretion, as it increases job security (i.e., CEO ownership reduces the fear of being fired), and decreases the need to maintain a good reputation in the external executive market. Thus, they have a greater ability to make the strategic decisions they consider most appropriate, without favoring relatively safe projects with short-term payoffs (Campbell and Marino, 1994; Hirshleifer and Thakor, 1992; Narayanan, 1985). Ability as resources refers to the availability of resources needed to pursue the goals and lead the firm in the desired direction. CEO ownership favors the ability to manage financial capital without being accountable for short-term results. In other words, CEO ownership fosters patient capital to finance the desired strategies (Habbershon and Williams, 1999; Lim et al., 2010).

Furthermore, psychology research indicates that the influence of affect on cognition and behavior is especially relevant when the task is complex and important for the individual (e.g., Fiedler 1990; Forgas 1995). Judgments that are personally important to an individual are more likely to be processed substantively (Forgas, 1995). The psychology literature shows that in these cases, the influence of affect on cognition is stronger (Forgas and Vargas, 2000). Family CEO ownership allows making strategic decisions, such as innovation inputs, that are personally relevant, since their wealth is highly sensitive to the outcomes of these decisions. Thus, we expect that the higher the level of ownership in the hands of the family CEO, the greater the cognitive processing effort, and hence the greater the effects of affect on R&D investment decisions. Based on these arguments, we expect:

H3a. Family CEO ownership strengthens the influence of CEO positive affect on R&D investments, such that the moderation effect will be positive according to H1a or negative according to H1b.

H3b. Family CEO ownership strengthens the influence of CEO negative affect on R&D investments, such that the moderation effect will be negative according to H2a or positive according to H2b.

2.3.2. The moderating effect of family CEO branch ownership

The moderating effect of family CEO ownership on the relationship between affect and R&D investment could be extended to the effect of the ownership of the family CEO's nuclear family, i.e., family CEO branch ownership. First, the strong ties of the CEO's nuclear family imply close relationships, extraordinary commitment, and deep trust among family members (Lim et al., 2010). Power is centralized in the family CEO (Lim et al., 2010) as head of the nuclear family. Thus, family ownership frees the CEO from internal and external constraints with regard to the managerial labor market and disposing of the firm's financial resources. Accordingly, when ownership is concentrated in the family CEO branch, the CEO may act with greater discretion in her/his choices, leading to CEO affect having a higher impact on risk preferences in terms of R&D investment decisions.

Second, as argued in our previous hypotheses, the influence of family CEO positive and negative affect on cognition and behavior is especially intense when the decision is important for the individual (e.g., Fiedler 1990; Forgas 1995). Family CEOs assess the consequences of their decisions not only on their rents but also on that of their family branch (James, 1999). Family owners hold less diversified investment portfolios and have much of their wealth invested in the firm (Sciascia et al., 2015). Thus, we expect that the higher the level of ownership in the hands of the family CEO branch, the greater the cognitive processing effort, and thus the greater the effects of family CEO affect on family firm R&D investments. Based on these arguments, we posit:

H4a. Family CEO branch ownership strengthens the influence of CEO positive affect on R&D investments, such that the moderation effect will be positive according to H1a or negative according to H1b.

H4b. Family CEO branch ownership strengthens the influence of CEO negative affect on R&D investments, such that the moderation effect will be negative according to H2a or positive according to H2b.

2.3.3. The moderating effect of the ownership of other family branches

The influence of family CEO affect on R&D investments may be also moderated by the concentration of ownership in other family branches different to that of the family CEO. Regarding CEO ability, the ownership of other family branches reduces the CEO's managerial discretion. Ownership provides incentives to family members to become involved in monitoring, since they have a large percentage of their assets invested in the firm (Demsetz, 1988; Block, 2012). In addition, the reputation of both the family and family members as individuals is strongly linked to the firm's success (Deniz and Suarez, 2005; Dyer and Whetten, 2006; Uhlaner et al., 2004). This strong interrelationship between reputation and success tends to increase family owners' commitment to effective monitoring (Block, 2012). Family ties also influence the control exercised by family shareholders. Family ties provide information advantages, allowing them to better understand the value and inherent risks of R&D projects (Tsao et al., 2015). The CEO's more distant family ties with other family branches may favor the monitoring function. Relationships between parents and children are based on close personal connections and ties that lead to attaching themselves to immediate family members. These relationships within the family branch are based on loyalty and respect toward parents (e.g., Kaye, 1996), which can make it difficult for direct family members to control the family CEO. However, due to more distant personal connections, relationships among different branches tend to be more combative than among members of the same family branch (Gersick et al., 1997). The other family branches may feel that the family CEO prioritizes his/her family branch instead of the family as a whole (Michiels et al., 2015; Yoshikawa and Rasheed, 2010; Van Doorn et al., 2020). For these reasons, the other family branches may monitor the CEO's decisions and mitigate his/her discretion over R&D decisions (Kraiczy et al., 2015; Wangrow et al., 2015).

The family CEO's power may be also reduced due to dominant positions in the family firm giving the family members of other branches a strong voice when making decisions (Kellermanns and Eddleston, 2004). This also favors control of managers' decisions by means of direct access to strategies and the threat of using their voting rights (David et al., 2007). Finally, the CEO's discretion may be also reduced because the control of other family branches makes his/her continuity in the position less secure. Thus, the CEO's discretion to make strategic decisions is reduced to those ensuring his/her continuity in the position.

Regarding ability as resources, the family CEO's ability to make strategic decisions will be constrained by reduced access to financial resources. Specifically, different family branches have different goals and levels of commitment to the firm. In this case, increased financial resources may be required to meet the needs of these family branches, limiting the CEO's availability of resources.

In sum, the strong monitoring incentives, the power of voting rights of other family branches, and the low availability of resources reduce the family CEO's latitude of action to set the objectives.

Furthermore, as noted, the influence of affect on cognition and behavior is especially relevant when the task is complex and important for the individual (e.g., Fiedler 1990; Forgas 1995). Although there may be non-family shareholders in the family business, the higher the ownership of the other family branches, the lower the ownership of the CEO and his/her branch. Therefore, the greater the ownership of the other family branches, the less personally relevant the R&D decision will be for the family CEO, since his/her wealth will be less sensitive to the outcomes of the strategic decision. These arguments suggest that the strategic decisions of family CEOs are affected by ownership in the hands of other family branches:

H5a. Ownership concentration among family branches to which the family CEO does not belong weakens the relationship between CEO positive affect and R&D investments, such that the moderation effect will be negative according to H1a or positive according to H1b.

H5b. Ownership concentration among family branches to which the family CEO does not belong weakens the relationship between CEO negative affect and R&D investments, such that the moderation effect will be positive according to H2a or negative according to H2b.

Table 1
Negative and positive affect factor analysis.

	Component 1	Component 2
	Negative affect	Positive affect
Irritable	0.795	
Hostile	0.775	
Jittery	0.748	
Distressed	0.727	
Nervous	0.706	
Upset	0.686	
Afraid	0.653	
Scared	0.649	
Guilty	0.586	
Ashamed	0.367	
Enthusiastic		0.752
Active		0.730
Determined		0.710
Attentive		0.650
Inspired		0.616
Proud		0.609
Excited		0.601
Alert		0.589
Strong		0.584
Interested		0.450
Eigenvalues*	5.201	3.726
% variance	26.006	18.630
% accumulated variance	26.006	44.636
Kaiser-Meyer-Olkin test of sampling adequacy		0.835
Bartlett's sphericity test		
Approximated chi-squared distribution		1071.679
ds		190
Sig.		0.000

3. Data and method

3.1. Sample

We test our hypotheses on a sample of Spanish private family firms. To obtain a representative sample, we used the Sabi-Bureau van Dijk database and selected a stratified random sample of 1000 family firms. Following prior research (e.g., Blanco-Mazagatos et al., 2007; Basco, 2017), we set the criterion of the family having more than 50% ownership and a presence in the firm's management and governance to characterize it as family-owned. As stratification criteria to select the sample, we used firm age (a proxy for firm generation) and size. We only included firms with more than 10 employees (therefore eliminating micro enterprises, according to the European Commission classification; 96/280/EC) to exclude so-called "lifestyle enterprises" (i.e., companies set up as a form of family survival, but whose owners do not have the intention to transfer them to future generations).

In February 2019, we launched an online survey to the CEOs of the selected family firms asking them to complete items related to their individual affect, family firm ownership structure, and R&D investments. Given that family CEOs have a significant influence on strategic decisions in family firms (Finkelstein and Hambrick, 1996; Hambrick and Mason, 1984), we focused on these CEOs to measure positive and negative affect and R&D investments. The questionnaire was sent out in two rounds resulting in a total 155 returned questionnaires. Our response rate of 15.5% is considered acceptable for this type of online survey (e.g., Dennis, 2003; Schulze et al., 2003; Sciascia and Mazzola, 2008). There were no meaningful differences in the survey variables between early and late respondents, suggesting the absence of response bias. From the initial sample, 13 responses were discarded due to incomplete data. Therefore, our final sample comprises 142 family firms.

By measuring the criterion variables with objective data, we prevented common method bias (Podsakoff et al., 2003). However, we also conducted a factor analysis (Harman's single factor test) introducing all variables (i.e., independent, dependent, and control variables). As no method factor emerged, we concluded that common method bias is not a problem in our analyses.

3.2. Variables

Dependent variable. The *R&D investment* variable was extracted from the questionnaire and measured by the ratio of R&D investments to total sales (e.g., Chrisman and Patel, 2012; Gomez-Mejía et al., 2014). This variable is considered a measure of the firm's

Table 2
Descriptive statistics and correlations

	Variables	Mean	SD	1		2	3		4		5		6		7		8	9		10	11		12		13	14		15		16		17
1.	R&D investment	0.09	0.45	1.00																											
2.	Positive affect	0.00	1.00	-0.18	**	1.00																									
3.	Negative affect	0.00	1.00	0.20	**	0.00	1.00																								
4.	Family CEO ownership	0.39	0.33	0.19	**	0.04	-0.07		1.00																						
5.	Family CEO branch ownership	0.49	0.37	0.14	*	0.07	0.01		0.82	***	1.00																				
6.	Ownership of other family branches	0.46	0.37	-0.12		-0.05	0.01		-0.74	***	-0.91	***	1.00																		
7.	First generation	0.27	0.45	-0.04		-0.08	-0.04		0.30	***	0.33	***	-0.35	***	1.00																
8.	CEO tenure[a]	2.96	0.64	0.02		-0.13	-0.18	**	0.12		0.11		-0.12		0.18	**	1.00														
9.	Firm size[b]	9.29	1.54	0.01		0.06	-0.06		-0.03		-0.05		0.08		-0.05		0.03	1.00													
10.	Firm age[c]	3.51	0.60	-0.04		-0.03	0.11		-0.11		-0.17	**	0.18	**	-0.39	***	0.07	0.24	***	1.00											
11.	Firm leverage	0.47	0.25	0.06		-0.02	-0.06		0.09		0.02		0.02		0.20	**	0.07	0.02		-0.12	1.00										
12.	Firm ROA	0.06	0.13	0.00		0.03	-0.08		0.10		0.11		-0.14		0.10		0.03	0.06		-0.05	-0.27	***	1.00								
13.	Firm CAPEX	0.13	0.13	0.17	**	0.06	0.16	*	0.07		0.17	**	-0.13		-0.01		-0.04	0.10		-0.06	0.08		0.07		1.00						
14.	Knowledge-intensive service industry	0.11	0.31	-0.03		0.06	0.04		0.10		0.12		-0.08		0.15	*	0.05	-0.02		-0.10	-0.08		0.00		-0.10	1.00					
15.	Low knowledge-intensive service industry	0.38	0.49	-0.09		-0.07	-0.10		-0.01		-0.02		0.06		0.07		0.04	0.06		-0.02	0.09		-0.16	*	0.01	-0.27	***	1.00			
16.	High-medium technology industry	0.09	0.29	-0.02		-0.07	0.09		-0.06		-0.08		0.04		-0.09		0.03	0.01		0.08	-0.25	***	0.21	**	-0.07	-0.11		-0.25	***	1.00	
17.	Low- medium technology industry	0.32	0.47	0.14	*	0.04	0.03		-0.04		-0.01		-0.02		-0.06		-0.04	-0.10		0.11	0.07		0.03		0.09	-0.24	***	-0.54	***	-0.22	***	1.00

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

[a] The values of the mean and standard deviation of CEO Tenure before the transformation are 23 and 10.96, respectively.

[b] The values of the mean and standard deviation of Firm size before the transformation are 369,474.94 and 2,242,082.5, respectively.

[c] The values of the mean and standard deviation of Firm age before the transformation are 39 and 21.11, respectively.

commitment to innovation and risk-related investments (Balkin et al., 2000; Baysinger and Hoskisson, 1989). Specifically, similarly to Sciascia et al. (2015), we used long-term R&D investments (in the previous 5 years) to capture the lasting effort to introduce innovation inputs.

Independent variables. Following the suggestions of Kellermanns et al. (2014), we used the positive and negative affect schedule (PANAS) (Watson et al., 1988) to measure both *positive* and *negative affect* of CEOs. Specifically, we used Sandín et al.'s (1999) adapted version in Spanish. PANAS is a widely-used scale in entrepreneurship (Baron and Tang, 2011; Foo et al., 2009; Rutherford and Holt, 2007) and strategic management research (Delgado-García et al., 2010, 2012). The scale is composed of 20 items: 10 measuring positive affective traits (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, active), and 10 measuring negative affective traits (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, afraid). We measured the affective traits of CEOs by asking them to rate on a 5-point scale the extent to which they generally experienced each affect. Affective traits and affective states have been shown to produce parallel cognitive effects across many different situations (Rusting, 1998; Lyubomirsky et al., 2005). However, we focus on affective traits rather than affective states because innovation is a continuing process and our dependent variable measures R&D investments over a 5-year period, meaning respondents are more likely to be conditioned by stable affective dispositions than affective states.

From the responses obtained, we identified the affective trait categories using principal component analysis with varimax rotation (Watson et al., 1988). The use of complementary criteria (i.e., eigenvalues, scree plot, and interpretability) led to a two-component solution (see Table 1). We appraised the internal consistency reliabilities with Cronbach's alpha, which is 0.871 for negative affective traits and 0.826 for positive affective traits, both above the 0.7 cut-off (Nunnally, 1978). We used the factor scores of the principal components analysis to construct the two main independent variables of the regression analyses: negative affective traits and positive affective traits (e.g., Delgado-García and De la Fuente-Sabaté, 2010; Momtaz, 2021).

Moderator variables. First, we used family *CEO ownership* measured as the ratio of ownership held by the family CEO to total ownership of the firm to assess the moderating effect of CEOs' involvement in corporate decision-making and their ability to make decisions. Kraiczy et al. (2015) use a similar measure for family ownership of top management team. Second, we included the *family CEO branch ownership,* measured as the ratio of the ownership held by the family CEO and the members of her/his family branch to total ownership of the firm to analyze the moderating effect of the CEO's nuclear family in R&D decisions. Finally, we used the ratio of ownership held by other family members outside the CEO's and her/his family branch to total firm ownership, namely *ownership of other family branches*. This variable captures only the ownership of members of the other family branches. In other words, if adding *family CEO branch ownership* to this variable, we would obtain total family ownership. However, this does not mean that the sum of the *family CEO branch ownership* and *ownership of other family branches* adds up to 100% of ownership, since there may also be non-family owners. Prior studies have used similar measures of family ownership to analyze its interference on the top management team's innovating decisions. Indeed, some authors use the percentage of ownership held by second and subsequent shareholders to proxy their role in opposing the innovation decisions of the controlling shareholder (e.g., García-García et al., 2020). To calculate these three measures, respondents (family firm CEOs) were asked to indicate the percentage of equity they personally owned, the percentage owned by their family branch, and the percentage owned by their whole family. Following Dawson and Richter's (2006) procedure in estimating interaction effects, we standardized all the variables.

Control variables. Following the literature on the determinants of R&D intensity, we controlled for management and firm-level variables. Concerning CEO characteristics, we include *first generation* measured with a dummy variable that takes value 1 if the CEO belongs to the first generation of the family (e.g., Duran et al., 2016; Jiang et al., 2020). We also use *CEO tenure* as the logarithm of the number of years that she/he has served as CEO (e.g., Barker and Mueller, 2002; Block, 2012). Regarding the firm-level variables, we include *firm size*, measured as the logarithm of total assets (e.g., Chen and Hsu, 2009; Jiang et al., 2020; Muñoz-Bullón and Sanchez-Bueno, 2011), *firm age*, measured as the logarithm of the number of years since the firm was established (e.g., Chen and Hsu, 2009; Zahra, 2005), *firm leverage*, calculated as the ratio of total debt to total assets (Gomez-Mejía et al., 2014; Jiang et al., 2020), accounting performance, measured as return on assets (*firm ROA*) (e.g., Jiang et al., 2020; Sciascia et al., 2015), and capital expenditure intensity (*firm CAPEX*), measured as the ratio of cash paid for fixed, intangible, and other long-term assets to sales (e.g., Anderson et al., 2012; Jiang et al., 2020). Finally, to control for the difference in the abundance of innovation opportunities, we used four dummy variables based on the Eurostat indicators on the high-tech industry and knowledge-intensive services (e.g., García-Manjón and Romero-Merino, 2012; Gomez-Mejía et al., 2014), specifically, *knowledge-intensive service industry*, *low knowledge-intensive service industry*, *high-medium technology industry,* and *low-medium technology industry*.

4. Empirical results

The main descriptive statistics and correlations of the variables are shown in Table 2. The average R&D ratio to sales is 9%, CEO ownership mean is 39%, and family branch ownership is 49%. On average, ownership held by other family branches is 46%. According to our data, 27% of CEOs are first generation with 23 years' experience in firm management. The average assets are almost €370,000, and the firms were established on average about 40 years ago. Their average leverage is around 47%, ROA around 6%, and capital expenditure rises to 13%.

We estimated the models using an ordinary least squares (OLS) linear regression analysis. We calculated the variance inflation factors (VIF) in all estimations, which ranged from 1.56 to 1.60. As they do not exceed the generally accepted limit of 10, we assumed the absence of multicollinearity problems. When the dependent and some independent variables are determined simultaneously by other observed or non-observed factors, endogeneity exists and the parameter estimates obtained with OLS regression will be inconsistent (Maddala, 1992). Therefore, following prior studies (e.g., Beiner et al., 2006; Kraiczy et al., 2015; Javeed et al., 2020,

Table 3
The Durbin-Wu-Hausman test for endogeneity of regressors.

	H_0: Regressors are exogenous				
	Positive affect	Negative affect	Family CEO ownership	Family CEO branch's ownership	Ownership of other family branches
Durbin-Watson- Hausman test	1.54	0.96	0.94	1.37	1.49
P-Value	0.2171	0.3298	0.3335	0.2434	0.2244

Notes: The test is applied to the independent and the moderating variables. We estimated two different models using *positive affect* and *negative affect* as dependent variables. We used all the control variables and as an exogenous instrument a new variable measuring the level of CEO identification with the family group. This exogenous variable was built following the scale of Smith et al. (2007). We then estimated three additional models using *family CEO ownership*, *family CEO branch ownership* and *ownership of other family branches* as dependent variables again using all the control variables and as exogenous instrument the existence of a board of directors. Then, we included the residuals of these estimations as independent variables in the original R&D model and calculated the Durbin-Watson-Hausman test shown in this table. The non-significance of these tests indicate the acceptance of H_0: Regressors are exogenous.

2021), we tested for endogeneity of both the independent (positive and negative affective traits) and moderating variables (CEO, family branch, and other branches' ownership). Specifically, we used the Durbin-Wu-Hausman test to detect endogeneity in the OLS regression (Durbin, 1954; Hausman, 1978; Davidson and MacKinnon, 1993), and as shown in Table 3, this led us to accept the null hypothesis of no endogeneity. Thus, we concluded that OLS can provide unbiased and consistent estimates for our sample.

Table 4 presents the results of the model estimations. We estimated the models using hierarchical lineal regression and included the independent, moderator, and control variables in Models 1, 3, and 5, and the interaction terms in Models 2, 4, and 6 (Table 4). The results of Models 1, 3, and 5 show that positive affective traits are negatively related to R&D investments, while negative affective traits positively influence R&D investments. Consequently, our results do not support H1a and H2a, but support H1b and H2b, in line with the affect maintenance arguments.

Table 4
Multiple regression analyses of the influence of family CEO positive and negative affective traits on R&D investments and the moderating effects of family ownership structure.

Dependent variable: R&D	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
MAIN EFFECT												
Positive affect	−0.098	***	−0.076	**	−0.097	***	−0.100	***	−0.096	**	−0.091	**
	(0.037)		(0.034)		(0.037)		(0.037)		(0.037)		(0.037)	
Negative affect	0.098	**	0.057		0.091	**	0.053		0.092	**	0.061	
	(0.038)		(0.035)		(0.039)		(0.038)		(0.039)		(0.038)	
MODERATOR												
Family CEO ownership	0.107	***	0.112	***	–		–					
	(0.038)		(0.035)									
Family CEO branch ownership	–		–		0.075	*	0.081	**				
					(0.040)		(0.038)					
Ownership of other family branches	–		–		–		–		−0.190	*	−0.211	**
									(0.109)		(0.105)	
INTERACTION EFFECT												
*Positive affect * Family CEO ownership*	–		−0.102	***	–		–					
			(0.035)									
Negative affect Family CEO ownership*	–		0.140	***	–		–					
			(0.036)									
Positive affect Family CEO branch ownership*	–		–		–		−0.112	***				
							(0.038)					
Negative affect Family CEO branch ownership*	–		–		–		0.083	**				
							(0.037)					
Positive affect Ownership of other family branches*	–		–		–		–		–		0.103	***
											(0.039)	
Negative affect Ownership of other family branches*	–		–		–		–		–		−0.080	**
											(0.039)	
CONTROL VARIABLES												
First generation	−0.193	**	−0.144		−0.178	*	−0.155		−0.180	*	−0.165	*
	(0.096)		(0.087)		(0.099)		(0.094)		(0.100)		(0.097)	
CEO tenure	0.032		0.003		0.035		−0.013		0.034		−0.005	
	(0.059)		(0.054)		(0.060)		(0.059)		(0.061)		(0.060)	
Firm size	0.020		0.014		0.019		0.026		0.020		0.030	
	(0.025)		(0.022)		(0.025)		(0.024)		(0.025)		(0.025)	
Firm age	−0.109		−0.082		−0.100		−0.066		−0.099		−0.081	
	(0.070)		(0.064)		(0.071)		(0.069)		(0.071)		(0.069)	

(*continued on next page*)

Table 4 (*continued*)

Dependent variable: R&D	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Firm leverage	0.097		0.072		0.136		0.104		0.148		0.111	
	(0.160)		(0.147)		(0.163)		(0.160)		(0.164)		(0.161)	
Firm ROA	0.044		0.050		0.071		0.053		0.074		0.062	
	(0.291)		(0.263)		(0.296)		(0.282)		(0.296)		(0.286)	
Firm CAPEX	0.312		0.364		0.280		0.181		0.308		0.206	
	(0.285)		(0.259)		(0.294)		(0.286)		(0.292)		(0.286)	
Knowledge-intensive service industry	0.066		0.052		0.059		0.030		0.078		0.056	
	(0.163)		(0.147)		(0.165)		(0.158)		(0.166)		(0.160)	
Low knowledge-intensive service industry	0.049		0.042		0.038		0.030		0.047		0.045	
	(0.131)		(0.118)		(0.133)		(0.127)		(0.134)		(0.129)	
High-medium technology industry	0.047		0.009		0.045		0.034		0.042		0.003	
	(0.172)		(0.156)		(0.175)		(0.167)		(0.175)		(0.171)	
Low-medium technology industry	0.193		0.140		0.177		0.143		0.178		0.177	
	(0.134)		(0.121)		(0.136)		(0.130)		(0.136)		(0.131)	
Constant	0.059		0.137		0.018		0.025		0.083		0.090	
	(0.341)		(0.309)		(0.346)		(0.332)		(0.349)		(0.340)	
Number of obs	142		142		142		142		142		142	
VIF	1.59		1.56		1.60		1.57		1.60		2.34	
F	2.06	**	4.14	***	1.71	*	2.57	***	1.67	*	2.57	***
Adjusted R^2	0.096		0.263		0.066		0.151		0.062		0.131	
ΔR^2	–		0.161		–		0.089		–		0.075	
F ΔR^2	–		15.371	***	–		7.383	***	–		6.082	***

Notes: Standard errors in parentheses; $^*p<0.1$, $^{**}p < 0.05$, $^{***}p<0.01$.

The results of Models 2, 4, and 6 show that the adjusted R^2 increases (ΔR^2) and the F of the change in R2 (F ΔR^2) is significant when including the interaction terms, thus clearly helping explain our dependent variable. These models deal with the moderation effect of CEO, CEO branch, and other family branches' ownership.

Results for Model 2 show a negative and significant coefficient for the moderated effect of CEO ownership in the relation between positive affect and R&D investments. This result supports H3a positing that CEO ownership strengthens the negative effect of positive affect on innovation. The results also show a positive and significant coefficient for the moderated effect of CEO ownership in the relation between negative affect and R&D investments. This result therefore supports H3b, as CEO ownership intensifies the positive effect of negative affect on innovation. Regarding CEO branch ownership, we also find in Model 4 that it strengthens the negative effect of CEO positive affect on R&D investments, thus supporting H4a, and the positive effect of CEO negative affect on innovation, hence supporting H4b. Thus, the signs of the interaction terms show that both CEO ownership and CEO branch ownership are in line with the direct effect, strengthening the effect of the independent variable on R&D investment. To ease the interpretation of the interaction effects, Fig. 1 to Fig. 3 plot the graphs (Aiken et al., 1991; Cohen et al., 2002). Fig. 1 shows the first significant interaction effect between positive/negative affective traits and CEO ownership. This effect indicates that when CEO ownership is high, both positive and negative affective traits have a greater influence (negative and positive, respectively) on R&D. A similar effect is found for family CEO branch ownership (see Fig. 2).

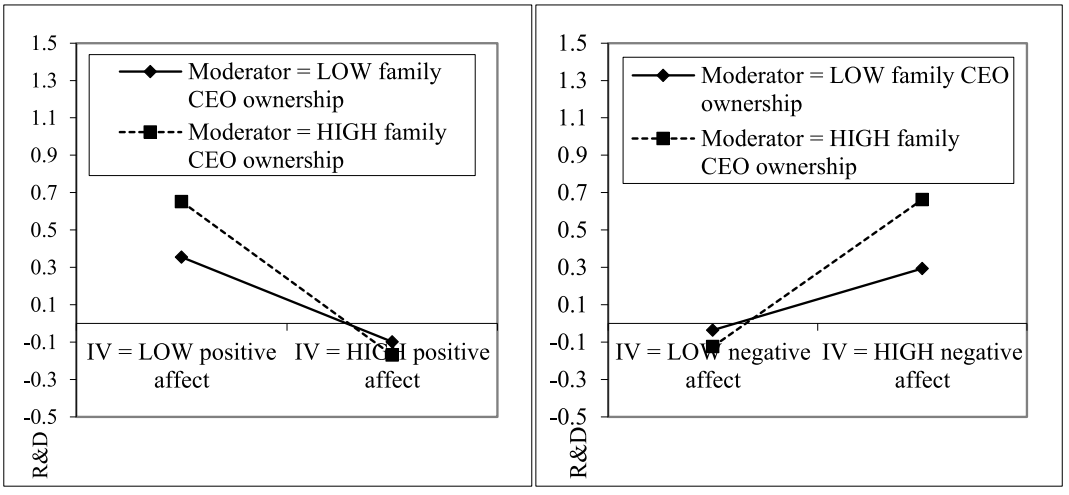

Fig. 1. Influence of family CEO positive and negative affect on family firm R&D investments moderated by family CEO ownership.

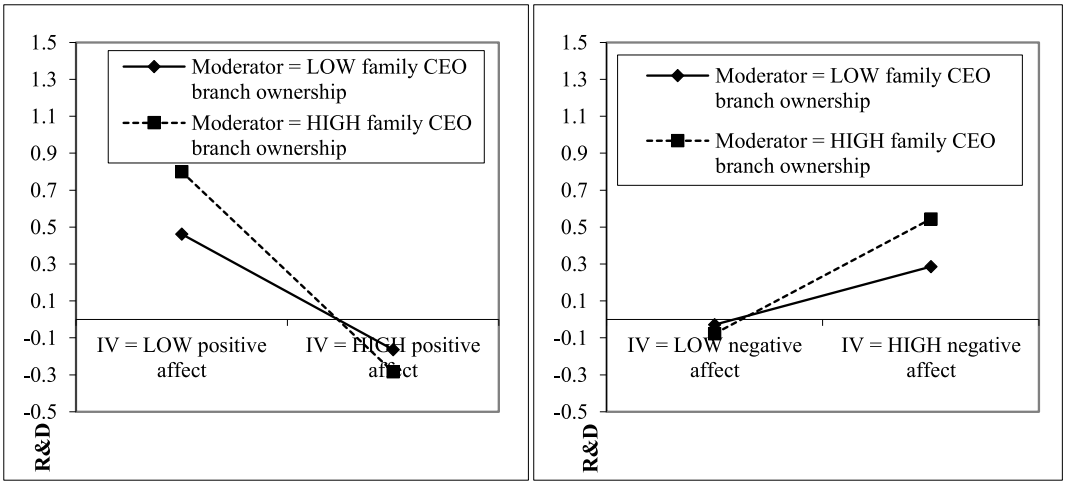

Fig. 2. Influence of family CEO positive and negative affect on family firm R&D investments moderated by family CEO branch ownership.

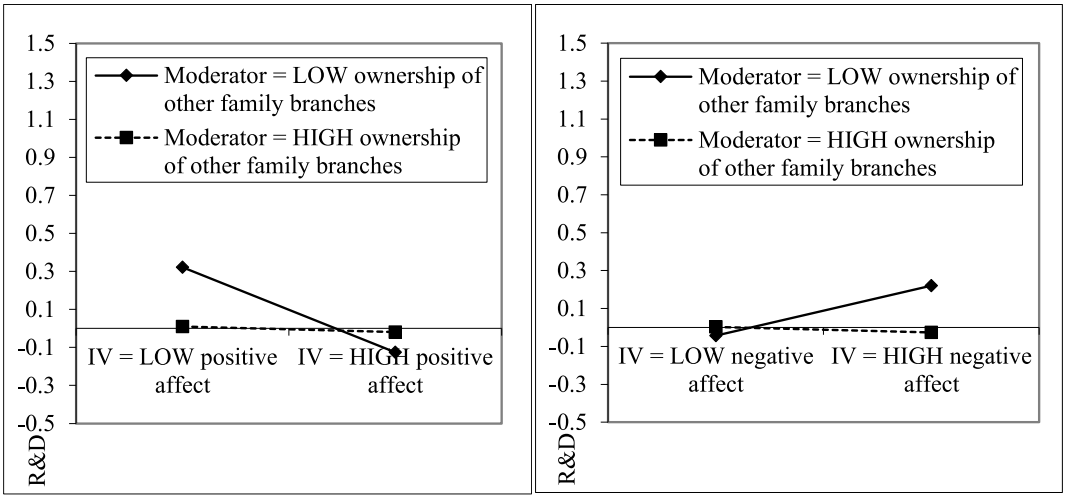

Fig. 3. Influence of family CEO positive and negative affect on family firm R&D investments moderated by ownership of other family branches.

Regarding the effect of ownership of other family branches, Model 6 in Table 4 shows there is also a moderating effect so that the greater the family ownership outside the CEO's control, the weaker the influence of CEO affective traits on R&D investments. Thus, family ownership other than CEO family branch weakens the negative effect of CEO positive affect on R&D investments, supporting H5a. Furthermore, it also reduces the positive effect of CEO negative affect on innovation, supporting H5b. These interaction effects plotted in Fig. 3 show that when family ownership outside the CEO branch is high, R&D investments are nearly independent of the positive and negative affective traits.

5. Discussion

Scholarly interest in analyzing the role of affect in strategic decision-making has grown (Ashton-James and Ashkanasy, 2008; Delgado-García and De la Fuente-Sabaté, 2010; Hodgkinson and Healey, 2011; Kim, 2012; Huy, 2012), while the psychology foundations of strategic management (Levinthal, 2011; Powell et al., 2011) has more recently spread to the family business field (De Massis and Foss, 2018; Yu et al., 2022). Scholars such as De Massis et al. (2018) argue that family firm strategy research needs to consider the interplay of affect at the individual level with strategic dynamics (e.g., innovation strategy). However, research on the role of affect in the strategic decision-making processes of family firms is still in its infancy (Kellermanns et al., 2014).

To respond to these calls, and drawing on studies on the relation between affect and cognition (Forgas, 1995), and risk-taking (Isen, 2000; Schwarz and Clore, 1988), we analyze the effect of positive and negative affect of family CEOs on the R&D investments of family firms. Furthermore, prior studies suggest a complex interaction between family ownership and management on strategic decisions (Van Doorn et al., 2020). Responding to calls to structure research on the determinants of family firm innovation around two key

drivers (willingness and ability) (Chrisman et al., 2015), this study analyzes whether specific family ownership characteristics (i.e., family CEO ownership, family branch ownership, and ownership of family members who do not belong to the CEO family branch) condition the intensity of the effect of family CEO affect on the family firm's propensity to invest in R&D.

Our results show that family CEO affect influences the innovation behavior of family firms. Specifically, family CEO positive affect reduces R&D investments, while family CEO negative affect increases R&D investments in family firms. These results are in line with the findings of Mittal and Ross (1998) based on family CEO affect maintenance arguments. The desire to maintain their positive affect may lead CEOs with high positive affect to reduce R&D investments due to the potential negative effect of the failure of these investments on their affective state. Conversely, the desire to change their negative affect may encourage family CEOs to invest in R&D given the potential positive consequences of the success of innovation inputs on their affect.

These findings also support the arguments of Mano (1994) and Isen (2000) on how affect may condition, in opposite ways, the two components of the expected utility of a decision involving risk (probability and utility), suggesting that the effect of affect on utility is more influential in the risk-taking decisions of individuals than the effect of affect on probability estimates (e.g., Nygren et al., 1996). The utility of a decision is equal to the probability of a positive outcome multiplied by the utility of that outcome plus the probability of the negative outcome (losing) multiplied by the negative utility (disutility) of that outcome (Edwards, 1961). Thus, our findings of the negative effect of CEO affect on family firm R&D investments suggest that although CEO positive affect might increase the subjective probability of the success of R&D investments, it also increases the negative utility arising from a potential meaningful loss, and this information on the potential loss is more salient and influential for CEO decisions. Similarly, our results of a positive effect of CEO negative affect on family firm R&D investments suggests that although their negative affect might decrease the family CEO's expectations of the success of investments in R&D, it also increases the positive utility of the potential success, and this positive utility is more relevant for decisions regarding R&D investments.

Our results also show that the higher the family CEO and family branch ownership, the greater the influence of CEO affect on R&D decisions. These results suggest that both types of ownership increase available financial resources (patient capital) (Lim et al., 2010), and are a source of family CEO power (Daily and Johnson, 1997) favoring the family CEO's discretion on R&D investment decisions. The results also support arguments that affect has a greater capacity to permeate cognition when the decision to be made is complex and important for the individual. Family CEO and family branch ownership increases the importance of R&D strategic decisions for the CEO due to the personal consequences of these decisions on their wealth and reputation.

In contrast, ownership concentration in other family branches reduces the effects of family CEO affect on family firm investments in R&D. Specifically, the results suggest that family CEO positive and negative affective traits have a low influence on R&D investments when ownership concentration is high in other family branches. This suggests that other family branches monitor the family CEO's strategic decisions, thus reducing discretion (Van Doorn et al., 2020). It also suggests that ownership provides incentives to members of these other family branches to become involved in monitoring, as they have a large percentage of their assets invested in the firm.

Our study makes several contributions to the literature. First, we empirically analyze for the first time the effect of family CEO affect on family firm strategic decisions, particularly innovation. We respond to recent claims in the literature on the promise of a micro-foundation approach in family business research (De Massis and Foss, 2018; Yu et al., 2022). Thus far, research has focused on the role of socioemotional wealth to consider specific positive or negative emotions that proliferate in family businesses (De Massis et al., 2018), or constructs associated with affect, such as psychological ownership (Ramos et al., 2014). However, the influence of affect on family firms goes beyond the role of socioemotional wealth (De Massis et al., 2018), needing direct measures of affect, such as the PANAS scale (Watson et al., 1988) widely used to capture individual affect (Kellermanns et al., 2014). We follow this approach to explicitly measure the affect of the CEO. Our study also contributes to research on family firm innovation. This study introduces positive and negative family CEO affect as new innovation-related variables in family business research. The opposite effects of family CEO positive and negative affect on R&D investment may explain the lack of consensus in the literature on the higher or lower level of R&D investments in the family business context. Last, family business research lacks analyses of family branches in family firm dynamics. Our study thus contributes to the line of research analyzing the complex interdependencies between family ownership and family management (Miller et al., 2014; Van Doorn et al., 2020). Our study suggests that family ownership structure may be a key dimension of family CEO discretion (i.e., ability). Prior studies have analyzed the monitoring effect of controlling owners who are not family members on innovation behavior (e.g., García-García et al., 2020), but thus far without exploring whether ownership of other family branches monitor the CEO's strategic decisions. Furthermore, our study shows that family CEO affect may be a potential source of heterogeneity among family businesses. Finally, along more general lines, our work contributes to research on emotions in strategy by showing the effect of positive and negative affect on strategic innovation decisions.

5.1. *Managerial implications*

Our research has several managerial implications. First, our evidence suggests that affective traits should be considered in CEO selection. Family firms are usually considered as traditional and more reluctant than other types of organizations to adopt risky strategies, such as innovation (Block, 2012; Duran et al., 2016). Our work can help family businesses increase their innovation efforts, since our findings show that the appointment of a family CEO with negative affective traits will likely favor an increase in R&D investments. This might be especially important when facing generational succession. In addition, our study is relevant for CEOs themselves to help them better understand their own strategic decisions and how their personal affective traits influence important innovation decisions. Awareness of the influence of their (positive or negative) affects on strategic decisions will place CEOs in a better position to avoid emotional bias and improve their decision-making in favor of the firm's future. As such, it could also be interesting to design strategies to reduce the impact of CEOs' emotional experience on decision-making, particularly as the current business

environment is highly competitive and turbulent. Leadership programs may help CEOs develop their emotional intelligence and awareness (Mayer and Salovey, 1997; Ashkanasy and Dasborough, 2003). CEOs can employ different emotion regulation strategies (Gross, 2008, 2013) to reduce their affective response to external stimuli. Finally, our research shows that family ownership structure can be an appropriate mechanism to align CEO disposition and behavior with the family's innovation strategy preferences. Thus, family members (outside the CEO family branch) need to unite to make integrated R&D investments, thereby reducing the family CEO's discretion to make R&D investments based on individual dispositions and preferences. As the ownership of CEO family branch members increases CEO discretion, and ownership of other branches limits it, it may be beneficial not to prune the branches of the family tree over generations.

5.2. Limitations and future research directions

Despite these interesting contributions, our study has several limitations. Prior studies (e.g., De Massis et al., 2014) suggest that other dimensions of family involvement beyond ownership play different roles in business processes, and may also influence the relationship between family CEO emotion and innovation investment decisions. Future research could explore the influence of family involvement in management (e.g., proportion of family members in the top management team) and firm governance (e.g., proportion of family members on the board of directors) on the relationship between family CEO emotions and family firm innovation investment decisions. Second, the external validity of the analysis is limited by the cross-sectional nature of our study. Although prior studies focusing on the effect of affect on strategic decision-making have also employed cross-sectional analyses (e.g., Delgado-García et al., 2010; Treffers et al., 2020), a longitudinal research design controlling for the stability of the independent variables could provide further evidence of the causal relationships among the variables. Third, our study focuses on a single country sample, which raises the question of generalizability. Future studies should thus explore whether our results can be generalized to firms in other European and non-European countries.

In addition to the research avenues outlined above, our study suggests several future research questions. By focusing on the effect of CEO emotions on strategy, our model could be expanded to other strategic decisions involving risk-taking (e.g., internationalization or diversification). In their study, Duran et al. (2016) show that family firms have lower levels of innovation investments but an increased conversion rate of innovation input into output, and ultimately, higher innovation output than non-family firms. Future research could explore whether our findings on the effect of CEO affect on innovation input could be extended to innovation output, and whether CEO affect conditions this conversion rate. Our research has focused on the effect of family CEO affective valence. Other studies argue that specific affective traits can also be analyzed in terms of the appraisal tendencies that condition individuals' decisions, for instance, through their risk perceptions (Lerner and Keltner, 2000). Future research could explore whether and how these appraisal tendencies condition the innovation input. Finally, following recent calls (e.g., Ashkanasy et al., 2017; Jarvis, 2017; Yu et al., 2022), it would be interesting to use new physiological and neuroscientific techniques to analyze the microfoundations of strategic decision-making, specifically to understand the influence of emotions on the business decision process.

Funding

This work was supported by grant from the Spanish Ministry of Science and Innovation (Ministerio de Ciencia e Innovación) PID2020-120288 GB-I00.

Author statement

Juan Bautista Delgado-García, Virginia Blanco-Mazagatos, M. Elena Romero-Merino and Celia Díaz-Portugal contributed to all activities of the submitted research.

The work submitted has not been published previously and it is not under consideration for publication elsewhere.

References

Aiken, L.S., West, S.G., Reno, R.R., 1991. Multiple Regression: Testing and Interpreting Interactions. Sage, Newbury Park, CA.
Amabile, T.M., 1983. The social psychology of creativity: a componential conceptualization. J. Pers. Soc. Psychol. 45, 357–376.
Amabile, T.M., 1988. A model of creativity and innovation in organizations. Res. Organ. Behav. 10, 123–167.
Anderson, R.C., Duru, A., Reeb, D.M., 2012. Investment policy in family controlled firms. J. Bank. Finance 36, 1744–1758.
Arkes, H.R., Herren, L.T., Isen, A.M., 1988. The role of potential loss in the influence of affect on risk-taking behavior. Organ. Behav. Hum. Decis. Process. 42, 181–193.
Ashkanasy, N.M., Dasborough, M.T., 2003. Emotional awareness and emotional intelligence in leadership teaching. J. Educ. Bus. 79, 18–22.
Ashkanasy, N.M., Humphrey, R.H., Huy, Q.N., 2017. Integrating emotions and affect in theories of management. Acad. Manag. Rev. 42 (2), 175–189.
Ashton-James, C.E., Ashkanasy, N.M., 2008. Affective events theory: a strategic perspective. In: Zerbe, W.J., Hartel, C.E.J., Ashkanasy, N.M. (Eds.), Research on Emotion on Organizations. Volume 4: Emotions, Ethics, and Decision-Making. Emerald Group Publishing/JAI Press, Bingley, pp. 1–34. UK.
Astrachan, J.H., Jaskiewicz, P., 2008. Emotional returns and emotional costs in privately held family businesses: advancing traditional business valuation. Fam. Bus. Rev. 21, 139–149.
Balkin, D.B., Markman, G.D., Gomez-Mejia, L.R., 2000. Is CEO pay in high-technology firms related to innovation? Acad. Manag. J. 43, 1118–1129.
Barker III, V.L., Mueller, G.C., 2002. CEO characteristics and firm R&D spending. Manag. Sci. 48, 782–801.
Baron, R.A., Tang, J., 2011. The role of entrepreneurs in firm-level innovation: joint effects of positive affect, creativity, and environmental dynamism. J. Bus. Ventur. 26, 49–60.
Basco, R., 2017. Where do you want to take your family firm? A theoretical and empirical exploratory study of family business goals. BRQ Business REs. Quarterly. 20, 28–44.

Baysinger, B., Hoskisson, R.E., 1989. Diversification strategy and R&D intensity in multiproduct firms. Acad. Manag. J. 3, 310–332.
Bee, C., Neubaum, D.O., 2014. The role of cognitive appraisal and emotions of family members in the family business system. J. Family Business Strat. 5, 323–333.
Beiner, S., Drobetz, W., Schmid, M.M., Zimmermann, H., 2006. An integrated framework of corporate governance and firm valuation. Eur. Financ. Manag. 12, 249–283.
Berrone, P., Cruz, C., Gomez-Mejia, L.R., 2012. Socioemotional wealth in family firms: theoretical dimensions, assessment approaches, and agenda for future research. Fam. Bus. Rev. 25, 258–279.
Bhattacharya, M., Bloch, H., 2004. Determinants of innovation. Small Bus. Econ. 22, 155–162.
Blanco-Mazagatos, V., de Quevedo-Puente, E., Castrillo, L.A., 2007. The trade-off between financial resources and agency costs in the family business: an exploratory study. Fam. Bus. Rev. 20, 199–213.
Block, J.H., 2012. R&D investments in family and founder firms: an agency perspective. J. Bus. Ventur. 27, 248–265.
Block, J., Miller, D., Jaskiewicz, P., Spiegel, F., 2013. Economic and technological importance of innovations in large family and founder firms: an analysis of patent data. Fam. Bus. Rev. 26, 180–199.
Bower, G.H., 1981. Mood and memory. Am. Psychol. 36, 129–148.
Bower, G.H., 1991. Mood congruity of social judgments. In: Forgas, J.P. (Ed.), Emotion and Social Judgments. Pergamon Press, Oxford, pp. 31–55.
Brundin, E., Sharma, P., 2012. Love, hate, and desire: the role of emotional messiness in the business family. In: Carsrud, A.L., Brännback, M. (Eds.), Understanding Family Businesses. Springer, New York, pp. 55–71.
Calabrò, A., Vecchiarini, M., Gast, J., Campopiano, G., De Massis, A., Kraus, S., 2019. Innovation in family firms: a systematic literature review and guidance for future research. Int. J. Manag. Rev. 21, 317–355.
Campbell, T.S., Marino, A.M., 1994. Myopic investment decisions and competitive labor markets. Int. Econ. Rev. 35, 855–875.
Carney, M., 2005. Corporate governance and competitive advantage in family-controlled firms. Enterpren. Theor. Pract. 29, 249–265.
Chen, H.L., Hsu, W.T., 2009. Family ownership, board independence, and R&D investment. Fam. Bus. Rev. 22, 347–362.
Chou, K.L., Lee, T., Ho, A.H., 2007. Does mood state change risk taking tendency in older adults? Psychol. Aging 22, 310–318.
Chrisman, J.J., Chua, J.H., De Massis, A., Frattini, F., Wright, M., 2015. The ability and willingness paradox in family firm innovation. J. Prod. Innovat. Manag. 32, 310–318.
Chrisman, J.J., Patel, P.C., 2012. Variations in R&D investments of family and nonfamily firms: behavioral agency and myopic loss aversion perspectives. Acad. Manag. J. 55, 976–997.
Clore, G.L., Parrott, G., 1991. Moods and their vicissitudes: thoughts and feelings as information. In: Forgas, J.P. (Ed.), Emotion and Social Judgments. Garland Science, London, pp. 107–123.
Cohen, J., Cohen, P., West, S.G., Aiken, L.S., 2002. Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences. Lawrence Erlbaum Associates, Mahwah, NJ.
Crossan, M.M., Apaydin, M., 2010. A multi-dimensional framework of organizational innovation: a systematic review of the literature. J. Manag. Stud. 47, 1154–1191.
Crossland, C., Hambrick, D.C., 2011. Differences in managerial discretion across countries: how nation-level institutions affect the degree to which CEOs matter. Strat. Manag. J. 32, 797–819.
Daily, C.M., Johnson, J.L., 1997. Sources of CEO power and firm financial performance: a longitudinal assessment. J. Manag. 23, 97–117.
Daspit, J.J., Chrisman, J.J., Ashton, T., Evangelopoulos, N., 2021. Family firm heterogeneity: a definition, common themes, scholarly progress, and directions forward. Fam. Bus. Rev. 34, 296–322.
D'Aveni, R.A., Dagnino, G.B., Smith, K.G., 2010. The age of temporary advantage. Strat. Manag. J. 31, 1371–1385.
David, P., Hitt, M.A., Liang, T.W., 2007. The Benefits and Costs of Large Block Ownership before and during the East-Asian Crisis. https://dra.american.edu/islandora/object/auislandora:63643.
Davidson, R., MacKinnon, J.G., 1993. Estimation and Inference in Econometrics. Oxford University Press, New York.
Dawson, J.F., Richter, A.W., 2006. Probing three-way interactions in moderated multiple regression: development and application of a slope difference test. J. Appl. Psychol. 91, 917–926.
De Massis, A., Di Minin, A., Frattini, F., 2015. Family-driven innovation: resolving the paradox in family firms. Calif. Manag. Rev. 58, 5–19.
De Massis, A., Eddleston, K.A., Hatak, I., Humphrey, R.H., Miller, D., Piva, E., Tang, Y., 2018. Discussion: view thread. Enterpren. Theor. Pract. 42, 1–166.
De Massis, A., Foss, N.J., 2018. Advancing family business research: the promise of microfoundations. Fam. Bus. Rev. 31, 386–396.
De Massis, A., Frattini, F., Lichtenthaler, U., 2013. Research on technological innovation in family firms: present debates and future directions. Fam. Bus. Rev. 26, 10–31.
De Massis, A., Kotlar, J., Chua, J.H., Chrisman, J.J., 2014. Ability and willingness as sufficiency conditions for family-oriented particularistic behavior: implications for theory and empirical studies. J. Small Bus. Manag. 52, 344–364.
De Massis, A., Sharma, P., Chua, J.H., Chrisman, J.J., 2012. Family Business Studies: An Annotated Bibliography. Edward Elgar Publishing.
Delgado-García, J.B., De la Fuente-Sabaté, J.M., 2010. How do CEO emotions matter? Impact of CEO affective traits on strategic and performance conformity in the Spanish banking industry. Strat. Manag. J. 31, 562–574.
Delgado-García, J.B., De La Fuente-Sabaté, J.M., De Quevedo-Puente, E., 2010. Too negative to take risks? The effect of the CEO's emotional traits on firm risk. Br. J. Manag. 21, 313–326.
Delgado-García, J.B., Rodríguez-Escudero, A.I., Martín-Cruz, N., 2012. Influence of affective traits on entrepreneur's goals and satisfaction. J. Small Bus. Manag. 50, 408–428.
Demsetz, H., 1988. The theory of the firm revisited. J. Law Econ. Organ. 4, 141–161.
Deniz, D., Suarez, M.K.C., 2005. Corporate social responsibility and family business in Spain. J. Bus. Ethics 56, 27–36.
Dennis Jr., W.J., 2003. Raising response rates in mail surveys of small business owners: results of an experiment. J. Small Bus. Manag. 41, 278–295.
Díaz-Díaz, N.L., López-Iturriaga, F.J., Santana-Martín, D.J., 2022. The role of political ties and political uncertainty in corporate innovation. Long. Range Plan. 55, 102111.
Dunegan, K.J., Duchon, D., Barton, S.L., 1992. Affect, risk, and decision criticality: replication and extension in a business setting. Organ. Behav. Hum. Decis. Process. 53, 335–351.
Duran, P., Kammerlander, N., Van Essen, M., Zellweger, T., 2016. Doing more with less: innovation input and output in family firms. Acad. Manag. J. 59, 1224–1264.
Durbin, J., 1954. Errors in variables. Rev. Int. Stat. Inst. 22, 23–32.
Dyer, W.G., Whetten, D.A., 2006. Family firms and social responsibility: preliminary evidence from the S&P 500. Enterpren. Theor. Pract. 30, 785–802.
Edwards, W., 1961. Behavioral decision theory. Annu. Rev. Psychol. 12, 473–498.
Fiedler, K., 1990. Mood-dependent selectivity in social cognition. Eur. Rev. Soc. Psychol. 1, 1–32.
Finkelstein, S., 1992. Power in top management teams: dimensions, measurement, and validation. Acad. Manag. J. 35, 505–538.
Finkelstein, S., Hambrick, D.C., 1990. Top-management-team tenure and organizational outcomes: the moderating role of managerial discretion. Adm. Sci. Q. 35, 484–503.
Finkelstein, S., Hambrick, D.C., 1996. Strategic Leadership: Top Executives and Their Effects on Organizations. West Publishing Company, Minneapolis, MN.
Foo, M.D., Uy, M.A., Baron, R.A., 2009. How do feelings influence effort? An empirical study of entrepreneurs' affect and venture effort. J. Appl. Psychol. 94, 1086–1094.

Forgas, J.P., 1995. Mood and judgment: the affect infusion model (AIM). Psychol. Bull. 117, 39–66.
Forgas, J.P., 2001. Feeling and Thinking: the Role of Affect in Social Cognition. Cambridge University Press, UK.
Forgas, J.P., Vargas, P.T., 2000. The effects of mood on social judgment and reasoning. In: Lewis, M., Haviland-Jones, J. (Eds.), Handbook of Emotions, second ed. Guildford Press, New York, pp. 350–367.
Fredrickson, B.L., Branigan, C., 2005. Positive emotions broaden the scope of attention and thought-action repertoires. Cognit. Emot. 19, 313–332.
García-García, L., Alonso-Buenaposada, M.G., Romero-Merino, M.E., Santamaria-Mariscal, M., 2020. Ownership structure and R&D investment: the role of identity and contestability in Spanish listed firms. Academia. Rev. Latinoam. Adm. 33, 405–426.
García-Manjón, J.V., Romero-Merino, M.E., 2012. Research, development, and firm growth. Empirical evidence from European top R&D spending firms. Res. Pol. 41, 1084–1092.
Gersick, K.E., Davis, J.A., Hampton, M.M., Lansberg, I., 1997. Generation to Generation: Life Cycles of the Family Business. Harvard Business Press, Boston, MA.
Gomez-Mejía, L.R., Campbell, J.T., Martin, G., Hoskisson, R.E., Makri, M., Sirmon, D.G., 2014. Socioemotional wealth as a mixed gamble: revisiting family firm R&D investments with the behavioral agency model. Enterpren. Theor. Pract. 38, 1351–1374.
Gomez-Mejía, L.R., Haynes, K.T., Núñez-Nickel, M., Jacobson, K.J., Moyano-Fuentes, J., 2007. Socioemotional wealth and business risks in family-controlled firms: evidence from Spanish olive oil mills. Adm. Sci. Q. 52, 106–137.
Goschke, T., 2006. Affect modulation of selective attention and background-monitoring. In: Experimenteel Psychologische Onderzoeckschool Symposium (EPOS), Affective Modulation of Cognitive Performance. Leiden University, Leiden, the Netherlands.
Gross, J.J., 2008. Emotion regulation. In: Lewis, M., Haviland-Jones, J.M., Feldman-Barrett, L. (Eds.), Handbook of Emotions, third ed. The Guilford Press, pp. 497–513.
Gross, J.J., 2013. Emotion regulation: taking stock and moving forward. Emotion 13, 359–365.
Habbershon, T.G., Williams, M.L., 1999. A resource-based framework for assessing the strategic advantages of family firms. Fam. Bus. Rev. 12, 1–25.
Hambrick, D.C., Finkelstein, S., 1987. Managerial discretion: a bridge between polar views of organizational outcomes. In: Cummings, L.L., Staw, B.M. (Eds.), Research in Organizational Behavior, vol. 9. JAI Press, Greenwich, CT, pp. 369–406.
Hambrick, D.C., Geletkanycz, M.A., Fredrickson, J.W., 1993. Top executive commitment to the status quo: some tests of its determinants. Strat. Manag. J. 14, 401–418.
Hambrick, D.C., Mason, P.A., 1984. Upper echelons: the organization as a reflection of its top managers. Acad. Manag. Rev. 9, 193–206.
Hausman, J.A., 1978. Specification tests in econometrics. Econometrica 46, 1251–1271.
Hirshleifer, D., Thakor, A.V., 1992. Managerial conservatism, project choice, and debt. Rev. Financ. Stud. 5, 437–470.
Hodgkinson, G.P., Healey, M.P., 2011. Psychological foundations of dynamic capabilities: reflexion and reflection in strategic management. Strat. Manag. J. 32, 1500–1516.
Humphrey, R.H., Massis, A.D., Picone, P.M., Tang, Y., Piccolo, R.F., 2021. The psychological foundations of management in family firms: emotions, memories, and experiences. Fam. Bus. Rev. 34, 122–131.
Huy, Q.N., 2012. Emotions in strategic organization: opportunities for impactful research. Strat. Organ. 10, 240–247.
Isen, A.M., 2000. Some perspectives on positive affect and self-regulation. Psychol. Inq. 11, 184–187.
Isen, A.M., 2002. Missing in action in the AIM: positive affect's facilitation of cognitive flexibility, innovation, and problem solving. Psychol. Inq. 13, 57–65.
Isen, A.M., Daubman, K.A., 1984. The influence of affect on categorization. J. Pers. Soc. Psychol. 47, 1206–1217.
Isen, A.M., Geva, N., 1987. The influence of positive affect on acceptable level of risk: the person with a large canoe has a large worry. Organ. Behav. Hum. Decis. Process. 39, 145–154.
Isen, A.M., Johnson, M., Mertz, E., Robinson, G.F., 1985. The influence of positive affect on the unusualness of word associations. J. Pers. Soc. Psychol. 48, 1413–1426.
Isen, A.M., Niedenthal, P.M., Cantor, N., 1992. An influence of positive affect on social categorization. Motiv. Emot. 16, 65–78.
Isen, A.M., Nygren, T.E., Ashby, F.G., 1988. Influence of positive affect on the subjective utility of gains and losses: it is just not worth the risk. J. Pers. Soc. Psychol. 55, 710–717.
Isen, A.M., Patrick, R., 1983. The effect of positive feelings on risk taking: when the chips are down. Organ. Behav. Hum. Perform. 31, 194–202.
Isen, A.M., Shalker, T.E., 1982. The effect of feeling state on evaluation of positive, neutral, and negative stimuli: when you "accentuate the positive,". do you "eliminate the negative"? Social Psychology Quarterly 45, 58–63.
James, H.S., 1999. Owner as manager, extended horizons and the family firm. Int. J. Econ. Bus. 6, 41–55.
Jarvis, L.C., 2017. Feigned versus felt: feigning behaviors and the dynamics of institutional logics. Acad. Manag. Rev. 42 (2), 306–333.
Javeed, S.A., Latief, R., Jiang, T., San Ong, T., Tang, Y., 2021. How environmental regulations and corporate social responsibility affect the firm innovation with the moderating role of Chief executive officer (CEO) power and ownership concentration? J. Clean. Prod. 308, 127212.
Javeed, S.A., Latief, R., Lefen, L., 2020. An analysis of relationship between environmental regulations and firm performance with moderating effects of product market competition: empirical evidence from Pakistan. J. Clean. Prod. 254, 120197.
Jiang, F., Shi, W., Zheng, X., 2020. Board chairs and R&D investment: evidence from Chinese family-controlled firms. J. Bus. Res. 112, 109–118.
Johnson, E.J., Tversky, A., 1983. Affect, generalization, and the perception of risk. J. Pers. Soc. Psychol. 45, 20–31.
Kahn, B.E., Isen, A.M., 1993. The influence of positive affect on variety seeking among safe, enjoyable products. J. Consum. Res. 20, 257–270.
Kamath, R.R., Liker, J.K., 1990. Supplier dependence and innovation: a contingency model of suppliers' innovative activities. J. Eng. Technol. Manag. 7, 111–127.
Kammerlander, N., Ganter, M., 2015. An attention-based view of family firm adaptation to discontinuous technological change: exploring the role of family CEOs' noneconomic goals. J. Prod. Innovat. Manag. 32, 361–383.
Kaye, K., 1996. When the family business is a sickness. Fam. Bus. Rev. 9, 347–368.
Kellermanns, F.W., Dibrell, C., Cruz, C., 2014. The role and impact of emotions in family business strategy: new approaches and paradigms. J. Family Business. Strat. 5, 277–279.
Kellermanns, F.W., Eddleston, K.A., 2004. Feuding families: when conflict does a family firm good. Enterpren. Theor. Pract. 28, 209–228.
Kim, K.H., 2012. Emotion and strategic decision-making behavior: developing a theoretical model. Int. J. Bus. Soc. Sci. 3, 105–113.
Kleinschmidt, E.J., Cooper, R.G., 1991. The impact of product innovativeness on performance. J. Prod. Innovat. Manag. 8, 240–251.
Kraiczy, N.D., Hack, A., Kellermanns, F.W., 2015. What makes a family firm innovative? CEO risk-taking propensity and the organizational context of family firms. J. Prod. Innovat. Manag. 3, 334–348.
Lazarus, R.S., 1999. The cognition-emotion debate: a bit of history. In: Dalgleish, T., Power, M. (Eds.), Handbook of Cognition and Emotion. John Wiley & Sons, pp. 3–19.
Lerner, J.S., Keltner, D., 2000. Beyond valence: toward a model of emotion-specific influences on judgement and choice. Cognit. Emot. 14, 473–493.
Levinthal, D.A., 2011. A behavioral approach to strategy—what's the alternative? Strat. Manag. J. 32, 1517–1523.
Lim, E., 2017. CEO option wealth and firm risk-taking: an analysis of multiple reference points. Long. Range Plan. 50, 809–825.
Lim, E.N., Lubatkin, M.H., Wiseman, R.M., 2010. A family firm variant of the behavioral agency theory. Strateg. Entrep. J. 4, 197–211.
López-Fernández, M.C., Serrano-Bedia, A.M., Gómez-López, R., 2016. Determinants of innovation decision in small and medium-sized family enterprises. J. Small Bus. Enterprise Dev. 23, 408–427.
Lyubomirsky, S., King, L., Diener, E., 2005. The benefits of frequent positive affect: does happiness lead to success? Psychol. Bull. 131, 803–855.

MacCrimmon, K.R., Wehrung, D.A., 1990. Characteristics of risk taking executives. Manag. Sci. 36, 422–435.
Maddala, G.S., 1992. Introduction to Econometrics, second ed. MacMillan Publishing Company, New York.
Mano, H., 1994. Risk-taking, framing effects, and affect. Organ. Behav. Hum. Decis. Process. 57, 38–58.
Mayer, J., Salovey, P., 1997. What is emotional intelligence? In: Salovey, P., Sluyter, D. (Eds.), Emotional Development and Emotional Intelligence: Implications for Educators. New York Basic Books, pp. 3–31.
Michiels, A., Voordeckers, W., Lybaert, N., Steijvers, T., 2015. Dividends and family governance practices in private family firms. Small Bus. Econ. 44, 299–314.
Miller, D., Le Breton-Miller, I., Minichilli, A., Corbetta, G., Pittino, D., 2014. When do non-family CEO s outperform in family firms? Agency and behavioural agency perspectives. J. Manag. Stud. 51, 547–572.
Miller, D., Minichilli, A., Corbetta, G., 2013. Is family leadership always beneficial? Strat. Manag. J. 34, 553–571.
Mittal, V., Ross Jr., W.T., 1998. The impact of positive and negative affect and issue framing on issue interpretation and risk taking. Organ. Behav. Hum. Decis. Process. 76, 298–324.
Momtaz, P.P., 2021. CEO emotions and firm valuation in initial coin offerings: an artificial emotional intelligence approach. Strat. Manag. J. 42, 558–578.
Morgan, T.J., Gomez-Mejía, L.R., 2014. Hooked on a feeling: the affective component of socioemotional wealth in family firms. J. Family Business Strat. 5, 280–288.
Morris, M.H., Allen, J.A., Kuratko, D.F., Brannon, D., 2010. Experiencing family business creation: differences between founders, nonfamily managers, and founders of nonfamily firms. Enterpren. Theor. Pract. 34, 1057–1084.
Munari, F., Oriani, R., Sobrero, M., 2010. The effects of owner identity and external governance systems on R&D investments: a study of Western European firms. Res. Pol. 39, 1093–1104.
Muñoz-Bullón, F., Sanchez-Bueno, M.J., 2011. The impact of family involvement on the R&D intensity of publicly traded firms. Fam. Bus. Rev. 24, 62–70.
Narayanan, M., 1985. Managerial incentives for short-term results. J. Finance 40, 1469–1484.
Nunnally, N.R., 1978. Stream renovation: an alternative to channelization. Environ. Manag. 2, 403–411.
Nygren, T.E., Isen, A.M., Taylor, P.J., Dulin, J., 1996. The influence of positive affect on the decision rule in risk situations: focus on outcome (and especially avoidance of loss) rather than probability. Organ. Behav. Hum. Decis. Process. 66, 59–72.
Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. J. Appl. Psychol. 88, 879–903.
Porter, M., 1990. The competitive advantage of nations. Harv. Bus. Rev. 68, 73–93.
Powell, T.C., Lovallo, D., Fox, C.R., 2011. Behavioral strategy. Strat. Manag. J. 32, 1369–1386.
Rafaeli, A., 2013. Emotion in organizations: considerations for family firms. Enterpren. Res. J. 3, 295–300.
Ramos, H.M., Man, T.W.Y., Mustafa, M., Ng, Z.Z., 2014. Psychological ownership in small family firms: family and non-family employees' work attitudes and behaviours. J. Family Business Strat. 5, 300–311.
Rondi, E., De Massis, A., Kotlar, J., 2019. Unlocking innovation potential: a typology of family business innovation postures and the critical role of the family system. J. Family Business Strat. 10, 100236.
Rusting, C.L., 1998. Personality, mood, and cognitive processing of emotional information: three conceptual frameworks. Psychol. Bull. 124, 165–196.
Rutherford, M.W., Holt, D.T., 2007. Corporate entrepreneurship: an empirical look at the innovativeness dimension and its antecedents. J. Organ. Change Manag. 2, 429–446.
Sánchez-Famoso, V., Iturralde, T., Maseda, A., 2015. The influence of family and non-family social capital on firm innovation: exploring the role of family ownership. Eur. J. Int. Manag. 9, 240–262.
Sánchez-Famoso, V., Pittino, D., Chirico, F., Maseda, A., Iturralde, T., 2019. Social capital and innovation in family firms: the moderating roles of family control and generational involvement. Scand. J. Manag. 35, 101043.
Sandín, B., Chorot, P., Lostao, L., Joiner, T.E., Santed, M.A., Valiente, R.M., 1999. Escalas PANAS de afecto positivo y negativo: validación factorial y convergencia transcultural. Psicothema 11, 37–51.
Schulze, W.S., Lubatkin, M.H., Dino, R.N., 2003. Toward a theory of agency and altruism in family firms. J. Bus. Ventur. 18, 473–490.
Schwarz, N., Bless, H., 1991. Constructing reality and its alternatives: an inclusion/exclusion model of assimilation and contrast effects in social judgment. In: Martin, L.L., Tesser, A. (Eds.), The Construction of Social Judgment. Erlbaum, Hillsdale, NJ, pp. 217–245.
Schwarz, N., Clore, G.L., 1988. How do I feel about it? Information functions of affective states. In: Fiedler, K., Forgas, J. (Eds.), Affect, Cognition and Social Behavior. Hogrefe International, Toronto, pp. 44–62.
Sciascia, S., Mazzola, P., 2008. Family involvement in ownership and management: exploring nonlinear effects on performance. Fam. Bus. Rev. 21, 331–345.
Sciascia, S., Nordqvist, M., Mazzola, P., De Massis, A., 2015. Family ownership and R&D intensity in small-and medium-sized firms. J. Prod. Innovat. Manag. 32, 349–360.
Smith, E.R., Seger, C.R., Mackie, D.M., 2007. Can emotions be truly group level? Evidence regarding four conceptual criteria. J. Pers. Soc. Psychol. 93, 431–446.
Stanley, L.J., 2010. Emotions and family business creation: an extension and implications. Enterpren. Theor. Pract. 34, 1085–1092.
Subramanian, A., Nilakanta, S., 1996. Organizational innovativeness: exploring the relationship between organizational determinants of innovation, types of innovations, and measures of organizational performance. Omega 24, 631–647.
Treffers, T., Klarner, P., Huy, Q.N., 2020. Emotions, time, and strategy: the effects of happiness and sadness on strategic decision-making under time constraints. Long. Range Plan. 53, 101954.
Tsao, S.M., Lin, C.H., Chen, V.Y., 2015. Family ownership as a moderator between R&D investments and CEO compensation. J. Bus. Res. 68, 599–606.
Tversky, A., Kahneman, D., 1981. The framing of decisions and the psychology of choice. Science 211, 453–458.
Uhlaner, L.M., Goor-Balk, H.J.M., Masurel, E., 2004. Family business and corporate social responsibility in a sample of Dutch firms. J. Small Bus. Enterprise Dev. 11, 186–194.
Van Doorn, S., Tretbar, T., Reimer, M., Heyden, M., 2020. Ambidexterity in family firms: the interplay between family influences within and beyond the executive suite. Long. Range Plan. 55, 101998.
Wangrow, D.B., Schepker, D.J., Barker III, V.L., 2015. Managerial discretion: an empirical review and focus on future research directions. J. Manag. 41, 99–135.
Watson, D., Clark, L.A., Tellegen, A., 1988. Development and validation of brief measures of positive and negative affect: the PANAS scales. J. Pers. Soc. Psychol. 54, 1063–1070.
Wright, W.F., Bower, G.H., 1992. Mood effects on subjective probability assessment. Organ. Behav. Hum. Decis. Process. 52, 276–291.
Yoshikawa, T., Rasheed, A.A., 2010. Family control and ownership monitoring in family-controlled firms in Japan. J. Manag. Stud. 47, 274–295.
Yu, X., Liu, T., He, L., Li, Y., 2022. Micro-foundations of Strategic Decision-Making in Family Business Organisations: a Cognitive Neuroscience Perspective. Long Range Planning, 102198.
Yuen, K.S., Lee, T.M., 2003. Could mood state affect risk-taking decisions? J. Affect. Disord. 75, 11–18.
Zahra, S.A., 2005. Entrepreneurial risk taking in family firms. Fam. Bus. Rev. 18, 23–40.
Zelenski, J.M., Larsen, R.J., 2002. Predicting the future: how affect-related personality traits influence likelihood judgments of future events. Pers. Soc. Psychol. Bull. 28, 1000–1010.
Zellweger, T.M., Astrachan, J.H., 2008. On the emotional value of owning a firm. Fam. Bus. Rev. 21, 347–363.

Juan Bautista Delgado-García is an Associate Professor at the University of Burgos. He received his PhD from the University of Burgos. His research interests centre on the role of affects in the cognitions and emotions of the entrepreneur and CEOs, corporate governance and family firms. He has published papers in British Journal of Management, Corporate Governance. An International Review, International Business Review, International Journal of Management Reviews, Journal of Business Research, Journal of Family Business Strategy, Journal of Small Business Management and Strategic Management Journal, among other journals.

Virginia Blanco-Mazagatos is an Associate Professor at the University of Burgos. He received his PhD from the University of Burgos. Her research interests include family firms, entrepreneurship and corporate governance. She has published papers in Family Business Review, International Journal of Management Reviews, Journal of Business Research, Journal of Family Business Strategy, among other journals.

M. Elena Romero-Merino studied Economics and Business Administration and received her PhD from the University of Valladolid. She is associate professor of Finance at the University of Burgos (Spain). Her main research focuses on the corporate governance, ownership structure, non-profit organizations, growth and R&D. Her research is published in journals such as Research Policy, British Journal of Management, Nonprofit and Voluntary Sector Quarterly, or Business Research Quarterly.

Celia Díaz-Portugal is a Part-time Professor and PhD Candidate at the University of Burgos. She is graduated in Law and in Business Administration with a master's degree from the Institute for Fiscal Studies (Spain). She has developed her career in the private sector mainly focusing on management and internationalization in the field of performing arts. Her research interests focus on the influence of emotions on the different stages of the entrepreneurial process.