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RESEARCH ARTICLE

I've got a feeling—how multi-modal emotional expressions affect investment decisions in reward-based crowdfunding

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Abstract Investment decisions in reward-based crowdfunding are often shaped by intuitive impressions such as the emotional appeal of the project presentation. Yet, it remains unclear how emotional project presentations should be to optimally influence funding decisions. Building on Dual Coding Theory and Emotions as Social Information (EASI) theory, we conducted regression and fuzzy-set qualitative analyses (fsQCA) to examine the effect of emotional expressions in the texts, pictures, and pitch videos of 16,967 Kickstarter project presentations. The results indicate that the intensity of the conveyed emotional expressions has an inverted u-shaped effect on investment behavior, meaning that high intensities of emotional expressions have a negative impact. Our findings also suggest that only specific combinations of modalities need to be used to effectively convey emotional expressions. For an optimal impact, a moderate approach should be chosen, both in terms of the intensity of emotional expressions and the number of modalities to convey them.

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Plain English Summary Emotional project presentations only help to convince investors when emotional expressions are used with moderate intensity and in specific combinations of the available media. Our study shows that increasing the intensity of the conveyed emotional expressions has a positive effect on investment behavior up to a certain point, after which the additional effect becomes negative. It also suggests that not all available communication media need to be used to effectively convey emotional expressions. Instead, we identify three subsets of the available media that are particularly well-suited for communicating emotional expressions to persuade investors. For entrepreneurs, our study provides a guideline on how to use emotional expressions strategically to convince potential investors. For academia, it introduces a fresh theoretical perspective to explain the impact of multi-modal emotional expressions in reward-based crowdfunding.

Keywords Reward-based crowdfunding · Non-linear regression analyses · FsQCA · Emotional cues · Multi-modal emotional expressions · EASI theory

JEL Classification G23 · G41 · L26 · M31

1 Introduction

Reward-based crowdfunding platforms like Kickstarter offer entrepreneurs the opportunity to source capital from the masses to realize novel business

ideas (Mollick, 2014). On these platforms, entrepreneurs typically request funding for projects to develop new products that are still in the prototype stage or not yet ready for the market. To convince potential investors, they set a funding goal and publish a multi-modal presentation of the project idea, which may include a text, pictures, and a pitch video (e.g., Bollaert et al., 2019; Kaminski & Hopp, 2020; Lin & Boh, 2021). The project presentation serves as the main source of information for investors to decide whether and to what extent a project should be funded (Mollick, 2014).

The reward-based crowdfunding market has grown rapidly in recent years, with both transaction volume and the number of project proposals steadily increasing. Despite the increased transaction volume, however, it can be observed that many projects fail to attract a sufficient number of investors (Feng et al., 2024; Moradi et al., 2023). Besides increased competitive pressure, one reason for this appears to be that the mechanisms of the new financial instrument are not yet fully understood. In particular, it remains unclear how project presentations should be designed to best convince potential investors (Lin & Boh, 2021; Tafesse, 2021; Yang et al., 2020). Knowing how to use the available communication modalities to persuade investors and influence their funding decision therefore becomes a critical success factor.

Since the described products cannot be experienced yet and potential investors typically lack the expertise for thorough due-diligence, previous studies found that investment decisions in reward-based crowdfunding are influenced less by detailed business plans and financial figures, but often rather by intuitive impressions such as the emotional appeal of the project presentation and the product (Li et al., 2017; Xiang et al., 2019). Prior research specifically demonstrates that the communication of emotional expressions as cues via the available modalities can influence funding decisions (Chen et al., 2023; Koch & Siering, 2019; Warnick et al., 2021). In general, emotional expressions can provide a substitute for missing information and shape decision-makers' appraisals of a situation or product, particularly when decisions must be made under uncertainty (Achar et al., 2016; van Kleef, 2014).

However, it remains unclear how emotional a project presentation should be, i.e., how intensively emotional expressions should be displayed to most effectively influence funding decisions. While some studies suggest that the effect on funding decisions increases with the intensity of the conveyed emotional expressions (e.g., Koch & Siering, 2019; Letwin et al., 2024; Li et al., 2017), others have observed saturation or even negative effects (e.g., Jiang et al., 2023; Li et al., 2021; Tafesse, 2021). Furthermore, prior research has mainly examined the effect of emotional expressions conveyed through a single communication modality (e.g., Chan et al., 2020; Costello & Lee, 2022; Wang et al., 2016; Younkin & Kuppuswamy, 2018). The effects resulting from simultaneously displaying emotional expressions in multiple modalities have hardly been studied so far. Therefore, it remains unclear whether all modalities should be used to convey emotional expressions or how they should be combined to achieve an optimal effect on funding decisions.

To contribute to the closure of this literature gap, we present the results of a study that examined the effects of emotional expressions on investment decisions in reward-based crowdfunding from a multimodal perspective. To determine how emotional project presentations should ideally be, we examine the following two research questions: *How does the intensity of the emotional expressions conveyed through the available modalities influence investment decisions? Which of the available modalities should convey emotional expressions to effectively influence investment decisions?* To answer these questions, we consider all available modalities for expressing emotions in project presentations and examine the impact of emotional words (in the text), emotional speech (in the pitch video), and facial emotional expressions (in pictures and the pitch video). Moreover, we build upon a combination of Dual Coding Theory (DCT) and Emotions as Social Information (EASI) theory to explain the impact of emotional expressions. Previous studies in the crowdfunding field often referred to the concept of primitive emotional contagion, which describes the response to emotional expressions as unconscious and automatic behavior. In contrast, EASI theory posits that the impact of emotional expressions is also shaped by the social context and their perceived appropriateness. Against this background, we assume that there is a maximum intensity of emotional expressions that should be conveyed via the available modalities to effectively influence the funding behavior. Furthermore, we

propose that different combinations of the available modalities exist, which can achieve an optimal effect on funding decisions when used to convey emotional expressions.

To evaluate our assumptions, we adopted a mixed-methods approach that combines quantitative and qualitative techniques (Venkatesh et al., 2016). Using this approach, we analyzed the impact of the emotional expressions in the text, speech, pictures, and pitch videos from 16,967 project presentations collected from Kickstarter, a leading reward-based crowdfunding platform. The emotional expressions contained in text and speech were identified using a dictionary approach (LIWC, Pennebaker et al., 2015). Facial emotional expressions shown in pictures and pitch videos were recognized using a machine-learning algorithm (Emotion API, Microsoft, 2023). To investigate the potential non-linear impact of emotional expressions, we first conducted multiple regression analyses (MRA). Based on the obtained results, we then performed a fuzzy-set qualitative comparative analysis (fsQCA) to determine which modality combinations are best suited to conveying emotional expressions that most strongly influence the investment decision. To ensure the stability of our findings, we conducted several robustness checks. Thereby, we verified our findings using data from the presentations of 11,618 reward-based crowdfunding projects that were gathered from Indiegogo. Furthermore, we varied the operationalizations of the dependent and independent variables as well as the techniques to identify emotional expressions. For instance, we used VADER (Hutto & Gilbert, 2014) and EmoRoBERTa (Demszky et al., 2020; Liu et al., 2019) instead of LIWC to identify the emotional expressions contained in text and speech. Finally, we checked whether our results remained robust when distinguishing between positive and negative emotions or project categories.

The results of our study provide new insights into the effect of emotional expressions in reward-based crowdfunding. First, our findings indicate that the intensity of the conveyed emotional expressions has an inverted u-shaped effect on investment behavior: transmitting emotional expressions more intensively increases the effect on funding decisions until an optimal level is reached, after which the additional effect becomes negative. By uncovering that emotional expressions can unfold both positive and negative effects depending on their intensity, we resolve the seemingly contradictory results of previous studies and integrate them into a coherent picture. Second, we show how emotional expressions can be effectively distributed across the available modalities, a topic that has been rarely studied in the reward-based crowdfunding domain. Our findings indicate that conveying emotional expressions through specific subsets of the available modalities suffices to achieve an optimal impact. Taken together, the results of our study hence suggest that the most effective approach to influencing the funding decision by conveying emotional expressions should be moderate both in terms of the intensity of the emotional expressions and the number of modalities through which they are communicated.

The remaining presentation is structured as follows: next, we discuss theoretical foundations and related work (Sect. 2). We then develop the hypothesis and propositions underlying our study. In Sect. 3, we describe our research approach. Thereafter, we present the results of our analysis in Sect. 4. We discuss the key findings and the implications for academia and practice in Sect. 5. After describing limitations and future research directions, we conclude the presentation in Sect. 6.

2 Theoretical background and propositions

2.1 The influence of emotional expressions on decision-making

Reward-based crowdfunding projects are presented using a mix of verbal and nonverbal communication modalities: typically, the presentation can encompass a written description, pictures, and a pitch video with a spoken voice-over. The available modalities allow for the communication of both explicit project information and implicit cues such as emotional expressions. Generally, cues are snippets of information that support the recipient's learning about a specific context. Prior studies have shown that verbal emotional expressions in written and spoken narrations, as well as facial emotional expressions in pictures and videos, can influence investment decisions (e.g., Allison et al., 2022; Koch & Siering, 2019; Lin & Boh, 2021; Raab et al., 2020). To explain this effect, prior studies in the reward-based crowdfunding domain often draw on the theoretical concept of primitive emotional

contagion. It explains the spread of emotional expressions from the sender to the recipients as a natural, subconscious affective reaction in which the recipient catches the displayed emotion (Hatfield et al., 1993). Emotional expressions can thus evoke a similar emotional state in the recipients as in the sender (van Kleef, 2009), which influences their decision-making.

While the concept of primitive emotional contagion (Hatfield et al., 1993) is now widely accepted, it cannot explain findings showing that the impact of emotional expressions is shaped by the communication context and situational social norms (van Kleef & Côté, 2022). To better understand how and why emotional expressions can influence investors' attitudes and decision-making, we therefore draw on the Emotions as Social Information (EASI) theory (van Kleef, 2014) and related research. EASI theory states that emotional expressions can trigger different (affective and/or inferential) responses in recipients depending on their perceived appropriateness. Analogous to the concept of primitive emotional contagion, the theory posits that emotional expressions can elicit affective reactions in recipients and thus influence their emotional state (Cheshin et al., 2018; van Kleef, 2014). For example, expressed joy can elicit reciprocal feelings of joy, which in turn can alter situational perceptions, influence interpersonal sympathy, and shape economic decisions (Achar et al., 2016; Loewenstein & Lerner, 2003). According to EASI theory, emotional expressions can also trigger inferential processes. By interpreting expressed emotions, recipients can draw conclusions about the senders' feelings, attitudes, and behavior. For instance, when confronted with a person's joy, recipients may conclude that the sender is enthusiastic or passionate about what (s)he is doing. Emotional expressions can thus provide clues that help recipients better understand the sender's appraisal of a situation or product (van Kleef, 2009, 2014), which can influence economic decisions especially when recipients have limited insight into the sender's actual motivations (Loewenstein & Lerner, 2003; Zhang et al., 2024).

However, EASI theory also suggests that the relative impact of affective reactions and inferential processes is mediated by the perceived appropriateness of the emotional expressions. Generally, emotional expressions are considered appropriate if they are "correct for the situation and in correct proportion to the evoking circumstances" (Shields, 2005, p. 7). To be effective, the emotional expressions shown must hence correspond to the social context in which they occur, both quantitatively (i.e., emotions must be shown with appropriate valence) and quantitatively (i.e., emotions must be shown with appropriate intensity). While the valence refers to the intrinsic positive or negative quality of an emotional stimulus, the intensity of emotional expressions characterizes a sender's arousal. Being a complex concept, it refers to the magnitude, duration, and recurrence of emotional expressions (Frijda et al., 1992; Sonnemans & Frijda, 1994).

Whether emotional expressions are perceived as appropriate appears to depend particularly on social-contextual factors, such as the nature of the interpersonal relationship between the communication partners or the recipients' willingness to engage in deliberate information processing. These factors collectively characterize the communication context and shape situational display rules and expectations regarding the expression of emotions (van Kleef & Côté, 2022). With its social-contextual perspective on the impact of emotional expressions, EASI theory offers a promising framework for explaining the effect of displayed emotional expressions on potential investors in the reward-based crowdfunding domain. Therefore, we use EASI theory as the theoretical basis for our analysis in the following chapters.

2.2 Related work and research gap

Previous studies have already investigated the impact of emotional expressions on the investment behavior in reward-based crowdfunding. However, most focused only on investigating the emotional expressions conveyed through a specific modality. Typically, they also assumed a linear relationship between conveyed emotional expressions and funding behavior; that is, the more emotional the presentation, the stronger the effect on investment behavior. For instance, several studies found that expressing positive emotions in the written project description can increase the funding performance (Costello & Lee 2022; Franzoni & Tenca 2023; Koch & Siering, 2019; Moradi & Badrinarayanan 2021; Moradi et al., 2023; Wang et al., 2017; Yosipof et al., 2024; Yuan et al., 2021). Likewise, studies reported that expressing negative emotions in the text can positively influence funding decisions (Kim et al., 2016; Moradi & Dass

2019). Positive effects on funding performance have also been observed for spoken emotional words in the pitch video (Allison et al., 2022; Chen et al., 2024; Miao et al., 2024) and for facial emotional expressions in the pitch video (Lin & Boh, 2021). Extant studies have also reported that perceived passion—a subjective measure of the emotionality of pitch videos—can positively influence funding intentions (Jin et al., 2024; Letwin et al., 2024; Li et al., 2017).

However, there are also studies that found no significant effect of written emotional words (Allison et al., 2017; Tafesse, 2021), spoken emotional words (Parhankangas & Renko 2017), facial emotional expressions in the pitch video (Li et al., 2021), or perceived passion in the pitch video (Chan et al., 2020; Oo et al., 2019). Some studies even report a negative impact of written emotional words (Wang et al., 2024), facial emotional expressions in the pictures (Wang et al., 2016), or perceived passion in the pitch video (Davis et al., 2017; Jiang et al., 2023). Other studies observed unstable effects that varied depending on the dependent variable chosen (Chen et al., 2023; Patel et al., 2020; Younkin & Kuppuswamy 2018). Taken together, the results of studies that assumed a linear relationship between conveyed emotional expressions and funding behavior therefore remain inconclusive and appear to be contradictory. A few studies provide indications that the relationship between conveyed emotional expressions and funding behavior may not be linear. In addition to a positive effect of written emotional words on funding behavior, Zhou et al. (2016) observed that the effect reversed at high intensity. Variable effects have also been reported for different intensities of facial emotional expressions in pictures (Raab et al., 2020) and pitch videos (Jiang et al., 2020b; Warnick et al., 2021).

Yet, all studies mentioned so far have only investigated the effect of emotional expressions conveyed via a single modality. Because they used different metrics to measure the emotionality of project presentations—ranging from binary categorizations to absolute or proportional numbers of emotional expressions to sentiment scores or perceived measures—their results cannot be straightforwardly compared or aggregated to obtain a complete picture. Limiting the analyses to individual modalities moreover risks failing to fully capture the complex effects of emotional expressions. Especially emergent effects resulting from the combined expression of emotions in multiple modalities cannot be studied in such settings. Insights into such effects may be gained from studies that have analyzed the emotionality of project presentations using a single score. Assuming a linear relationship, Xiang et al. (2019) found that project presentations perceived as more emotional had a more negative impact on funding performance. Since the perceived emotionality of a project presentation was analyzed using an aggregated value, the partial effects of verbal and nonverbal emotional expressions, as well as their specific interplay, cannot be examined. Consequently, it remains unclear whether all modalities should be used to convey emotional expressions, or how these should be combined to optimize the impact on investment decisions.

Insights into the modalities that effectively influence the funding behavior can also be derived from studies, which aim at identifying relevant features of project presentations to predict the success of reward-based crowdfunding campaigns. These studies show that considering text and audio features improves the accuracy of predicting funding success (Dousios et al., 2025; von Selasinsky & Isaak 2020). Further improvement in predictive accuracy is achieved by including visual features (Kaminski & Hopp 2020), with features such as human faces even possessing greater predictive power than product images (Al-Qershi et al., 2022). However, these studies do not provide specific insights into the impact of verbal and nonverbal emotional expressions and their combined perception on funding performance. Research analyzing such impacts of emotional expressions from a multi-modal perspective has so far only been conducted in the adjacent field of donation-based crowdfunding. Assuming a linear relationship, two studies analyzed the impact of emotional expressions in the text and pictures of donation-based project presentations on funding behavior (Lu et al., 2024; Zhao et al., 2022). Similar to their unimodal counterparts with linear assumptions, these studies yielded contradictory results. Transferring the results to reward-based crowdfunding moreover is not straightforwardly possible, because the communication context differs and presentations of donation-based projects typically do not include videos.

Table 1 summarizes the findings of the previously discussed studies, which were conducted in the reward-based crowdfunding domain. To find an

Table 1 Research on the effect of emotional expressions in the reward-based crowdfunding domain

Study and reported effects of emotional expressions	Analyzed relationship and modality	
Allison et al. (2017)^{ns}, Costello & Lee (2022)$^{+}$, Franzoni & Tenca (2023)$^{+}$, Kim et al. (2016)$^{+}$, Koch and Siering(2019)$^{+}$, Moradi & Dass (2019)$^{+}$, Moradi & Badrinarayanan (2021)$^{+}$, Moradi et al. (2023)$^{+}$, Patel et al. (2020)$^{+/-}$, Tafesse (2021)^{ns}, Wang et al. (2017)$^{+}$, Wang et al. (2024)$^{-}$, Yosipof et al. (2024)$^{+}$, Younkin & Kuppuswamy (2018)$^{+/-/ns}$, Yuan et al. (2021)$^{+}$	L	Text
Allison et al. (2022)$^{+}$, Chen et al. (2024)$^{+}$, Miao et al. (2024)$^{+}$, Parhankangas & Renko (2017)^{ns}	L	Speech
Chen et al. (2023)$^{-/ns}$, Wang et al. (2016)$^{-}$	L	Pictures
Chan et al. (2020)$^{ns\,*}$, Davis et al. (2017)$^{-\,*}$, Jiang et al. (2023)$^{-\,*}$, Jin et al. (2024)$^{+\,*}$, Letwin et al. (2024)$^{+\,*}$, Li et al. (2017)$^{+\,*}$, Li et al. (2021)^{ns}, Lin adn Boh (2021)$^{+}$, Oo et al. (2019) $^{ns\,*}$	L	Video
Xiang et al. (2019)$^{-}$	L	Project presentations as a whole
Dousios et al. (2025), von Selasinsky & Isaak (2020)	P	Text, speech
Al-Qershi et al. (2022), Kaminski & Hopp (2020)	P	Text, video, and speech
Zhou et al. (2016)	NL	Text
Raab et al. (2020)	NL	Pictures
Jiang et al. (2020b), Warnick et al. (2021)	NL	Video
This study	Non-linear, multi-modal perspective on text, pictures, video, and speech	

Study assumed: *L*, linear relationship; *NL*, non-linear relationship; *P*, success prediction. *Perceived passion. $^{+}$Positive linear effect. ^{ns}Non-significant effect. $^{-}$Negative linear effect

explanation for their rather contradictory findings and to provide a more detailed picture, we analyze how the intensity of the emotional expressions in project presentations influences investment decisions. Thereby, we assume a non-linear relationship and adopt a multi-modal perspective that includes all available communication modalities.

2.3 Non-linear effect of emotional expressions on funding behavior

According to the EASI theory, whether recipients perceive emotional expressions as appropriate depends on the communication context and situational factors, such as the nature of the interpersonal relationship with the sender or the recipients' willingness to deliberately process information (van Kleef & Côté, 2022). In general, emotions are more likely to occur in close relationships between people who share a long history of interaction and care more about each other (Frijda et al., 1992). In such contexts, communication is often informal and occurs in a casual, less guarded atmosphere that makes it easier to express emotions (van Kleef & Côté., 2022). In personal relationships, more emotional conversations are therefore more expected and more likely to be perceived as appropriate than in professional business relationships, which are rather socially distant and typically serve specific purposes such as decision-making or the execution of transactions (van Kleef & Cote 2022). As business relationships are more goal-oriented than personal relationships, the motivation of the recipients to engage in the processing of explicit information also tends to be higher (Cheshin, 2020). In such scenarios, more emotional conversations are therefore more likely to be perceived as distraction and hence to be viewed as inappropriate. Instead, communication is rather formal, fact-oriented, and guided by display rules that require strict control of emotional expressions, often both in terms of their valence and intensity (Cheshin, 2020). Studies in the sales and customer service context have shown that intense (other than moderate) expressions of

happiness or sadness by salespersons were accordingly perceived by customers as inauthentic and inappropriate, which led to reduced trust in the salesperson and lower product satisfaction (Cheshin et al., 2018). Likewise, a study in a negotiation context found that high intensities of expressed anger elicited smaller concessions than medium intensities because they were perceived as inappropriate (Adam & Brett, 2018).

We surmise that similar mechanisms apply in the reward-based crowdfunding domain. We assume that conveying moderate expressions of positive emotions such as happiness through project presentations increases funding performance. Positive emotional expressions can signal enthusiasm and passion, which are considered advantageous qualities in attracting investors (Li et al., 2017). They are also associated with valued entrepreneurial qualities such as competence and assertiveness, which can motivate investors to fund a project (Anglin et al., 2018; Lyubomirsky et al., 2005; McMullen & Shepherd, 2006). However, we suppose that highly intensive expressions of positive emotions negatively influence funding behavior. When entrepreneurs express positive emotions excessively, potential investors may conclude that they are overly confident about their projects. Overconfidence is associated with concerns about the ability to reflect critically and the motivation to respond appropriately to problems (Barasch et al., 2016; Shipman & Mumford, 2011), which can negatively affect investment decisions. Presentations with excessive expressions of positive emotions may also be viewed as unprofessional (Jiang et al., 2020b). Potential investors may therefore become cautious about the motives or conclude that the presentation is manipulative (Weber & Wirth, 2014), which decreases their willingness to invest in the project.

Compared to positive emotions, negative emotions are expressed much less frequently in the presentations of reward-based crowdfunding projects (Warnick et al., 2021; Younkin & Kuppuswamy 2018). Nonetheless, we assume that moderate expressions of negative emotions also can increase funding performance. For instance, expressions of anger can signal determination and ambition when they relate to the severity of a problem or the lack of something (Harmon-Jones et al., 2011; van Kleef et al., 2010; Veling et al., 2011). Such qualities of entrepreneurs can increase the willingness investors to fund a project (Warnick et al., 2021). When discussing challenges or threats, expressions of fear regarding business uncertainty can signal risk awareness and problem seriousness, which justifies the need for external support and can increase investors' disposition to fund a project (Ruebottom, 2013; Warnick et al., 2021). Similarly, expressions of sadness that accompany sincere requests for support can evoke empathy and prosocial responses from potential investors. This can stir a desire to mitigate negative outcomes and thus increase the motivation to support a project (DeSteno et al., 2004; Small & Verroch, 2009; Warnick et al., 2021). However, we suppose that highly intensive expressions of negative emotions negatively influence funding behavior. Excessive displays of anger can be perceived as impulsive and reckless. Such traits are associated with poor entrepreneurial performance and therefore can reduce the willingness of potential investors to support the project (Forbes, 2005; Geddes & Callister, 2007; Hmieleski & Baron, 2008; Warnick et al., 2018). Similarly, intense expressions of fear can signal uncontrollability or fear of a situation, which can negatively affect risk perceptions (Foo, 2011; Henthrone et al., 1993) and make investors more hesitant to fund a project. Pronounced expressions of sadness can create impressions of resignation and helplessness, which can negatively affect the perception of the entrepreneur's capability and motivation (Tiedens, 2001; Warnick et al., 2021). We posit that such negative perceptions reduce the disposition to invest into the project.

In summary, we thus propose that the transmission of emotional expressions, regardless of their valence, has a positive effect on the funding decision of potential investors until an optimal intensity is reached, after which the additional effect becomes negative. Although only a few studies have directly compared the social effects of emotional expressions across different modalities, current evidence suggests that they are functionally equivalent (van Kleef & Côté, 2022). This means that expressions of a particular emotion can elicit comparable responses in a certain situation regardless of whether they occur via the face, voice, or words. Accordingly, we assume that there is an inverted u-shaped relationship between the intensity

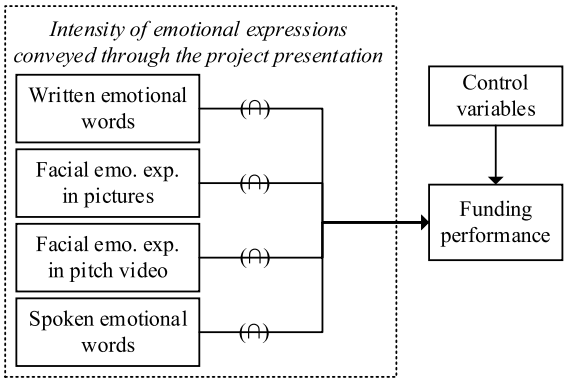

Fig. 1 Research model to investigate combined effects of emotional expressions on funding performance

of emotional expressions and the funding behavior across all available modalities (as depicted in Fig. 1). As a basis for our subsequent confirmatory analysis, we accordingly formulate hypothesis:

> **H1:** The intensity of the conveyed emotional expressions has an inverted u-shaped effect on funding performance across all available modalities of the project presentation.

2.4 The effect of multi-modal emotional expressions

Presentations of reward-based crowdfunding projects are typically multi-modal in nature. As investors tend to evaluate project presentations holistically (Yang et al., 2020), it seems conceivable that the concurrent expression of emotions across multiple modalities might have a different impact on investors than unimodal emotional expressions alone. However, current emotion research provides little insight into how multi-modal configurations of emotional expressions influence the behavioral responses of recipients (van Kleef & Côté, 2022). In particular, it is not yet well understood how emotional expressions are integrated and processed by recipients when they are perceived concurrently across multiple modalities (van Kleef & Côté, 2022). Consequently, it also remains unclear which modalities should be used in combination to convey emotional expressions that most effectively influence the funding decision.

To find answers to this question, we build upon Dual Coding Theory (DCT) as a theoretical framework (Paivio, 1991). DCT posits that the human mind generally processes information via two different but interconnected systems: the imagery system processes nonverbal information (images, auditory sensations, other sensory experiences) while the verbal system handles linguistic information like words and spoken language. When processing a stimulus, these systems create different types of mental representations that can be stored and retrieved for subsequent use. Nonverbal information is processed in a mostly automatic procedure and stored as a perceptual, sensory representation, that is, as a mental image that closely resembles the physical stimulus. Verbal information triggers rational, higher-order processes and is stored as an abstract, conceptual representation. The ability to code a stimulus in these two ways enhances its perception and facilitates remembering and recalling it. Communicating information through both verbal and nonverbal modalities accordingly has been proven to lead to less ambiguity in the interpretation of information and to a better understanding (Paivio, 1991, 2007; Sundar, 2000).

Understanding expressed emotions as social information in the sense of the EASI theory, we surmise that they are also processed by the recipients through the two systems introduced by the DCT. Expressing emotions through both verbal and nonverbal modalities should therefore facilitate their perception and understanding beyond what either method could achieve alone. Research has shown that recipients can indeed process concurrent verbal and nonverbal emotional expressions (such as emotional facial expressions and spoken words) more effectively, leading to improved perception and recognition of the expressed emotions (Gerdes et al., 2014; Klasen et al., 2012; Paulmann & Pell 2011). We assume that this observation also applies to the reward-based crowdfunding domain.

In accordance with the two systems introduced by the DCT, emotion research has further found that nonverbal emotional expressions seem to be particularly suitable for eliciting reciprocal emotional reactions (Hatfield et al., 2014; Townsend & Kahn, 2014; van Kleef et al., 2010), while verbal emotional expressions seem to provide the details needed to draw inferences (Grebelsky-Lichtman & Avnimelech, 2018; Kim & Lennon, 2008; van Kleef et al., 2010). Because these two complementary aspects together determine the emotional response

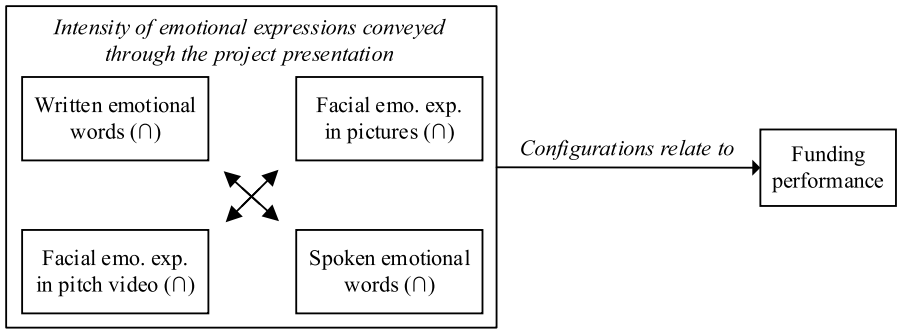

Fig. 2 Research model to investigate combined effects of emotional expressions on funding performance

of the recipients in general (van Kleef & Côté, 2022), we suppose that a combination of verbal and nonverbal emotional expressions may be particularly effective in shaping the investment behavior in reward-based crowdfunding (cf. Figure 2). We thereby assume that the intensities of the displayed emotional expressions remain appropriate as specified by H1. As a theoretical assumption against which we can compare the results of our subsequent exploratory analysis, we thus suggest proposition:

P1: Conveying emotional expressions using a combination of a verbal and a nonverbal modality effectively influences funding performance.

Since project presentations represent the only source of information, the advertised products cannot yet be experienced, and the entrepreneurs are usually unknown to potential investors, funding decisions in reward-based crowdfunding must be made under conditions of high information asymmetry and uncertainty. Studies have shown that making informed decisions in such environments requires systematic cognitive processing (Allison et al., 2017; Courtney et al., 2016). As described by DCT and related studies, especially verbal information appears to activate a systematic processing mode that is essential for interpreting complex information (Kim & Lennon 2008; Paivio, 1991; Smith, 1991). Accordingly, verbal emotional expressions seem to support the interpretation of the emotional intention more accurately than nonverbal expressions. Verbal emotional expressions can therefore be particularly effective in reducing uncertainty and play an important role in shaping decisions (Grebelsky-Lichtman & Avnimelech 2018; Hafeez & Drnovsek 2025; Zhao et al., 2022). For the investment decisions in reward-based crowdfunding, verbal emotional expressions could therefore be more significant than nonverbal ones.

However, solely conveying verbal emotional expressions would mean foregoing the advantages of dual mental representations for recognizing and interpreting emotional expressions. Apparently, though, the recognition and interpretation of emotions can also be facilitated by conveying redundant expressions through multiple verbal modalities (Paulmann & Pell 2011). Studies have shown that emotional judgements generally tend to improve when more than one source of congruent information about the intended emotion is available (Collignon et al., 2008; De Gelder & Bertelson 2003; Paulmann & Pell 2011). Therefore, we assume that a multi-modal transmission of verbal emotional expressions might compensate for this disadvantage. Since it specifically supports inferential reasoning, we surmise that a multi-modal combination of verbal emotional expressions might be an alternative configuration to effectively shape the investment behavior in reward-based crowdfunding (cf. Figure 2). Again, we assume that the intensities of the displayed emotional expressions remain appropriate as specified in H1. As a second theoretical assumption for comparison with the results of our subsequent exploratory analysis, we accordingly formulate proposition:

P2: Conveying emotional expressions using a multi-modal combination of verbal modalities effectively influences funding performance.

3 Data and research approach

To evaluate our hypothesis (H1) and propositions (P1–P2), we build upon a data-driven research

approach (Mollick, 2014). Data was primarily collected from Kickstarter, which is one of the leading reward-based crowdfunding platforms. We gathered publicly available data from all completed (i.e., both successful and unsuccessful) crowdfunding projects running between September 2016 and May 2017. While we recognize the value of incorporating more recent data, availability restrictions prevented extending the data set up to 2025. However, the core mechanisms and psychological factors that influence investors' funding decisions appear to be relatively stable over time (Miao et al., 2024), making the data collected highly relevant and representative for the study.

To help limiting the impact of projects that may be considered outliers, we followed the recommendations of Mollick (2014). We excluded projects that aimed for a funding goal of over $200,000 as projects typically do not exceed this funding amount and higher pledge goals are pursued by far less than 1% of all projects. We also excluded projects with durations shorter than 7 days or descriptions under 100 words, as both usually indicate minimal effort toward fundraising (Franzoni & Tenca 2023; Mollick, 2014). Furthermore, we removed all projects that used a language other than English to ensure the comparability of the analysis of verbal emotional expressions. The final data set contained 16,967 projects. To ensure that the applied criteria to exclude outliers did not influence the results, we performed a robustness check without applying exclusion criteria (cf. Section 4.2).

3.1 Variable description

3.1.1 Dependent variable

To investigate the influence of emotional expressions conveyed through verbal and nonverbal modalities on funding performance, we analyze the total amount of funds raised at the end of the project duration as the dependent variable. Regardless of whether the campaign achieved its pledge goal, the dependent variable *funding raised* reflects the entrepreneurs' ability to create a persuasive project presentation that influences the decision-making process. Simultaneously, the variable *funding raised* represents the investors' decisions to financially support the entrepreneurs' idea (Jiang et al., 2020b; Li et al., 2017).

3.1.2 Independent variable

We operationalized our independent variables to account for the intensity of emotional expressions in the textual descriptions (written emotional words), speech (spoken emotional words), pictures (facial emotional expressions), and the pitch video (facial emotional expressions). These are the primary modalities that can be used to present the campaign (Mollick, 2014). To quantitatively assess the emotions contained in the textual description and the transcribed text of the pitch video's speech, we used the Linguistic Inquiry Word Count (LIWC) software version 2015 (Pennebaker et al., 2015). LIWC evaluates the psychological and structural components of text samples and tracks stylistic aspects of language use. It is widely used in psychology, entrepreneurship research, and information systems research to quantify linguistic constructs (e.g., Lin & Boh, 2021; Parhankangas & Renko 2017). In particular, LIWC contains a validated dictionary that assigns each word to one or more linguistic categories (Pennebaker et al., 2015). To measure the emotional aspects of written and spoken language, we utilized the LIWC category "affect." This category accounts for all words that have an emotional appeal and elicit affective responses in the recipients, e.g., "happy," "love," or "cried" (Pennebaker et al., 2015). The intensity of emotional words is measured as the sum of words labelled as affective in the textual description or the video transcript.

To quantitatively measure the emotional expressions conveyed in pictures and the pitch video, we calculated the intensity of the displayed facial emotional expressions. To identify the facial emotional expressions shown in the pictures, we utilized the "Emotion API," a machine learning algorithm from Microsoft's Cognitive Services (Microsoft, 2023). This approach has been applied and validated in studies exploring online interactions (Kim & Kim 2018; Raab et al., 2020; Yoo et al., 2023; Zhao et al., 2022). The Emotion API can reliably identify human faces and recognize emotional expressions. It characterizes emotional expressions using a vector of confidence scores for seven basic emotions: anger, contempt, disgust, fear, happiness, sadness, and surprise (Bryant & Howard 2019). The emotion scores are calculated and normalized for each face to values between zero and one. Values closer to "one" indicate a more

strongly expressed emotion. For example, a face displayed is likely to show a more emotionally charged expression if the algorithm assigns it the value "one." If the algorithm detected multiple faces in a picture, we added up all the individual emotion scores within that picture to take into account that multiple faces can display a wider range of emotional expressions. Likewise, we added up all the aggregated emotion scores from all pictures to obtain the overall score for each project. To ensure consistency, we used the same approach for detecting facial emotional expressions in every frame of the pitch video. Again, if the algorithm detected multiple faces in a frame, we added up all the individual emotion scores within that frame. Finally, we added up the aggregated emotion scores from all frames to obtain the overall score for the entire video and then divided this score by the number of frames per second. This accounted for variations in frame rates and standardizes the measurements on a per-second basis. For example, if the algorithm returns a score of "ten," the video shows 10 s of highly emotional facial expressions.

To verify the stability of our results and to capture the effects of more specific emotions, we also examined separately positive and negative written/spoken emotional words (LIWC categories "posemo" and "negemo") and facial expressions (happiness and sadness/anger/fear) in a robustness check. The emotional expressions examined in the robustness check correspond to the most frequently expressed and analyzed emotions in reward-based crowdfunding (e.g., Koch & Siering, 2019; Warnick et al., 2021).

3.1.3 Control variables

Building on previous studies, we included entrepreneur-, presentation-, and project-related control variables that influence the funding performance. To control for entrepreneurial characteristics, we considered team size, as larger teams signal effectiveness (Bollaert et al., 2019). Since preparing answers for frequently asked questions sends a positive signal of preparedness (Li et al., 2017), we controlled for the number of FAQ items provided. We also considered entrepreneurs' experience in terms of the number of previously created projects (Cappa et al., 2020) and accounted for reciprocity effects resulting from the number of previously backed projects (Jiang et al., 2020a). Furthermore, we controlled for presentation-related variables such as project duration (Cappa et al., 2020), funding goal (Letwin et al., 2024), and the number of rewards (Bollaert et al., 2019; Jiang et al., 2020a). In addition, we accounted for the utilization of the modalities, i.e., the word count in the project description (Cappa et al., 2020; Koch & Siering, 2019), the number of pictures (Wang et al., 2023), the duration of the pitch video (Mitra & Gilbert, 2014), and the number of spoken words in the pitch video (Parhankangas & Renko, 2017). Finally, project-related variables, in particular the project category, the location of the project/team, and the project start month (Cumming et al., 2024), were controlled for. Table 2 shows the variables considered together with descriptive statistics. Table 3 shows the correlation matrix for the dependent and continuous independent variables.

3.2 Data analysis approach

To answer our research questions, we chose a mixed-methods approach that combines quantitative multiple regression analysis (MRA) with fuzzy-set qualitative comparative analysis (fsQCA). As recommended, we first performed the MRA and then the fsQCA (Dusa, 2019), thus integrating quantitative and qualitative techniques in a sequential and complementary manner (Venkatesh et al., 2016). The MRA examines the net effects and symmetric relationships between emotional expressions and funding performance. It determines the optimal intensity of emotional expressions that should be conveyed through each modality to achieve the highest funding. Thereby, it also considers potential non-linear effects (i.e., inverted u-shaped relationships). This aligns with the quantitative part of our mixed-methods approach, which emphasizes statistical inference and the identification of generalizable results. To expand upon these findings, we complement MRA with fsQCA, which employs configurational and set-theoretic logic. FsQCA can uncover complex, asymmetric "causal recipes," i.e., combinations of conditions associated with a specific outcome of interest (Pappas & Woodside, 2021; Woodside, 2013). It allows us to identify distinct combinations of emotional displays across various modalities that are necessary or sufficient for high funding. This provides an additional perspective on the impact of multi-modal emotional

Table 2 Variables, descriptions, and descriptive statistics

Variable	Description	Mean	SD	Min	Max
Dependent variable					
Funding raised	Funding raised at the end of project duration	9,235	26,390	0	190,832
Independent variables					
Emotional words	Intensity of written emotional words in description	28.25	26.48	0	139
Emotional pictures	Intensity of facial emotional expressions in pictures	0.75	1.78	0	10.02
Emotional video	Intensity of facial emotional expressions in pitch video (seconds)	15.29	29.44	0	153.37
Emotional speech	Intensity of spoken emotional words in pitch video	9.91	12.51	0	54
Control variables					
Team members	Number of team members	1.31	0.75	1	5
FAQ items	Number of FAQ items	0.64	1.98	0	12
Backed	Number of previously backed projects	6.14	17.24	0	117
Created	Number of previously created projects	0.83	2.15	0	14
No. of rewards	Number of rewards	7.57	5.19	1	27
Project duration	Number of days a project accepts funds	31.77	10.55	7	60
Pledge goal	Funding target aimed to raise	13,865	21,834	77	200,000
No. words	Number of project presentation words	676.83	533.47	114	2,801
No. pictures	Number of project presentation pictures	8.67	11.97	0	57
Video duration	Duration of the pitch video (seconds)	104.66	101.77	0	474
No. spoken words	Number of spoken words in the pitch video	188.52	235.91	0	1,043
Category	Categorical variable for the project category				
State	Categorical variable for the project location				
Month	Categorical variable for project's starting month				

$n = 16{,}967$; all variables winsorized at 1st and 99th percentiles

expressions on funding performance. It reflects the qualitative dimension of our mixed-methods approach, which enables us to uncover meaningful configurations of emotional expressions that would be missed by traditional statistical models. While MRA is primarily used to validate theory-driven assumptions in confirmatory analyses, fsQCA is particularly effective in uncovering novel configurations, thus enriching the theoretical foundation with new insights in exploratory analyses. Furthermore, the configurational approach of fsQCA offers a more interpretable alternative to modeling complex higher-order interactions in MRA.

In our mixed-methods approach, the regression results are used for the fsQCA calibration process to ensure that the set memberships are grounded in empirical evidence. MRA and fsQCA are therefore not used in isolation, but as complementary approaches that enrich each other's findings. By combining these approaches, we follow a call for methodological pluralism (Venkatesh et al., 2013) to provide a more comprehensive and nuanced understanding of how multi-modal emotional expressions shape funding performance (Pappas & Woodside, 2021; Ragin, 2008; Venkatesh et al., 2016).

3.2.1 Non-linear multiple regression analysis

To analyze the net effects of emotional expressions and answer the first research question, we performed ordinary least squares regressions with funding raised as the dependent variable and tested for an inverted u-shaped relationship. To mitigate the influence of potential outliers, all variables were winsorized at the 1st and 99th percentiles. Instead of removing these data points, winsorizing replaces them with the specified percentile. This ensures that the analysis is not unduly influenced by outliers (e.g., Haans et al.,

Table 3 Correlation matrix (Pearson)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	Funding raised								
(2)	Emotional words	0.29***							
(3)	Emotional pictures	0.26***	0.35***						
(4)	Emotional video	0.06***	0.15***	0.20***					
(5)	Emotional speech	0.19***	0.30***	0.23***	0.59***				
(6)	No. words	0.33***	0.91***	0.33***	0.13***	0.28***			
(7)	No. pictures	0.47***	0.51***	0.41***	0.01	0.17***	0.56***		
(8)	Video duration	0.17***	0.26***	0.19***	0.54***	0.79***	0.29***	0.18***	
(9)	No. spoken words	0.18***	0.26***	0.21***	0.59***	0.93***	0.28***	0.15***	0.84***
(10)	Team members	0.33***	0.24***	0.25***	0.10***	0.19***	0.26***	0.27***	0.17***
(11)	FAQ items	0.49***	0.22***	0.20***	0.03***	0.13***	0.25***	0.36***	0.11***
(12)	Backed	0.16***	0.20***	0.08***	0.00	0.04***	0.21***	0.23***	0.00
(13)	Created	0.09***	0.09***	0.00	−0.07***	−0.07***	0.10***	0.15***	−0.06***
(14)	No. of rewards	0.27***	0.38***	0.30***	0.21***	0.30***	0.41***	0.42***	0.31***
(15)	Project duration	0.06***	0.00	0.03***	−0.02*	0.01	0.00	0.03***	0.03***
(16)	Pledge goal	0.26***	0.14***	0.11***	0.03***	0.11***	0.18***	0.15***	0.13***
		(9)	(10)	(11)	(12)	(13)	(14)	(15)	
(10)	Team members	0.19***							
(11)	FAQ items	0.13***	0.26***						
(12)	Backed	0.02*	0.08***	0.11***					
(13)	Created	−0.07***	−0.04***	0.02**	0.45***				
(14)	No. of rewards	0.30***	0.23***	0.18***	0.13***	0.07***			
(15)	Project duration	0.01	0.02*	0.05***	−0.11***	−0.16***	0.02**		
(16)	Pledge goal	0.13***	0.14***	0.17***	−0.07***	−0.10***	0.11***	0.17***	

All variables winsorized at 1st and 99th percentiles. *$p<0.05$; **$p<0.01$; ***$p<0.001$; $n=16{,}967$

2016; Lohmar et al., 2023). Only variables that still exhibited a strongly right-skewed distribution after winsorization (i.e., a skewness greater than two) were normalized using an inverse hyperbolic sine (IHS) transformation: $\sinh^{-1}(y)=\log(y+(y^2+1)^{1/2})$. The IHS transformation is conceptually similar to the natural logarithm and produces very similar results. The main difference between the two approaches is that the IHS allows for the interpretation of zero values, which cannot be transformed using a simple logarithmic transformation. In our context, these zero values are meaningful as they represent, for instance, the absence of emotional expressions in a modality. Due to its widespread use in econometric studies and crowdfunding research (e.g., Anglin et al., 2018; Sewaid et al., 2025), we therefore chose to use IHS transformation. To ensure the validity of our results, we performed a robustness check using logarithmic instead of the IHS transformation (cf. Section 4.2). Given the high variability of the dependent and independent variables, applying winsorization and, where necessary, IHS transformation helps to reduce the influence of extreme values and stabilize the variance in the dataset (Cumming et al., 2024).

Since the applied Breusch-Pagan test indicated heteroscedasticity, meaning that the assumption of homoscedasticity in ordinary least squares regression with standard errors is violated, all regression models in this study use and report robust standard errors. Robust standard errors adjust for heteroscedasticity and provide reliable standard errors under these conditions (Croux et al., 2004). Model 1 considers the control variables. Model 2 accounts for the linear effects of all emotional expressions. Model 3 adds their squared terms. The results of the complete model (Model 3) identify the "optimal" and "adverse" intensity of emotional expressions that correlate with high and low funding, respectively.

3.2.2 *Fuzzy-set qualitative comparative analysis*

To answer the second research question and explore, which configurations of modalities with emotional expressions lead to high funding performance, we performed an fsQCA. The analysis consists of three steps: calibration, testing for necessary conditions, and analysis of sufficient configurations (Ragin, 2008). In the first step, we transformed the independent variables for each modality (i.e., no. words, no. pictures, video duration, and no. spoken words) into fuzzy-set scores ranging from 0 to 1. For this, we applied the "S-Shape" function as a method to account for linear relationships. Following De Crescenzo et al. (2020), we used the 10th percentile as threshold for full non-membership, the 50th percentile for the crossover point, and the 90th percentile for full membership.

In addition, we transformed the variables measuring the intensities of the different types of emotional expressions into fuzzy-set scores using the "Bell-Shape" function as a method to account for non-linear relationships. Thereby, we used the results of the regression analyses as an input to state explicit calibration points (Dusa, 2019). In particular, we used our knowledge of the non-linear effect of emotional expressions to more precisely specify the thresholds for full membership, crossover points, and full non-membership for each type of emotional expression (Ragin, 2008). As the regression results show, for each type of emotional expression there is an "optimal" ("adverse") range in which the conveyed intensity correlates with the highest (lowest) funding performance. While the "optimal" effect is achieved near the turning point, the "adverse" effect lies near the ends of the inverted u-shaped curve. The "Bell-Shape" function builds upon two upper and two lower breakpoints, as well as two crossover points, to reflect an inverted u-shaped curve. Accordingly, we set the values of the two upper breakpoints to encompass the most effective intensities of emotional expressions that correlate with at least 90% of maximum funding performance (i.e., the range near the turning point). Intensities in this range receive a fuzzy-set score of 1 (i.e., full membership) and are considered "optimal" for raising high funding. In addition, we set the values of the two lower breakpoints to encompass the least effective intensities of emotional expressions that correlate with at most 10% of maximum funding performance (i.e., the ranges near both ends of the inverted u-shaped curve). Intensities in these ranges receive a fuzzy-set score of 0 (i.e., full non-membership) and are considered "adverse" for raising high funding. The two crossover points represent the midpoints. Accordingly, we set the values of the crossover points to mark the average effective intensities of emotional expressions that correlate with 50% of maximum funding performance. To avoid fuzzy-set scores of 0.5 at the crossover points, we replaced these with 0.499 as suggested in literature (De Crescenzo et al., 2020).

In the second step, we tested whether specific types of emotional expressions or modalities are necessary; that is, whether a particular type of emotional expression or modality must be present in all configurations to achieve high funding. It is recommended that those factors need to exceed a consistency threshold of 0.90 and a coverage threshold of 0.60 (De Crescenzo et al., 2020; Dusa, 2019). In the third step, we analyzed sufficient configurations (Fiss, 2011; Ragin, 2008). A sufficient configuration is a combination of factors that work together to produce a desired outcome, in our case a high funding amount. In other words, a sufficient configuration is a specific combination of the presence and/or absence of modalities and the use of "optimal" and/or "adverse" intensities of emotional expressions. To reduce the generated truth table to sufficient configurations, we applied an often used consistency threshold of 0.80, which is slightly higher than the minimally recommended threshold of 0.75 (Fiss, 2011; Pappas & Woodside, 2021). We applied a frequency threshold of 170, which corresponds to 1% of our sample size (Maggetti & Levi-Faur, 2013). To remove ambiguous configurations that stand for both high and low funding levels, we set a threshold of 0.75 for proportional reduction in inconsistency (Pappas & Woodside, 2021). We applied the Quine-McCluskey algorithm to simplify the sufficient configurations (Dusa, 2019).

4 Results

4.1 Regression analysis results

Table 4 presents the results of our regression analyses. The results of Model 1, which includes only the control variables, are consistent with prior studies

Table 4 Regression results with *funding raised* as the dependent variable

	(1) Funding raised[a]			(2) Funding raised[a]			(3) Funding raised[a]			u-test		VIF
Emotional words				−0.219	***	(0.05)	0.158	**	(0.05)	$t=6.99$	***	8.817
Emotional words^2							−0.158	***	(0.01)			2.604
Emotional pictures[a]				0.106	***	(0.02)	0.296	***	(0.04)	$t=5.03$	***	5.946
Emotional pictures[a] ^{2}							−0.103	***	(0.02)			5.132
Emotional video[a]				0.433	***	(0.03)	0.364	***	(0.03)	$t=0.82$		3.691
Emotional video[a] ^{2}							−0.108	***	(0.03)			2.199
Emotional speech				0.065		(0.05)	0.459	***	(0.06)	$t=8.99$	***	12.524
Emotional speech^2							−0.191	***	(0.02)			2.941
Team members[a]	0.370	***	(0.02)	0.347	***	(0.02)	0.330	***	(0.02)			1.225
FAQ items[a]	0.370	***	(0.02)	0.368	***	(0.02)	0.366	***	(0.02)			1.262
Backed[a]	0.700	***	(0.02)	0.665	***	(0.02)	0.631	***	(0.02)			1.714
Created[a]	0.084	***	(0.02)	0.109	***	(0.02)	0.112	***	(0.02)			1.510
No. rewards	0.741	***	(0.02)	0.704	***	(0.02)	0.666	***	(0.02)			1.532
Project duration	−0.102	***	(0.02)	−0.090	***	(0.02)	−0.084	***	(0.02)			1.162
Pledge goal[a]	−0.012		(0.02)	−0.028		(0.02)	−0.055	*	(0.02)			1.446
No. words	0.190	***	(0.02)	0.373	***	(0.05)	0.312	***	(0.05)			6.997
No. pictures	0.651	***	(0.02)	0.624	***	(0.03)	0.593	***	(0.03)			2.305
Video duration	0.091	*	(0.04)	0.010		(0.04)	0.044		(0.04)			3.747
No. spoken words	0.398	***	(0.04)	0.134	*	(0.06)	0.051		(0.06)			11.160
Category control	Yes			Yes			Yes					
State control	Yes			Yes			Yes					
Month control	Yes			Yes			Yes					
Adjusted R^2	0.474			0.484			0.497					

$n=16{,}967$; robust standard errors are reported in parentheses. *VIF*, variance inflation factor. *$p<0.05$; **$p<0.01$; ***$p<0.001$. [a]Inverse hyperbolic sine transformation (transformed)

on founder- and presentation-related factors (e.g., Jiang et al., 2020a; Koch & Siering, 2019; Li et al., 2017; Mollick, 2014). Model 2 accounts for the linear effects of all emotional expressions. To test whether the model fitness further improved with the addition of their squared terms, we performed an *F*-test comparing Model 2 with Model 3 (*F*-test χ^2 (4, $N=16{,}697)=107.06$, $p<0.001$). The result shows that the addition of the squared terms did increase the model fitness.

Our hypothesis (H1) posits an inverted u-shaped relationship between emotional expressions and the funding raised. Following Lind and Mehlum (2010), we used a three-step procedure to formally demonstrate this relationship: First, the squared term must be negative and significant. Second, the slopes at the end of each data range must be sufficiently steep. Third, the turning point must lie within the data range. To test steps two and three, it is recommended to conduct an appropriate u-test (Haans et al., 2016; Lind & Mehlum, 2010). Our results regarding Model 3 show a positive and significant impact of written emotional words ($\beta=0.158$, $p<0.01$) and a negative and significant impact of their squared term ($\beta=-0.158$, $p<0.001$). The turning point is 41.51, and its 95% confidence interval lies within the data range. The results of the u-test moreover confirm the inverted u-shape ($t=6.99$, $p<0.001$). The intensity of facial emotional expressions in pictures has a positive and significant impact on the total funding raised ($\beta=0.296$, $p<0.001$), while its squared term is negative and significant ($\beta=-0.103$, $p<0.001$). The turning point is 1.482, and its 95% confidence interval lies within the data range. The results of the u-test moreover confirm the inverted u-shape ($t=5.03$, $p<0.001$). The intensity of facial emotional expressions in the pitch video has a positive and significant impact ($\beta=0.364$, $p<0.001$), while its squared term is negative and significant ($\beta=-0.108$,

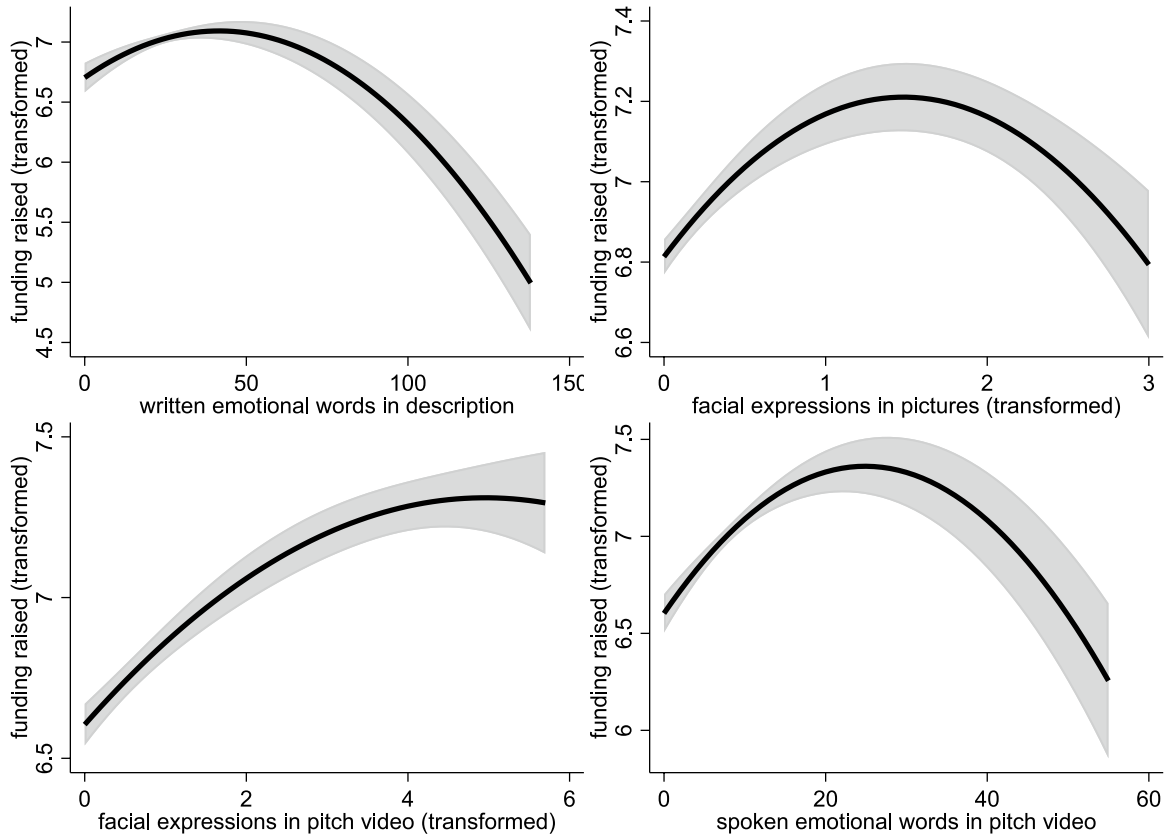

Fig. 3 Effects of emotional expressions on funding raised (including 95% interval)

$p<0.001$). We identified a turning point at 4.95, but its 95% confidence interval was not within the data range. Thus, the u-test could not confirm a statistically significant inverted u-shaped relationship ($t=0.82$, $p>0.05$). Our results for Model 3 also show a positive and significant impact of spoken emotional words ($\beta=0.459$, $p<0.001$) and a negative and significant impact of their squared term ($\beta=-0.191$, $p<0.001$). The turning point is 24.92, and its 95% confidence interval lies within the data range. The results of the u-test moreover confirm the inverted u-shape ($t=8.99$, $p<0.001$).

Taken together, the results thus support H1. Model 3 confirms a significant inverted u-shaped impact of the intensity of emotional expressions in all available modalities except for the facial emotional expressions in the pitch video. Although facial emotional expressions in pitch videos also show a turning point regarding their effectiveness, which gives them an inverted u-shaped characteristic, this observation is not statistically significant (Lind & Mehlum, 2010). That said, conveying approximately 42 written emotional words through the textual description is most effective and reflects the turning point. Similarly, the greatest impact on funding performance is achieved when approximately 25 spoken emotional words are embedded in the pitch video. Facial expressions in pictures are most effective when approximately two people express an intense emotional expression. The greatest impact of facial emotional expressions in the pitch video occurs when they are displayed for approximately 71 s, which reflects the turning point. Figure 3 shows the non-linear relationships between the different emotional expressions and the funding raised.

4.2 Robustness checks

We conducted several robustness checks to verify the stability of our findings. The results of these

tests are shown in the online appendix (Online Appendix A and B). First, we analyzed data gathered from a different reward-based crowdfunding platform and a different time period to verify the generalizability of our results. Therefore, we drew a random sample of the projects published on Indiegogo between 2015 and 2025 and collected data from 16,684 projects. After applying the same exclusion criteria we used for the Kickstarter dataset, our final dataset consisted of 11,618 projects. To measure emotional expressions in the text descriptions, we used the same LIWC bibliography as in our main analysis. Since the Microsoft Emotion API used in our main analysis was no longer available, we used the DeepFace facial expression recognition toolkit (Serengil & Özpınar, 2024) to identify facial emotional expressions in pictures, following the same methodological approach as in our main analysis. However, because especially older videos oftentimes were not available anymore for analysis, we excluded facial emotional expressions and spoken emotional words in pitch videos from our analysis. The results show a non-linear, inverted u-shaped relationship between emotional expressions—both in textual descriptions and pictures—and the funding raised. This indicates that similar dynamics regarding verbal and nonverbal emotional expressions exist, at least on western-oriented crowdfunding platforms. Detailed results are found in Online Appendix A.

Second, we used alternative methods to measure written and spoken emotional words in the project description and the transcribed pitch video. Specifically, we used VADER (Hutto & Gilbert, 2014) and EmoRoBERTa (Demszky et al., 2020; Liu et al., 2019) instead of LIWC. Like LIWC, VADER determines the sentiment using a curated lexicon, whose rules reflect grammatical and syntactical conventions for expressing and emphasizing feelings. To account for the intensity of written or spoken emotional words, the proportions of text falling in each emotional category are multiplied by the number of written or spoken words. The results are consistent with our model (cf. Online Appendix B – Table B1). We then used EmoRoBERTa, a pre-trained neural network based on BERT, which is fine-tuned for emotion recognition in texts (Demszky et al., 2020; Liu et al., 2019). EmoRoBERTa provides a confidence score between 0 and 1 for the presence of a given emotion. We measured the intensity of written and spoken emotional words by summing up all words whose confidence scores exceeded 50%. The results are consistent with our model (cf. Online Appendix B – Table B2).

Third, we calculated the variance inflation factors (VIFs) of Model 3 to check for multicollinearity between the independent variables. The VIFs are depicted in Table 4 next to the regression results of Model 3. Our results show that most VIFs are below or close to the frequently recommended threshold of 5 (O'brien, 2007), with the exception of the variables *no. words*, *no. spoken words*, *emotional words*, and *emotional speech*. *Video duration* also correlates more strongly with *emotional speech*. Conceptually, this is not surprising given the inherent mutual dependence of these variables: A longer video duration increases the likelihood of more words being spoken, and a higher number of written or spoken words can contain more emotional expressions. Therefore, *no. spoken words* is interdependent on *video duration*, just as *emotional words* and *emotional speech* are interdependent on *no. words* and *no. spoken words*, respectively (Neter et al., 1990). Following the recommendations of Kalnins (2018) on how to mitigate multicollinearity concerns, two additional robustness tests were performed. On the one hand, we calculated the ratios of conceptually dependent pairs of independent variables. Specifically, we divided *emotional words* by the *no. words* to determine the ratio of written emotional words in the textual description. This approach was also applied to the remaining emotion-related variables. The new variables serve as indicators of the relative intensity of emotional expressions in their respective modalities (Younkin & Kuppuswamy 2018). Using these ratios, we can account for multicollinearity (Kalnins, 2018). The findings are consistent with our model, except that the u-test for the ratio of facial emotional expressions in pitch videos also reached significance (cf. Online Appendix B – Table B3). On the other hand, we investigated whether including the control variables *no. words*, *no. spoken words*, and *video duration* affects the sign and magnitude of the conceptually dependent variables *emotional words* and *emotional speech*. The robustness check showed that the signs and magnitudes of the emotion-related independent variables remained unchanged after introducing the interdependent control variables (cf. Online Appendix B – Table B4).

This suggests that multicollinearity is unlikely to be a significant concern (Kalnins, 2018). Rather than omitting variables, the inclusion of the control variables *no. words*, *no. spoken words*, and *video duration* is further supported by the improved model fitness (*F*-test: χ^2 (3, 16,697) = 18.38, $p < 0.001$). Since these control variables have a notable impact on funding performance (Koch & Siering, 2019; Yang et al., 2020), we decided to retain them in our analysis.

Fourth, we evaluated the robustness of our findings using different operationalizations of our dependent and independent variables to confirm the stability of our regression analysis and rule out alternative explanations for the observed effects. On the one hand, we operationalized the influence on the funding decision by considering the success of the project, specifically whether the *funding goal was reached*. A value of one represents a successful project, whereas a value of zero represents an unsuccessful one. This binary operationalization reflects Kickstarter's "all-or-nothing" approach, where raised funds are only transferred if the funding goal is reached. It is often analyzed in crowdfunding research (Mollick, 2014). Model B5-1 (cf. Online Appendix B – Table B5), which uses binary logistic regression due to the dichotomous dependent variable, shows that the results are consistent with those of Model 3 (cf. Table 4). On the other hand, we operationalized the influence of emotional expressions on funding decisions by considering the *number of backers* who had pledged their support for the project. Model B5-2 (cf. Online Appendix B – Table B5) shows that the results are consistent with our previous findings.

Fifth, we tested the stability of our findings using different operationalizations of the emotion-related variables. In particular, we conducted three robustness checks to investigate whether the observed effect differs depending on the valence of the expressed emotions. On the one hand, we analyzed the effect of positive written and spoken emotional words (utilizing the LIWC category "posemo") and positive facial emotional expressions (happiness). The results remain consistent (cf. Online Appendix B – Table B6). On the other hand, we analyzed the effect of negative written and spoken emotional words (utilizing the LIWC category "negemo") and negative facial emotional expressions as the sum of sadness, anger, and fear (Warnick et al., 2021). The results show a non-linear, inverted u-shaped effect (cf. Online Appendix B – Table B7) similar to those for positive emotional expressions, except that the u-test for negative facial emotional expressions in pitch videos reached significance. To examine the nuanced effects of positive and negative emotional expressions together, we also conducted a single regression analysis that included both sets of variables. The results show a non-linear, inverted u-shaped effect for both, with effect sizes and statistical significance being slightly lower for negative emotional expressions (cf. Online Appendix B – Table B8). While positive emotions are expressed much more frequently in reward-based crowdfunding (Warnick et al., 2021; Younkin & Kuppuswamy, 2018) and dominated the analysis of Model 3, the results of the robustness check confirm our impression that expressions of negative emotions can also have a positive—albeit smaller—influence on funding performance (cf. Section 2.3).

Sixth, to further understand the non-significant inverted u-shaped effect of facial emotional expressions in pitch videos, we tested all combinations of verbal and nonverbal emotional expressions and their influence on the significance of the u-test. The regression analysis without *emotional speech* shows a statistically significant inverted u-shaped relationship for facial expressions in pitch videos (cf. Online Appendix B – Table B9). This result corroborates the findings of a previous study that examined facial emotional expressions in videos in isolation (Warnick et al., 2021).

Seventh, we further analyzed our results with respect to the project category. Previous studies have shown that the project presentation and the relationship between entrepreneurs and potential investors can vary depending on the project type (Gafni et al., 2019). Instead of using project category as a categorical control variable, we therefore distinguished between hedonic, *artistically* oriented projects and utilitarian, *technology* oriented projects. Following the approach of Gafni et al. (2019), we created a binary variable to split the dataset into these two subsamples. The results for artistically and technology oriented projects are consistent with Model 3 (cf. Online Appendix B – Table B10) and confirm the overarching non-linear effect of emotional expressions on funding performance. However, for artistically oriented projects, the u-test for facial emotional expressions in pitch videos also reaches significance ($p < 0.05$).

Table 5 Analysis of sufficient conditions for high and low funding performance

Configuration	High funding			Low funding	
	C1 *Emotional verbal*	C2 *Emotional video*	C3 *Emotional non-video*	C4 | C5 *Non-emotional presentation*	
Emotional words	●		●		○
Emotional pictures			●	○	○
Emotional video		●	○	○	○
Emotional speech	●	●	○	○	○
No. words	●	●	●	○	○
No. pictures	●	●	●	○	○
Video duration	●	●	○	○	
No. spoken words	●	●	○	○	○
Raw coverage	0.263	0.262	0.051	0.447	0.335
Unique coverage	0.044	0.048	0.037	0.107	0.014
Consistency	0.938	0.940	0.893	0.869	0.903
Solution coverage	0.347			0.462	
Solution consistency	0.928			0.866	

Notion based on Fiss (2011), the symbol ○ indicates the absence and ● indicates the presence of the condition. Blank cells indicate a "don't care" situation. In this case, the emotional expression plays a subordinate role and may be either present or absent

Eighth, we performed robustness checks to verify that our treatment of the dataset did not influence the regression results. One robustness check was conducted without applying criteria to exclude outliers. The results remain consistent with Model 3 (cf. Online Appendix B – Table B11). In another robustness check, we applied the logarithmic transformation $y = \log(y+1)$ instead of the inverse hyperbolic sine transformation to highly skewed variables. To account for zero values in the variables, a constant of one was added. The results are consistent with Model 3 (cf. Online Appendix B – Table B12). Finally, we checked for biases that might have been introduced by winsorization (e.g., Haans et al., 2016) and conducted additional robustness checks with a more conservative winsorization at the 0.1st and 99.9th percentiles, as well as without applying winsorization. The results of both checks are consistent with Model 3, except that the u-test for facial emotional expressions in pitch videos also reaches significance without winsorization (cf. Online Appendix B – Tables B13 and B14).

4.3 fsQCA results

In the fsQCA, the test for necessary conditions revealed no influencing factor as a mandatory condition (consistency < 0.90). Therefore, no single type of emotional expression or modality is required to achieve high funding. Instead, the results yield three configurations that are sufficient for achieving high funding. The reported solution coverage of 0.347 describes the extent to which the outcome is explained by the three configurations. It is consistent with the results of other studies using fsQCA to predict investment decisions (De Crescenzo et al., 2020). The solution consistency is 0.928, and all three configurations are above the required minimum consistency threshold of 0.75 (Fiss, 2011; Pappas & Woodside, 2021).

The first configuration (C1) shows that project presentations can achieve high funding levels when they make use of all available modalities (i.e., many written words, many pictures, a long video, many spoken words) and convey optimal intensities of written and spoken emotional words (presence of the condition, cf. Table 5). In this configuration, facial emotional expressions in the pictures and the pitch video are irrelevant (i.e., do not care conditions in Table 5). Therefore, we refer to C1 as the *emotional verbal* configuration. The configuration corresponds to our theoretical assumptions described in proposition P2.

According to the second configuration (C2), project presentations can also achieve high funding levels when they make use of all available modalities and convey optimal intensities of facial emotional

expressions in the pitch video and spoken emotional words (presence of the condition, cf. Table 5). In this configuration, facial emotional expressions in pictures and written emotional words are irrelevant for the funding performance (i.e., do not care conditions in Table 5). Consequently, we refer to C2 as the *emotional video* configuration. The third identified configuration (C3) describes that project presentations can achieve high funding levels even when pitch videos and their associated facial emotional expressions and spoken emotional words are absent or only minimally used (absence of the condition, cf. Table 5). In this case, the presentation must contain an information-rich description (i.e., many written words and pictures) and convey optimal intensities of written emotional words and facial emotional expressions in pictures (presence of the condition, cf. Table 5). We refer to C3 as the *emotional non-video* configuration. Both C2 and C3 rely on a combination of verbal and nonverbal emotional expressions, which corresponds to our theoretical assumptions described in proposition P1.

4.4 fsQCA sensitivity analyses and post-hoc analyses

Since fsQCA is sensitive to the chosen thresholds, especially regarding the frequency and raw consistency, we performed robustness checks with varying thresholds to verify the stability of our results. We found that the results are stable between a minimum frequency threshold of 149 and a maximum frequency threshold of 225. Furthermore, the results remain robust up to a raw consistency threshold of 0.893. FsQCA results can also be sensitive to the chosen calibration breakpoints. To verify the stability of our results, we varied the lower breakpoints for full non-membership to include projects that correlated with only 5% or 15% of the maximum funding performance. In addition, we varied the upper breakpoints for full membership to include projects that achieved at least 85% or 95% of the maximum funding performance. The results remain robust with respect to the alternative calibrations points (cf. Online Appendix C – Table C1 and C2). Furthermore, the results remain consistent when adding fuzzy values between 0.001 and 0.50 (cf. Online Appendix C – Table C3).

As an additional robustness check, we performed the fsQCA using VADER and EmoRoBERTa as alternative methods to measure written and spoken emotional words in the project description and the transcribed pitch video. The fsQCA results remained comparable (cf. Online Appendix C – Tables C4 and C5). We also checked whether the results remained stable when restricting the analysis to expressions of positive emotions, that is, facial expressions of happiness in pictures and pitch videos, as well as positive written and spoken emotional words. Such positive emotions are most frequently expressed in reward-based crowdfunding (Warnick et al., 2021; Younkin & Kuppuswamy 2018). The results are consistent with the originally reported findings (cf. Online Appendix C – Table C6).

As a post-hoc analysis, we conducted an fsQCA with the same factors, but targeting low funding performance as goal. Again, no factor was found to be a mandatory condition. The analysis of sufficient configurations revealed two configurations (cf. Table 5). Both configurations demonstrate that the absence or minimal use of emotional expressions, combined with limited use of the main communication modalities, leads to low funding performance. We refer to both as the *non-emotional presentation* configurations.

5 Discussion

5.1 Key findings

The results of our study suggest that investment decisions in reward-based crowdfunding are influenced by the emotional expressions conveyed through the project presentation, specifically by the intensity of written emotional words (in the text), spoken emotional words (in the pitch video), and facial emotional expressions (in the pictures and video). As the products advertised in crowdfunding campaigns cannot be experienced by potential investors yet and the funding decision hence must be made under uncertainty, the perception and evaluation of emotional expressions obviously help to shape decision-makers' appraisal of the project as suggested in literature (Achar et al., 2016; Li et al., 2017; van Kleef, 2014). The results of the conducted robustness checks suggest that this effect occurs similarly across leading (western-oriented) reward-based crowdfunding platforms and affects artistically and technology oriented projects in the same way.

The regression analyses reveal a non-linear, inverted u-shaped relationship between the intensity of emotional expressions conveyed through the available modalities and funding performance. The latter was measured by the amount of funding raised, the number of investors, and the probability of reaching the pledge goal. The observed relationship means that increasing the intensity of emotional expressions increases the amount of funding raised until an optimal intensity level is reached, beyond which the effect of conveying further emotional expressions becomes negative. Likewise, conveying an optimal intensity level of emotional expressions is associated with the highest number of investors and, as a consequence, with the highest probability of reaching the pledge goal. The results of our robustness checks indicate that the observed relationship thereby occurs regardless of the valence of the expressed emotions. In principle, it hence exists for the expression of both positive and negative emotions (albeit with different effect sizes).

Generally, emotional expressions are more likely and hence more expected in close personal relationships (Frijda et al., 1992) than in professional business contexts, where relationships are typically more distant and more goal-oriented and transactional. Confirming findings from previous studies, our results suggest that emotional expressions may still be beneficial in such contexts, as they can contribute to decision-making, especially when decisions must be made under uncertainty (Achar et al., 2016; van Kleef, 2014). However, they also indicate that intense expressions of emotions in the reward-based crowdfunding domain may deviate from expected behavior and are therefore likely to be perceived as inappropriate by potential investors. Ideally, the communication modalities used in the presentations of reward-based crowdfunding projects should therefore convey a moderate intensity of emotional expressions to balance both effects and achieve an optimal impact on funding performance.

The configurational analysis furthermore shows that emotional expressions should be conveyed through a carefully chosen combination of modalities to achieve an optimal effect on funding behavior. Specifically, the results of the fsQCA suggest that it is neither necessary to convey emotional expressions through all available modalities, nor is it sufficient to only use a single modality. Rather, emotional expressions appear to be most effective when conveyed through functionally complementary subsets of the available modalities. We identified three comparably effective configurations: the *emotional verbal (C1)*, *emotional video (C2)*, and *emotional non-video (C3)* setting. Each configuration uses a different, but functionally complementary, pair of modalities to convey emotional expressions that achieve high funding.

Our results suggest that an optimal effect can be achieved particularly when specific combinations of a verbal and a nonverbal modality are used to convey emotional expressions with optimal intensity levels (C2 and C3). On the one hand, entrepreneurs can fully exploit the multi-modal nature of pitch videos to convey facial emotional expressions in combination with spoken emotional language (C2). Alternatively, verbal emotional expressions can be embedded in the textual description and complemented by facial emotional expressions in accompanying images (C3). Although providing a pitch video is often considered to be a mandatory success factor (e.g., Mollick, 2014; Yang et al., 2020), our results show that it is not necessarily required to effectively convey emotional expressions. According to Dual Coding Theory (Paivio, 1991), the relative strength of combining verbal and nonverbal modalities results from their processing in two separate cognitive subsystems. They create two mental representations of the perceived emotions, which leads to a better *perception* and *recognition* of the conveyed emotions (Klasen et al., 2014; Paivio, 1991; Seo, 2020). Our findings suggest that the combination of verbal and nonverbal modalities also significantly influences the behavioral *response* of the recipients (i.e., the funding behavior).

However, we also found evidence that an optimal effect on funding behavior can be achieved by conveying emotional expressions only through multiple verbal modalities. The fsQCA results show that high funding levels can be achieved by conveying emotional expressions in optimal intensities through written words in the description and spoken words in the pitch video (C1). This configuration suggests that verbal emotional expressions may have a stronger effect on funding behavior than nonverbal expressions, which alone cannot achieve an optimal effect. One reason for this could be that verbal emotional expressions activate higher-order, language-mediated processes that are essential for rational information

processing (Paivio, 1991). Given the reflective, analytical nature of the decision-making process (Allison et al., 2017; Courtney et al., 2016), they might hence be particularly helpful. Moreover, verbal expressions are well-suited to conveying explicit emotions and subtle nuances that nonverbal modalities may struggle to effectively express (Kim & Lennon, 2008; Smith, 1991; Zhao et al., 2022). Conveying redundant verbal emotional expressions, which theoretically can improve their perception and understanding (De Gelder & Bertelson, 2003; Paulmann & Pell, 2011), could therefore be an effective strategy to compensate for the advantages of combining verbal and nonverbal emotional expressions.

Taken together, the results of the fsQCA suggest that the emotional expressions conveyed in the available modalities of project presentations are unlikely to achieve an optimal effect in isolation. Only the multimodal display of emotional expressions appears to have an optimal influence on funding decisions. Our findings also show that project presentations with low levels of conveyed emotional expressions are associated with low funding performance (C4/C5). This finding reinforces the assumption that an emotional project presentation plays a crucial role in persuading potential investors and increasing the performance of reward-based crowdfunding campaigns. According to our results, however, it is also not necessary to convey emotional expressions through all available modalities. To achieve an optimal result, the approach to conveying emotional expressions should therefore be moderate, both in terms of the intensity of the emotional expressions and the number of communication modalities used.

5.2 Implications for academia

The results of our study have implications for academia and practice. For academia, this study offers a nuanced perspective on the mechanisms by which emotional expressions influence decision-making in the reward-based crowdfunding domain. Previous research in this area has often conceptualized emotional expressions as peripheral signals that influence decision-making by eliciting automatic affective responses (e.g., Allison et al., 2017; Koch & Siering, 2019). We broaden this perspective by applying the Emotions as Social Information (EASI) theory to reward-based crowdfunding. This theory emphasizes both the affective reactions elicited by emotional expressions and the inferential processes by which investors interpret them. In contrast to established theoretical frameworks such as Signaling Theory (Spence, 1973) or Elaboration Likelihood Model (Petty & Cacioppo, 1986), EASI theory specifically focuses on the effects of emotional expressions. Other than the concept of primitive emotional contagion (Hatfield et al., 1992), it emphasizes the importance of social context and perceived appropriateness when describing the impact of emotional expressions on the recipient's behavior. With this interpersonal perspective, EASI theory provides a richer theoretical fundament that can support the development of a more nuanced understanding of how emotions are perceived and integrated into decision-making processes.

Based on EASI theory and its concept of perceived appropriateness, we can provide a possible explanation for the rather contradictory findings of previous studies that assumed a linear relationship between conveyed emotional expressions and funding performance. While some studies in the reward-based crowdfunding domain report a positive relationship (e.g., Koch & Siering, 2019; Letwin et al., 2024; Li et al., 2017), others identified saturation effects or even negative effects of emotional presentations (e.g., Jiang et al., 2023; Li et al., 2021; Tafesse, 2021). By showing that emotional expressions can unfold both positive and negative effects depending on their intensity, we can resolve these seemingly contradictory findings of previous studies and integrate them into a coherent picture. Our research highlights the nonlinear relationship between the intensity of emotional expressions and the resulting funding behavior and explains this effect with perceived appropriateness as a core element of EASI theory (van Kleef & Côté, 2022): for emotional expressions to be effective, they must align with the social context that shapes situational norms and expectations regarding the expression of emotions. By focusing on the effect resulting from the intensity of conveyed emotional expressions, we show that a discrepancy with social norms and expectations can even outweigh advantages that emotional expressions might have for decision-making.

Although project presentations are inherently multi-modal and emotional expressions are rarely perceived in isolation (Gerdes et al., 2014; Yang et al., 2020), previous studies in the area of reward-based crowdfunding have primarily focused on emotional

expressions conveyed through a single modality and examined their individual effects (e.g., Koch & Siering, 2019; Moradi et al., 2023; Yosipof et al., 2024). Our study fills this gap by adopting a multi-modal perspective and demonstrating how emotional expressions, which are conveyed through combinations of textual descriptions, images, and pitch videos, shape the funding behavior. Previous research in cognitive psychology has shown that multi-modal emotional expressions can facilitate emotion *perception* and *recognition* (e.g., Bänziger et al., 2009; Gerdes et al., 2014; Klasen et al., 2014; Paulmann & Pell, 2011). However, it is not yet fully understood "how people weigh and integrate such emotional information remains to be uncovered" (van Kleef & Côté, 2022, p. 649). The extent to which multi-modal emotional expressions influence the behavioral *response* of recipients hence is still subject to ongoing research.

Our results show that not all available modalities need to be used to convey emotional expressions to achieve an optimal effect in the reward-based crowdfunding domain. Rather, the multi-modal display of emotional expressions should be carefully orchestrated to effectively shape investor perceptions and influence funding decisions. The findings of our study thus provide new insights on how the perception of multi-modal emotional expressions might affect behavioral responses. By combining EASI theory with DCT, we furthermore propose a novel theoretical lens to explain why certain combinations of multi-modal emotional expressions can be particularly effective in shaping behavioral responses. We argue that an improved perception and recognition of emotions can promote affective reactions and inferential reasoning processes, which together shape a recipient's behavioral response. We propose that a combination of verbal and nonverbal emotional expressions could be particular effective in achieving both. Our findings also indicate that multi-modal emotional expressions might be particularly effective if they are appropriate to the specific task and the processing cognitive system. The results of our fsQCA suggest that verbal emotional expressions are particularly effective in the context of reward-based crowdfunding, because they can achieve optimal effects on their own while being a necessary complement to nonverbal emotional expressions. This observation suggests that verbal emotional expressions may play a dominant role in professional decision-making contexts as they trigger rational, higher-order cognitive processes. Our findings hence also provide new insights to help answering the open question of "whether certain modalities are preferentially relied upon" (van Kleef & Côté, 2022) when processing multi-modal emotional expressions.

5.3 Implications for practice

For practice, our study provides insights into the impact that an emotional project presentation can have on the success of reward-based crowdfunding campaigns. To influence funding decisions and maximize a campaign's success, the project presentation should convey emotional expressions. However, to achieve an optimal effect in terms of funding performance, we recommend adopting a moderate approach. Specifically, the emotional expressions conveyed must still adhere to the norms and expectations of professional communication. Therefore, written emotional words (in the text), spoken emotional words (in the pitch video), and facial emotional expressions (in the pictures and pitch video) should be conveyed only up to an optimal intensity level that investors still perceive as appropriate. Conveying emotional expressions beyond this intensity level has a negative effect.

To achieve an optimal impact, we furthermore found that it is sufficient to use combinations of two modalities to convey emotional expressions at their respective peak intensity: First, investors can be effectively persuaded with an emotional pitch video (C2) that uses both spoken emotional words and facial emotional expressions with peak intensity. Such a video can, for instance, complement an otherwise rather formal project description. Second, if a pitch video is omitted, the presentation should contain written emotional words in the textual description and facial emotional expressions in the accompanying images at their respective peak intensity levels (C3). As a third, equally effective option, an entrepreneur can rely on a combination of written emotional words in the textual description and emotional speech in the pitch video (C1). In this case, facial emotional expressions neither need to be displayed in the images nor in the pitch video to reach high funding. Instead, these modalities can focus on presenting the product and its features.

According to our findings, the most effective strategy for increasing funding by conveying emotional

expressions in project presentations is a moderate approach, both in terms of the displayed intensity of emotional expressions and the number of modalities used to convey them. Simply maximizing both aspects will not lead to the desired result. Our findings can serve as a guide for entrepreneurs who are responsible for creating project presentations. Furthermore, platform operators can use these findings to develop best-practice guidelines that enhance the emotional appeal of crowdfunding campaigns and improve their effectiveness in persuading potential investors.

5.4 Limitations and future research

Several limitations should be considered when interpreting our results. Above all, our analysis primarily relies on data from a single crowdfunding platform that was collected during a specific time frame, which limits generalizability. Although we conducted a robustness check using data from a different platform and time period, future research should strengthen the external validity of our results by examining additional platforms and time frames. We also did not investigate whether the use of emotional expressions has changed with the increasing professionalization of the crowdfunding field. Changes in the use of emotional expressions over time may particularly have biased the dataset used for our robustness check, as it covered a longer time frame. To shed more light on the use of emotional expressions in the field of reward-based crowdfunding, future research could also include time series analyses. In addition, the knowledge base could benefit from analyzing panel data with daily information on funding performance to explore the influence of emotional expressions on funding decisions at different stages of the campaign, for example, at launch, during the final days, or in relation to the remaining funding required.

Our findings are furthermore contingent on the tools we employed. Although LIWC and Microsoft Emotion API are established and validated tools (e.g., Kim & Kim, 2018; Lin & Boh, 2021; Moradi & Badrinarayanan, 2021; Raab et al., 2020; Yoo et al., 2023; Zhao et al., 2022), using additional tools and measures to verify our results could further increase the validity of our findings. The robustness tests using EmoRoBERTa and VADER for text and speech analysis, and DeepFace for the recognition of facial expressions, represent steps in this direction. While we used these tools to account for the intensity of emotional expressions, they also offer the potential to go beyond metrics of magnitude, recurrence, or a positive–negative classification. Future research should use these tools for more fine-grained analyses of emotional expressions as they facilitate the differentiation of subtle emotional nuances and the identification of emotional expressions like excitement or disappointment. Future research could also use tools for analyzing body movements, postures, and gestures to account for the emotions inferred from these nonverbal expressions.

Future research could also consider additional factors that might shape the effect of emotional expressions but could not be analyzed in our study. While we accounted for possible differences between artistically and technology oriented projects, we could not examine other project characteristics such as the perceived innovativeness or sustainability. Furthermore, future research could aim at identifying additional social-contextual factors such as the closeness of the relationship between the entrepreneur and the investors. Higher intensities of emotional expressions may, for instance, be more positively received when a more personal relationship has been established. Next to perceived appropriateness, future research could also identify additional factors that mediate the relationship between emotional expressions and the behavioral response. Studies in other professional communication contexts have, for instance, shown that displays of intense emotions lead to reduced trust in the expresser, which negatively affects the behavioral response. Since our data-driven approach did only support the analysis of the relationship between emotional intensity (stimulus) and funding behavior (response), such endeavors could further contribute to better understand the conditions under which emotional expressions are effective (van Kleef & Côté, 2022). Finally, future research could investigate the effectiveness of emotional expressions depending on the local context in which they are expressed. It is conceivable that emotional expressions could have different effects depending on whether they are expressed when describing the vision or the risks of the project. As we wanted to achieve an overview of the underlying mechanisms, we did not yet cover this aspect.

6 Conclusion

The display of emotional expressions in the project presentation can have a significant impact on the

investment behavior in reward-based crowdfunding. So far, however, it remains unclear how emotional a project presentation should be to most effectively influence funding decisions. The results of our study contribute to the closure of this literature gap. By uncovering that emotional expressions can unfold both positive and negative effects depending on their intensity, we bring together seemingly contradictory findings of previous studies and integrate them into a coherent picture. Specifically, our results suggest that moderate, rather than excessive, intensities of emotional expressions yield the most favorable impact on funding performance. Furthermore, we show how emotional expressions should be distributed across the available modalities to achieve an optimal effect, an aspect that has received little attention in reward-based crowdfunding so far. Our findings indicate that conveying emotional expressions through specific subsets of the available modalities can be sufficient. Taken together, the most effective approach to influence funding decisions with an emotional project presentation should hence be moderate with respect to both the intensity of the emotional expressions and the number of modalities used to convey them.

Our study also offers a fresh theoretical perspective to explain the impact of emotional expressions in reward-based crowdfunding. Drawing on EASI theory, we argue that the effects of emotional expressions are mediated by social-contextual factors, such as the nature of the interpersonal relationship between the communication partners or the recipients' willingness to engage in deliberate information processing. These factors determine whether the conveyed emotional expressions are perceived as appropriate by the recipients and, accordingly, determine their relative effectiveness. By combining EASI theory with DCT, our study furthermore provides a theoretical explanation for why certain combinations of modalities can be particularly effective in conveying emotional expressions. By broadening the analytical perspective from mere signaling to a more nuanced picture of the perception of multi-modal emotional expressions and their influence on funding decisions in the reward-based crowdfunding domain, we aim to provide valuable insights for entrepreneurs and new directions for future research endeavors.

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Declarations

Competing interests The authors declare no competing interests.

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