

A psychological rating instrument: The entrepreneurial pitching success scale and its reliability and validity

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ABSTRACT

Entrepreneurial pitching success (EPS) is a behavioral observation scale consisting of behaviorally anchored items developed to understand behavioral predictors of pitching success; it is based on a scoping review of the empirical literature on pitching, condensed to 13 important aspects. Similar to the elaboration likelihood theory and system 1/system 2 decision-making, we suggest two routes of persuasion in pitching—rational arguments and inspirational and affective approaches. Study 1 ($N = 100$) on the first version of the scale established interrater reliability and improved the precision of the wording of the items. Study 2 ($N = 185$) on the criterion validity correlated the predictor items and factors with three success variables: 1) feeling inspired by the pitch; 2) convinced of good market opportunities; and 3) advancing to the next level in the Slush Pitching Competition as “objective” success. Study 2 proves clear criterion validity of the EPS. Thus, EPS can be used to bridge research and practice.

KEYWORDS

Pitching; success variables; validation

Introduction

An entrepreneurial pitch is a short introduction to a new venture, a new product idea, or a new process. Pitching may have an important impact in most situations in which something new is communicated. In contrast to a longer introduction or to voice in a company, a pitch is supposed to be short. Thus, research on pitching can inform many fields of inquiry that study the first set of communications of something important.

Formally, however, pitching has been mainly studied in entrepreneurship research; a pitch serves as a short introduction of a business idea to potential investors with the intent to eventually receive support for the entrepreneurial venture. Mastering the art of pitching has become a rite of

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passage for budding entrepreneurs. The pitch is often the first time resource providers (investors, business angels, venture capital managers, and so on) and the budding entrepreneur “meet”; therefore, it is of vital importance. Entrepreneurs turn to funders for financial support to start, grow, and sustain their ventures. Pitches are time-constrained because resource providers want to get a quick overview. “In essence, pitches are avenues where entrepreneurs perform to express and legitimize their business ideas and mobilize investor support, and where, for their part, investors aim to optimize decision processes to choose high-quality ventures to which they can commit resources, time, and attention” (Kalvapalle et al., 2024, p. 2024). Entrepreneurs typically deliver their pitches verbally, maybe augmenting them with a PowerPoint presentation or with product demonstrations. In principle, pitches appear in all walks of life, such as proposals for new ideas, for example, Hollywood movies (Elsbach & Kramer, 2003), voicing problems or opportunities within companies and getting support for initiatives (Tornau & Frese, 2013; Van Dyne & LePine, 1998), getting help in everyday work (Hofmann et al., 2009), and so on.

In short, pitching initiates a process in which potential financiers make investments of their time, attention, and finances (Cardon et al., 2017). Funders are interested in examining pitches to determine whether the teams/entrepreneurs are serious, whether they show commitment, and whether they are able to deal with potential challenges (Zott & Huy, 2007). Pitches are supposed to convince investors that the new venture will succeed and that the product/service provided meets market needs (Parhankangas & Ehrlich, 2014). We use the standpoint of the pitching party—pitching success is, therefore, conceptualized to be the success of the pitching party (Kalvapalle et al., 2024).

The empirical studies and the theorizing on pitching are surprisingly both underdeveloped and overdeveloped. The literature is overdeveloped because many different and at times contradictory theories and constructs have been suggested to lead to pitching success—often without references to the other theories and constructs. But the literature is also underdeveloped because there have been few attempts to provide a comprehensive model. Related to this, there is also no comprehensive measure to predict pitching success. This article attempts to provide order for disparate ideas and a measure that may help to consolidate the current literature on pitching. What are then the most important desires of a pitch suggested up to this point?

One area of relevant theories and empirical articles views pitching to encompass primarily rational arguments (Higgins et al., 2003) on the potential market and the viability of a new firm—here market analysis and operational business characteristics are important (Applegate, 2005; Aulet, 2013). A variant of the rational argument approach is used by articles that are based on signaling theories to understand the persuasive nature of pitches (Colombo, 2021; Steigenberger & Wilhelm, 2018).

In sharp contrast to these rational approaches, some scholars suggest that it is more important to influence the “gut feelings” of potential investors. Gut feelings can be influenced by the inspirational character of pitches (Huang & Pearce, 2015). Thus, the pitch needs to feed into these “gut” feelings by getting potential investors excited about the new venture. Because initial encounters are often influenced by affect, affective effects of pitches were studied frequently. Affect, and particularly positive affect, has been suggested to be of primary importance (Zajonc, 1984) for any kind of decision-making. A frequent area of study is how positive affect may provide the motivational push to get potential investors to act positively on the path to providing finances to the new firm has been studied frequently (Allison et al., 2022; Cardon et al., 2017; Chen et al., 2009; Li et al., 2017; Murnieks et al., 2016). Given the verbal character of pitches, approaches focusing on the rhetoric of pitches have also been suggested (Van Werven et al., 2019).

There has been a nearly exponential increase in interest in entrepreneurial pitches, as exemplified by the number of articles published and their increase in citations (Kalvapalle et al., 2024, p. 554). The research in the area of entrepreneurial pitching has led to a proliferation of different explanatory concepts in the pitch literature; therefore, scholars frequently called for holistic and broad approaches that would embrace the different approaches to pitches (Anglin et al., 2014; Clarke et al., 2019; Kalvapalle et al., 2024; Oo et al., 2019).

This then leads to two major contributions of our article. First, our article is supposed to bring together different ideas on pitching by introducing a measurement instrument to predict pitch success. We believe that it is too early to emphasize highly specific theories of pitching. We need to be open to the idea that different theoretical approaches should be embraced and tested in contrast to each other or each contribute some part of the pitching success. To be holistic (and multifactorial), we base our theorizing on the psychological concepts of decision-making suggested by Kahneman and Slovic: This is a family of theories with two psychological systems—system 1 and system 2 (Kahneman, 2003; Slovic, 1996), with system 1 being intuitive, associative, and fast and often related to emotions and habitual reactions; in contrast, system 2 is slow, effortful, conscious, and thoughtful. This family of theories serves as a guide for the development of our observational coding scheme.

Our second contribution is to develop a behaviorally anchored measurement system that may help to bridge research and practice and that can give justice to the complex and multifactorial psychological area of pitching success. To our knowledge, this is the first time a behaviorally anchored measure has been developed for entrepreneurship research, although it has a long history in the psychology of performance (Campbell et al., 1973; Landy & Farr, 1983). We examine the reliability of the scale with the help of inter-coder agreement; moreover, we provide concurrent criterion validity estimates by correlating the items to success in real-life pitches (Study 2). The observational behavioral

Entrepreneurial Pitching Success (EPS) scale can be used for the analysis of videos or life-performance (and even written material), and it was planned to be usable and versatile for different situations (Van Werven et al., 2019).

We based our coding scale on the empirical literature.¹ In accordance with evidence-based entrepreneurship (Frese et al., 2014), we used the scientific entrepreneurship literature on pitching to develop the behavioral items of the observational instrument. Theoretically, the scale assembles a wide range of success factors of pitching, and it allows research to develop a common corpus of pitch effectiveness. Practically, we believe that the EPS scale can help coaches and educators to train pitching, and it can also be used by entrepreneurs to improve their own pitches. We report two studies on the reliability and validity of the EPS scale.

Theory and hypothesis

As discussed above, we base our thinking on the psychological concepts of decision-making and persuasion; these theories assume that there are two systems—often called system 1 and system 2 (Kahneman, 2003; Sloman, 1996).² System 1 is intuitive, associative, and fast, and often related to emotions or thought habits; system 2 is slow, effortful, and thoughtful. A similar concept was developed to understand persuasion processes by Petty and Cacioppo (1986). Petty and Cacioppo's (1986) elaboration likelihood theory suggested that persuasion works via two pathways—one is a peripheral pathway that is persuasion without any deep thinking about it, for example, prestige suggestion (for example, “two team members have worked at Google” in a pitch for a new software) or working from biases (for example, “everyone knows” . . .). Grandiose gestures in a pitch constitute emotional and peripheral cues (Clarke et al., 2019). The elaboration likelihood theory (Petty & Cacioppo, 1986) would propose that peripheral cues can be persuasive in instances where incentives for central cognitive processing are low or where there is little information available; peripheral cues may become less influential when the necessity and usefulness of processing arguments rationally and consciously are increased. A similar argument was made by Kahneman (2003) that system 1 thinking prevails unless there is a good reason to override reliance on intuition. In those situations, where the central pathway (or system 2) is primarily affected, persuasive thoughts work via rational arguments—rational arguments are based on weighing positives and negatives from a societal and financial market point of view (for example, the pitch

¹We started the development of our scale in the year 2021 (an important summary of the literature then was by Letwin et al. (2021)), an excellent summary of recent research on entrepreneurial pitching is provided by Kalvapalle et al. (2024). In the spirit of a parsimony, we do not attempt to replicate a full summary of research.

²Some theories also suggest three systems, with the additional system describing the transition from System 2 to System 1 in the process of learning or training (Anderson, 1982; Zacher & Frese, 2018); while these additional concepts are useful System 1/System 2 approaches are good enough for the purpose of this article.

may include good arguments for the economic viability of the new firm). The elaboration likelihood model of persuasion has been used in entrepreneurial pitching research to explain the persuasiveness of peripheral cues, like how entrepreneurial passion influences positive reactions of funders (Letwin et al., 2021, 2024; Mitteness et al., 2012). Thus, emotional appeal may be highly influential for persuasion and in pitching success.

However, the central route may be preferred when the invested sum is large (Allison et al., 2017) or when there is disagreement in the decision-making team. The elaboration likelihood theory suggests that the more significant the investment, the more an investor should follow the central route—the effortful, thoughtful route that asks the question of market value and the likely future success of the entrepreneurial team, given their experience and qualifications (Allison et al., 2017). Also, a highly professional environment may trigger reliance on the central route. Thus, the frequency of use of the central route (system 2) should not be underestimated.

Although there may be theoretical differences between the Kahneman and Sloman approach and the theory by Petty and Cacioppo, there is an important overlap between these theories, and they both help to understand the different processes of influencing investors with a pitch. Pitching implies that the entrepreneur communicates to the recipient. Given the complexity of at least two parties (communicator and recipient of the communication) being involved, it is not always clear which kind of approach leads to the central and peripheral routes in the recipient. Thus, optimizing the fit between pitch provider and pitch recipient is not easy, because they do not usually know each other. Therefore, most skilled communicators will attempt to influence the investors on both routes. An additional issue is that the pitch recipients often go back and forth between the two systems. In some cases, the two systems may result in contradictory effects of thoughts and emotions, for example, if the potential investor is enthusiastic about the product and the entrepreneurial team but may not be convinced of the market value and financial viability of the firm; such a contradiction may need to be resolved by the investor. In those cases, where there is agreement between the two systems, the investor may be easily convinced; however, in many cases, more than one investor will have to agree—in such cases, the central components of persuasion may be more important. The most important conclusion of this short discussion is that good pitches should include both paths—the peripheral and the central ones—to improve pitch success. Therefore, we hypothesize:

Hypothesis 1: Peripheral as well as central routes are both important to explain pitch success.

There are two types of overall success judgments: being inspired and perceiving good market opportunities for the entrepreneurial unit. In this

article, we use these two judgments as potentially important success measures. The two systems, system 1 (peripheral route) and system 2 (central route), are likely related differentially to these two outcome measures. Being *inspired* implies developing a positive emotional embrace of the entrepreneurial pitch. Inspiration has been studied in charismatic leadership research, as inspiration follows from a charismatic communication with all its facets (Frese et al., 2003). The second dependent variable is a judgment on the pitch to show good market *opportunities*. This is a judgment on whether or not a new firm presents a chance to turn investments into profits—rational thinking about the chances of survival and growth will be important here (Aulet, 2013). We do not assume that these two different dependent variables will be completely independent of each other. Indeed, we suggest that these two processes are highly related because most pitchers know that they have to include both persuasive factors in their pitches. Still, there may be some differential emphasis with inspirational appeal related to the peripheral route and opportunity judgment related to the central route.

Hypothesis 2a: The inspirational/emotional appeal (peripheral route) of the pitch is most strongly related to being inspired by the pitch.

Hypothesis 2b: The rational persuasion items on opportunities (central route or system 2 thinking) are most strongly related to being convinced of the market opportunities.

Pitches can have different functions, depending on the setting. Therefore, the items of the scale will show differential validity in different settings. There is no agreed-upon taxonomy of settings in entrepreneurship. However, both in the entrepreneur-nexus literature (Shane, 2003) as well as in the literature on external enablers of entrepreneurship (Davidsson et al., 2020), the context of the entrepreneurial opportunity plays an important role. As pitches relate to the opportunities, pitches will also differ depending on the context. Different settings will require different pitches, and thus, there may be differential relationships between different settings (for example, humanitarian help versus maximization of investors' returns). In other words, there are no uniform correlations with pitching success because different environments demand different pitches. Similarly, funders' motives can differ strongly. For example, in some cases (such as Kiva), loan providers have primarily humanitarian and prosocial rather than just pecuniary interests; in those cases, the instrumental interests may become secondary; thus, the emotional route of persuasion may be more important than in the pitches for straight support for commercial enterprises. However, even here, investors may want to choose the more "worthy" entrepreneurs for contributing funds (Allison et al., 2015). In other cases (for

example, Kickstarter), people invest because they like the potential product or they want to get the product at a discount (Allison et al., 2017).

Hypothesis 3: The items of the pitching scale are differentially related to pitching success depending on different entrepreneurial settings.

Methods

Behaviorally anchored items and coding issues

In the last analysis, pitching consisted of (verbal) behaviors. Work psychology has used behavioral rating scales to improve the usual Likert-type scales of measurement. Likert-type scales are useful for general impressions and summary impressions that are often highly subjective. In contrast, “Behavioral Observation Scales . . . ask raters to report the frequency of specific job-related behaviors” (Tziner & Kopelman, 2002, p. 479). Since we wanted to go beyond subjective impressions of the usefulness of pitches, we chose to develop behavioral observation scales for pitches. We used theoretical and empirical criteria to develop the items with behavioral anchors (final version in Figure 1).

Our construction of the behavioral observation scale attempted to be broad to cover various components relevant to good pitches. Whenever one is using behavioral anchors, the anchor itself carries some weight and, therefore, there is a lower degree of a common factor relevant for high Cronbach’s alphas (Cortina, 1993). Our measure of reliability is based on the inter-rater agreement of observers, because every item stands for itself.

Most studies in entrepreneurship use a five or seven-point answer scale based on a Likert-type of scaling technique (Maranell, 2017). Indeed, our original scale (used in Study 1) also used five-point scales that were not anchored. However, these types of questions lower inter-rater agreements. Therefore, we decided to develop behaviorally anchored rating scales to increase inter-rater agreement (Tziner & Kopelman, 2002). Behaviorally anchored scales are also easier to use when observing pitches. Behaviorally anchored rating scales often develop anchors for each part of the one-to-five components of the answer scale. This solves many problems of inter-rater reliability. However, even with anchors, the concepts measured still have some degree of abstractness and complexity; thus, we do not expect the resultant inter-rater reliabilities to be very high. Also, the anchors are not differentiated for each of the five-point answer scales in detail, so we could not empirically develop a full set of behaviorally anchored scales; thus, our approach can be called a semi-behaviorally anchored answer scale.

An additional practical problem appears whenever pitches are given by highly professional teams (which was clearly the case for the Slush Pitching competitions). They develop and rehearse their pitches well; thus, they tend to



Variables	Does not apply strongly	Does not apply/weakly applies	Neutral	Applies	Strongly applies
1. Peripheral: Variation of speed of talking and variation in voice (loud and soft)	1. Monotone tone and speed	2. A bit of a monotone tone and speed	3. Middle	4. Fair variation in talking speed and voice	5. Very strong variation in talking speed and voice
2. Peripheral: Used gestures, supporting pitch	1. No gestures	2. Only gestures that do not support pitch	3. Middle	4. Two gestures that help to focus attention.	5. Three or more gestures that help to focus attention.
3. Peripheral: Showed (a) enthusiasm & (b) passion, (c) positive words	1. None of the three	2. Shows medium of one of them	3. Middle	4. Shows two of them strongly	5. Shows all of them strongly
4. Peripheral: Appealed to important values of listeners	1. No reference to potential values of listeners	2. Little reference to potential values of listeners	3. Middle	5. Somewhat referring to potential values of listeners	5. Strongly referring to potential values of listeners
5. Peripheral: Looked authentic	1. Reads out pitch or exaggerates tremendously	2. Memorized the pitch	3. Middle	4. Shows s/he stands behind the ideas of the pitch	5. Clearly stands fully behind the ideas of the pitch
6. Peripheral: Used images, metaphors, analogies	1. No use of images, metaphors, and analogies	2. Uses one image, metaphor or analogy that does not fit very well	3. Middle	4. Uses good supporting examples of images, metaphors or analogies	5. Uses a well-fitting example of images, metaphors or analogies
7. Central: Personal Initiative – self-starting and innovative (team or individual)	1. Shows no sign of having been self-starting and innovative (as team or individual)	2. Little signs of being self-starting and innovative	3. Middle	4. Displays one example of how the team/individual was self-starting and innovative	5. Shows two or more clear examples of self-starting and innovative
8. Central: Product usefulness	1. Does not adequately describe the usefulness of the product/service	2. Does not clearly describe the usefulness of the product/service to potential customers	3. Middle	4. Describes the usefulness of the product/service for customers (with example)	5. Persuasively describes the usefulness of the product/service for customers (examples)
9. Central: Commercial value	1. No cost analysis and no market data for product/service	3. Shows a bit of cost analysis and/or market data for the product/service	3. Middle	4. Shows cost analysis and market data for product/service	5. Convincingly shows cost analysis and market data for product/service
10. Central: Shows entrepreneurial knowledge, experience	1. Shows no entrepreneurial knowledge and/or no experience	2. Shows a bit of entrepreneurial knowledge and experience	3. Middle	4. Displays entrepreneurial knowledge (displays knowledge on what needs to be done) entrepreneurial experience	5. Very strong display of entrepreneurial knowledge (what needs to be done) and entrepreneurial experience
11. Mixed Central and Peripheral: Showed identity as entrepreneur	1. No sign of identity for starting, growing entrepreneurial unit or for inventing product/service	2. Signals a bit of an identity of starting, growing of entrepreneurial unit or inventing product/service	3. Middle	4. Signals importance of identity for starting, growing of entrepreneurial unit or inventing a product/service	5. Signals high importance of starting, growing or inventing for identity
12. Mixed Central and Peripheral: Describes vision for product	1. No use of emotional words or vision for product/service	2. A bit of use of emotional words or a bit of a vision for product/service	3. Middle	4. Use of emotional words or vision for product/service	5. Lots of emotional words and strong vision for product/service
13. Mixed Central and Peripheral: Repeats and clearly describes team/individual's vision for product	1. No vision	2. Vision or vision achievement is not clearly described	3. Middle	4. Clearly describes vision and achievement	5. Very clear description of vision and repetition of vision statement
14. Outcome: Inspired me as a listener	1. Listener (subjective): I have no positive feelings for product/service	2. Subjective: I have some positive feelings for product/service	3. Middle	4. Subjective: I have positive strong feelings for product/service, feel inspired	5. Subjective: I have very positive feelings for product/service, feel highly inspired
15. Outcome: Convinced me as listener: market opportunity	1. Subjection: There is no convincing market opportunity	2. Subjection: I am a bit convinced of market opportunity	3. Middle	4. Subjection: I am convinced of the market opportunity	5. Subjection: I am very strongly convinced of the market opportunity

Figure 1. Coding scheme.

deliver good pitches, and that, in turn, leads to reduced variance in the ratings of these pitches. The resulting ceiling effect reduces the correlations and the inter-rater agreements. Our scale should also be usable for training pitching, so we needed to be able to measure less effective pitches; therefore, the lower-bound anchors may not be ticked frequently in our studies.

Important measurement areas of pitches

The EPS scale was based on empirical studies. The pitch literature is large and highly diversified—we found empirical studies in entrepreneurship journals, psychology journals, communication journals, management journals, and international management journals. Using a scoping review approach, we concentrated on quantitative studies of behavioral approaches to pitching to get a rapid overview of the relevant literature to develop items for our scale (Arksey & O'Malley, 2005; Paul & Criado, 2020). In developing the scale, we tried to steer a middle ground between being too inclusive and not inclusive enough. Table 1 provides theoretical and empirical reasoning for each item. In the spirit of a scoping review, we restricted the sample of articles to empirical studies with a certain degree of methodological sophistication and with a psychological approach to pitching (see, for example, Kalvapalle et al., 2024, for an excellent and up-to-date review). From a philosophy of science approach to validation, we used the approach by Haig (2025) who suggested a pragmatic view in contrast to the typical approach to theories as nomological networks. Such a pragmatic approach suggests an explanatory coherent network, in which “pragmatic effectiveness” is valuable and leads to abductive reasoning (Haig, 2025). Such a viewpoint also translates into the use of exploratory factor analyses (see below).

The full scale with all the behaviorally anchored descriptions of the answer scale is displayed in Figure 1 (the final version was slightly improved for readability). In this study, we considered 13 predictors and three outcomes (also displayed in Table 2). Table 1 displays the items and the literature they were garnered. We categorized the items theoretically a priori into *peripheral*, *central*, and *mixed*. The characteristics, which communicate inspirational, affective, and routine, refer to the peripheral route of persuasion, such as high gestures, strong and passionate words, variations in speed and voice, images, positive words, and authenticity. They often relate to paralinguistic approaches of charismatic and inspirational communications (Frese et al., 2003), because they help to produce intensive emotional experiences. In contrast, the central route is characterized by pitches showing the commercial viability of products, high team knowledge and experience, and innovative ideas and initiative. In addition, there are three items that were not easily theoretically categorized. We called them “mixed,” as we could not a priori decide whether these items belonged to the peripheral or central routes of persuasion: Items related to entrepreneurial identity (often measured as part of passion) and to visions, which have a rational goal function as well as

Table 1. The empirical literature base for the development of items for the entrepreneurial pitching success (EPS) scale.

Variables	Empirical Study	Theoretical Reasons
1. Peripheral: Variation of speed of talking and variation in voice (loud and soft)	Allison et al. (2022); Anglin et al. (2014); Antonakis et al. (2021); Frese et al. (2003); Murnieks et al. (2016); Niebuhr et al. (2017); Tsay (2021)	Belongs to the area of charisma
2. Peripheral: Used gestures, supporting pitch	(Clarke et al., 2019; Tsay, 2021)	Gestures as a sign of passion
3. Peripheral: Passion positive words, showed enthusiasm	Allison et al. (2022); Hubner et al. (2020); Jiang et al. (2019); Letwin et al. (2024); Murnieks et al. (2016); Sanchez-Ruiz et al. (2021); Tsay (2021)	Passion is contagious and leads to positive emotions and support
4. Peripheral: Appealed to important values of listeners	Higgins et al. (2003); House et al. (1999); Lee et al. (2017); Oo et al. (2019); Peng et al. (2022); Sanchez-Ruiz et al. (2021)	The listener feels valued, flattered, and responds positively to the pitch
5. Peripheral: Looked authentic	Petraglia (2009)	Authenticity allows listeners to believe the story as true
6. Peripheral: Used images, metaphors, analogies	Campos et al. (2017); Clarke et al. (2019); Towler (2003)	Good stories persuade and often use images and analogies
7. Central: Personal Initiative —self-starting and innovative	Chan and Parhankangas (2017); Oo et al. (2019)	Innovativeness increases the chances of high margin in the market
8. Central: Product usefulness	Jiang et al. (2021)	Product usefulness increases sales and longevity
9. Central: Commercial value	Sort and Nielsen (2018)	Market for product/service is the centerpiece of a good business model
10. Central: Entrepreneurial knowledge, experience	Piva and Rossi-Lamastra (2018); Tatchemo et al. (2022)	Entrepreneurial experience signals higher market potential of entrepreneurial unit
11. Mixed: Central and Peripheral: Showed identity as entrepreneur	Murnieks et al. (2016); Navis and Glynn (2011); Sanchez-Ruiz et al. (2021)	2.Signals high importance, high motivation, dealing with difficulties better.
12. Mixed: Central and Peripheral: Described vision for product	Baum et al. (1998); Dvir et al. (2004); Peng et al. (2022)	Visions are affective and high goals, leading to higher motivation and higher performance.
13. Mixed: Central and Peripheral: Repeated vision for product	Cacioppo and Petty (1979); Hintzman (2010); Zajonc (1984)	Repetition helps memory effects, and repeated ideas lead to positive affect
15. Outcome: Inspired me as a listener	Peripheral outcome	
16. Outcome: Convinced me of market opportunity	Central outcome	

emotional value (Baum et al., 1998; Dvir et al., 2004). Charismatic communication often refers to visions and values that may help to be persuasive (Higgins et al., 2003; House et al., 1999).

Petty and Cacioppo (1979) discussed repetition of a message (in our case, repeating the vision statement) to increase its effects on persuasion and to work via the peripheral route (Zajonc, 1984). However, Petty and Cacioppo (1979) also showed that repeating too often may produce negative effects because of reactance and boredom. We suggest that repeating the vision twice may be optimal for a short pitch.

We used three outcome variables: The first one was whether the pitch inspired the listener and thus produced positive feelings toward the project

Table 2. Summary of reliability and validity results (Study 1 and 2).

	ICC		Correlation; Criteria Study 1		Correlations; Criteria Real World Study 2		
	ICC Study 1 Column 1	ICC Study 2 Column 2	Inspired Column 3	Opportunity Column 4	Inspired Column 5	Opportunity Column 6	Success Column 7
<i>Predictors:</i>							
1. Variation Speed, Voice	0.35	0.67	.47**	.36**	.58**	.47**	.24**
2. Gestures	0.82	0.72	.44**	.47**	.60**	.42**	.12
3. Passion, Enthusiasm	0.19	0.53	.56**	.47**	.71**	.58**	.20*
4. Listeners' Values	0.19	0.50	.68**	.60**	.65**	.57**	.13
5. Looked Authentic	0.58	0.43	.48**	.43**	.59**	.43**	.13
6. Images	0.45	0.39	.60**	.55**	.60**	.55**	.16*
7. Personal Initiative	0.37	0.36	.73**	.58**	.64**	.57**	.27**
8. Product Usefulness	0.22	0.44	.65**	.56**	.65**	.67**	.19**
9. Commercial Value	0.39	0.50	.77**	.76**	.63**	.69**	.25**
10. Presented Knowledge	0.54	0.48	.79**	.83**	.59**	.64**	.24**
11. Entrepreneur Identity	0.39	0.53	.72**	.68**	.72**	.66**	.23**
12. Described Vision	0.46	0.59	.74**	.61**	.65**	.55**	.20**
13. Repeated Vision	—	0.28	—	—	.58**	.52**	.16**
<i>Outcomes:</i>							
14. Inspired	0.29	0.58	—	.83**	—	.87**	.31**
15. Opportunity	0.54	0.35	.83**	—	.87**	—	.37**

(up to the point of being enthusiastic and inspired by the project and the pitch); the second one was whether the listener was convinced of good market opportunities for the entrepreneurial unit. These two outcome variables were rated by coders. The third dependent variable was external success—this was used to prove the criterion validity of the observational behavior EPS scale. External success was based on the decisions of the potential financial supporters who listened to the pitches. This variable was based on a dichotomous item: Success means winning the competition versus not winning (in the Slush 100 Pitching Competition, “winning” means being admitted to the next step of the competition, which consists of a detailed interview with business funders, potentially leading to substantial support for the business).

We proceeded by evaluating which persuasion route made a pitch successful. To do so, we empirically tested the 13 different characteristics as predictors of three different outcome variables. The pitching scale was used first in a flagship practical course on entrepreneurship at the end of an international two-year MBA program (Study 1); we continued to develop the pitching scale for use in a competition for venture capital in Study 2 (in this case, the Slush competition allowed us to download the videotapes of pitches; we used the decision of the venture capital providers to allow the teams to go to the next level as our success measure).

Study 1

Design of the study

Forty-two MBA students developed new products and services for new firms in a three-month action learning course at an Asian Premier Business School. The pitches did not exceed two minutes per student. All pitches were video

recorded (after we received agreement to video record). The coding system for Study 1 was based on a rational construction (influenced by the empirical literature), to improve the scale later on. The participants had to pitch their innovative projects at first without any introduction to good pitching performance. A week later, a lecture on good pitching followed, and the students were asked to improve their pitches. The pitches that followed this introduction received feedback from coaches and fellow students. The third pitch was done in front of professors (who graded the pitches). This produced a total of 100 pitches.

Each pitch was rated by two coders (two coders rated each randomly assigned half of all pitches; one of the authors coded all pitches) (Feng, 2015). The coders did not know whether the pitches were done before or after training.³ All coders underwent a two-hour training on how to score the attributes of the pitches based on five sample pitches. The original coding used a five-point Likert answer scale without behavioral anchors. Only in Study 2 did we assign behavioral anchors instead of using the Likert approach. Thus, the original coding sheet was a precursor to the one presented in Figure 1. After coding 10 pitches, discussions among the coders clarified coding issues.

There were three criteria for a good pitching scale: First, the pitching items had to be reliably coded—for the reliability estimate, we used the intra-class coefficient (Shrout & Fleiss, 1979). Second, the coded items of the scale had to be related to success measures—for this, we used (in Study 1) the coded outcome variables of feeling inspired and convinced of (market) opportunities. Third, Study 2 tested the criterion validity of the measure.

Results of Study 1 and discussion of limitations

In the following, we present the results of Study 1. We used the limitations of Study 1 to provide reasons for Study 2. The most important reason for Study 1 was to code pitches reliably using the intraclass correlation coefficient (ICC). There is no consensus on what constitutes a good ICC. Some authors suggest a minimally acceptable ICC of .50 (Koo & Li, 2016), whereas other authors see a “fair” size in coefficients between .20 and .40 (Landis & Koch, 1977). Still others suggest that a fair size is above .40 (Cicchetti, 1994). Using .40 as the cutoff point, only six of the predictors’ ICCs in Study 1 were acceptable (Table 2); most of them were relatively poor (below .40 and even below .20 and .30). To improve coding, we developed semi-behaviorally anchored items for coding in Study 2 to improve the ICCs.

In terms of construct validity, Study 1 showed the predictors to have high correlations with the two outcome variables, being inspired as a listener and

³The videos were used to teach pitching; t-tests showed significant improvements for all but one of the items from before to after the training. Thus, it is possible to train pitching. This is, however, not the focus of the current manuscript, which concentrates on the development of the EPS and of its coding.

being convinced of the product's viability in the market (opportunity). These correlations speak for Hypothesis 1 that both peripheral as well as central routes are important for persuasion.

Hypotheses 2a and 2b argue for the differential relationships' two routes. Thus, the peripheral route items were hypothesized to correlate more highly with inspiration, and the central route variables of rational persuasion more highly with being convinced of market opportunities. Hypothesis 2a was not supported. The highest correlations (using an arbitrary cutoff point of .70) with "inspired me" were from items of both routes. Therefore, this result speaks against the idea of the two routes in the case of entrepreneurial pitches and thus against Hypotheses 2a and 2b. However, in contrast to Hypothesis 2a, there was some support for Hypothesis 2b, as the highest correlations with "market opportunity" included items that were meant to work via the central route: commercial value and showing knowledge and experience. Thus, Hypothesis 2b seemed at first sight supported for the central route. On the other hand, the very high correlation between the two outcome variables, inspiration and opportunity ($r = .83$), may suggest that differential relationships via the different routes are unlikely to hold up. We will come back to these hypotheses when discussing Study 2. We tested Hypothesis 3 by comparing the results from Studies 1 and 2, as they are from two different settings.

A serious limitation of Study 1 relates to common method variance (Lindell & Whitney, 2001; Siemsen et al., 2010). Common method variance is particularly problematic in cross-sectional survey studies with only one source (Richardson et al., 2009). Thus, some of the most worrisome problems of common method variance do not exist in Study 1 because we used several sources (trained coders who were not liable to rely on ego-syntonic answers or frequently misunderstood the items). Nevertheless, some of the high correlations found in Study 1 could have been inflated by common method variance—both predictors and outcomes were rated by the same coders. Other forms of bias may have influenced both raters, such as the good looks of the pitchers, which could also contribute to common method bias (Brooks et al., 2014).

The best way to address the problem of common method variance is to design a better study (Aguinis & Vandenberg, 2014). Therefore, the design of Study 2 was different in two ways: First, Study 2 examined concurrent criterion validity in a real-world context. As the criterion of a good pitch is not to impress the coders but to impress financial providers to make positive decisions on the process of providing financial resources, Study 2 used professional investors' decisions as the criterion. Study 2 allowed us to examine how these professionals would be influenced by pitches that were in accordance with the items of the EPS. Also, our hypotheses could be studied more meaningfully with an externally derived success variable. Second, we improved the EPS to produce answer alternatives built on behavioral observation

scales with anchors, as described below. Third, we used three coders in Study 2 (Boerner et al., 2025; Clingingsmith et al., 2022; Koo & Li, 2016) to increase reliability.

Study 2

Study design and sample

To test whether our scale could predict the success of real-life entrepreneurial pitches, we drew from the Helsinki-based Slush Pitching Competition. This is an international pitching competition that is held annually, with about 100 entrepreneurs selected per year from a pool of more than 10,000 applicants from all over the world, where entrepreneurs give a three-minute pitch about their ventures. The videos of the live pitching competition were sourced from the Slush competition website. Specifically, we selected all pitches from the years 2017 and 2019, which gave us a sample of 185 different pitches (not everyone invited presented at this round of pitches). They met the following criteria: 1) The pitch was presented for three minutes by one entrepreneur, with 90 percent presenter view and 10 percent showing slides; 2) Our success measure was based on the professionals who made the judgment whether a team was allowed to move to the semifinal round. In all, 13 percent of the teams were allowed to move on. The decision-makers were early-stage investors from top venture capital firms: “Slush 100 has given early-stage startups the chance to international visibility and support from onstage to the business world” (Slush, 2022). (We coded 1 for “yes” to move to the final level of high support and 0 for “no.”)

For Study 2, the Likert scale was changed to a behavioral observation scale using behaviorally anchored endpoints. It was not possible to exemplify each of the five answer possibilities with behaviors, as is done for strict traditional behavioral anchored scales; our approach was, therefore, “semi-behavioral,” as we provide behavioral anchors primarily for the endpoints (1 and 5). Three coders rated each of the videos with the improved behaviorally anchored coding sheet presented in Figure 1, without knowledge of their success. Coder training was done in the same way as for coders in Study 1.

We also added an item to the coding sheet (repeating the vision and clearly describing it) because we were unsure whether a one-time reference to the vision would be effective enough, and repetition also has a persuasive influence (Cacioppo & Petty, 1979); that is, repetition leads to positive affect, as shown in a number of experiments (Zajonc, 1984). The final EPS scale is displayed in Figure 1.

Results and discussion of Study 2

Each video was fully coded by three different coders, and we used the average of their ratings for all analyses. The inter-rater reliability was computed for each item of the EPS scale (a two-way mixed model; Shrout & Fleiss, 1979). Table 2 presents the ICC values of all predictors and items. Improved ICCs appear as a result of having three coders and by introducing behavioral anchors into the coding scale for Study 2⁴. A comparison of the ICCs between Study 1 and Study 2 shows ICCs improved by and large, except in six predictors. We aimed to achieve ICCs above .40. And, indeed, in Study 2, only three predictors missed the .40 cut-off point—used images, personal initiative, and repeated vision. However, they were close enough to the cutoff point of .40 (with the possible exception of repeated vision, which we added for theoretical reasons to the scale in Study 2). Thus, we decided to keep these items in the scale.

Exceptions to the .40 rule appeared on the two outcome measures—inspiration and market opportunity across the two studies. These outcome measures were very difficult to code because they included coders' impressions of their emotional state (inspiration) and complex judgments (market opportunity). Moreover, they were close enough to .40, and they were highly correlated with each other, so we kept them in our scale.

Low ICCs may indicate that certain items are difficult to judge and may depend on the setting; for example, item 7 on personal initiative is such an item because it includes being self-starting, innovative, and dealing with difficulties (Campos et al., 2017).

The three dependent variables of Study 2 are the two outcome variables, inspiration and opportunity, as well as the dichotomous “success” variable, which implies that the entrepreneurial unit is moving up to the next level to receive large-scale support. The coded outcome variables (rows 5 and 6) showed correlations of a similar size as in Study 1 (rows 3 and 4 in Table 2). These are high correlations, and common method variance might be at play here. The two coded outcome variables were again highly correlated—this speaks against a sharp difference between the central route and the peripheral route.

The most important dependent variable is success, because its correlations are not confounded by common method variance; success is determined by Slush competition investors' verdicts, in contrast to the pitch predictors. Table 2 shows that 10 of the 13 coded predictors of success correlated significantly with the “objective” success variable; even item 7 on personal initiative (as well as new item 13) correlated significantly with success despite their somewhat lower inter-rater reliabilities.

⁴The higher ICCs of Study 2 (Table 2) are not just due to 3 coders – 2 coders also produced better ICCs once we used behaviorally anchored items (the appropriate results can be received from the authors).

Thus, our empirically and theoretically derived “pitch catalog” of 13 items showed some degree of usefulness for predicting success in a professional environment (on average, the 13 predictors correlated .20 with success; the 10 significant ones averaged $r = .22$). The two coded outcome criteria—inspiration and opportunity—were also significantly correlated with the success variable, with sizable significant correlations of $r = .31$ and $r = .37$, respectively (Table 2). This supports our development of the items as well as Hypothesis 1, as both central as well as peripheral items are important for success.

Tables 3 and 4 present means, standard deviations, and intercorrelations of all variables of the two studies. There are very high intercorrelations between the predictors: The better teams and individuals performed better in all the items, and they used several approaches to make their pitches successful. Despite three coders, common method variance may increase the size of the intercorrelations of the predictors. Thus, there is multicollinearity in these data, which speaks against using multiple regression analyses because multicollinearity produces unstable and often non-interpretable regression coefficients. We, therefore, did not perform multiple regression analyses.

The size of the validity coefficients for each of the items appears to be small; however, recent meta-analytic studies have shown that correlations such as the ones we found are not really small but more in the area of medium-sized validity coefficients (Bosco et al., 2015). Moreover, validity coefficients are usually small for individual items.

Robustness analyses

Since multi-collinearity prevented us from using multiple regression analyses based on the items, we decided to develop factors to combine several items. We did an exploratory factor analysis using the theoretical differentiation of two different routes of persuasion. Given the highly select nature of our sample, range restrictions may reduce the validity coefficients (Hunter & Schmidt, 2004).

Study 2 had enough power ($N = 185$) to allow us to calculate an orthogonal exploratory principle component analysis of the 13 predictors with VARIMAX rotation (Bandalos & Boehm-Kaufman, 2009). Three different factor solutions with two, three, and four factors were compared. As is often the case, none of the factor solutions was completely satisfactory, and all solutions showed relatively high cross-loadings of the items on other factors. The best solution was the four-factor orthogonal solution with Varimax rotation method, which is also readily interpretable. This solution showed the best RMSEA value of .06, suggesting that the solution had an adequate fit to the observed data (Browne & Cudek, 1992), with 59 percent; it also clearly explained more than 50 percent of the variance. The communalities were generally adequate (greater than .50), and it had readily interpretable four factors. The four-factor solution, shown in Table 5,

Table 3. Inter-correlations and means and standard deviations – Study 1.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
Predictors:															
1. Variation Speed, Voice	3.86	0.76													
2. Gestures	3.03	1.31	59** [42, 72]												
3. Passion, Enthusiasm	4.01	0.66	74** [61, 83]	63** [46, 75]											
4. Listeners' Values	4.16	0.62	66** [51, 78]	45** [25, 62]	71** [58, 81]										
5. Looked Authentic	3.38	0.94	66** [51, 77]	66** [50, 77]	58** [40, 72]	63** [46, 75]									
6. Images	3.31	0.96	55** [37, 69]	62** [46, 75]	59** [42, 72]	53** [34, 68]	61** [44, 73]								
7. Personal Initiative	4.12	0.53	44** [24, 61]	40** [18, 58]	44** [23, 61]	66** [50, 77]	45** [25, 62]	45** [24, 61]							
8. Product Usefulness	3.44	0.76	31** [08, 50]	43** [22, 60]	32** [10, 52]	44** [24, 61]	40** [18, 57]	49** [29, 65]	55** [36, 69]						
9. Commercial Value	3.57	0.84	43** [22, 60]	51** [32, 67]	47** [26, 63]	55** [36, 69]	53** [34, 68]	53** [34, 68]	68** [53, 79]	75** [63, 84]					
10. Presented Knowledge	3.38	0.94	55** [37, 70]	60** [42, 73]	58** [41, 72]	66** [51, 78]	64** [47, 76]	64** [48, 76]	65** [49, 77]	68** [53, 79]	77** [66, 85]				
11. Entrepreneur Identity	3.68	0.81	58** [41, 72]	57** [38, 71]	66** [50, 77]	66** [50, 77]	60** [43, 73]	65** [49, 76]	57** [39, 71]	66** [51, 78]	75** [63, 84]	84** [76, 90]			
12. Described Vision	3.91	0.82	61** [44, 73]	45** [25, 62]	66** [50, 77]	82** [73, 89]	62** [46, 75]	48** [28, 64]	73** [60, 82]	55** [37, 70]	69** [54, 79]	69** [54, 79]	70** [55, 80]		
13. –	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Outcomes:															
14. Inspired	3.31	0.81	62** [45, 74]	53** [34, 68]	63** [46, 75]	73** [60, 82]	64** [48, 76]	64** [48, 76]	74** [62, 83]	78** [67, 86]	80** [69, 87]	78** [67, 86]	78** [67, 86]	78** [66, 85]	
15. Opportunity	3.31	0.85	40** [19, 58]	54** [35, 69]	50** [31, 66]	63** [46, 75]	52** [32, 67]	51** [32, 66]	64** [48, 76]	79** [69, 87]	81** [72, 88]	72** [59, 82]	70** [56, 80]	67** [52, 78]	83** [73, 88]

Note. Decimal points deleted from correlations for space constraints; (M) mean and (S) standard deviation, respectively; $N = 100$; values in square brackets indicate the 95 percent confidence intervals for the correlations; * = $p < .05$; ** = $p < .01$. Variable 13 was ONLY added in Study 2.

Table 4. Inter-correlations and means and standard deviations – Study 2 Slush pitching competition.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Predictors:</i>																	
1. Variation Speed, Voice	4.17	0.73															
2. Gestures	3.78	0.97	50**														
			[38,60]														
3. Passion, Enthusiasm	4.35	0.60	63**	51**													
			[53,71]	[39,61]													
4. Listeners' Values	4.38	0.62	52**	31**	64**												
			[41,62]	[18,44]	[54,72]												
5. Looked Authentic	4.35	0.59	64**	53**	55**	43**											
			[55,72]	[42,63]	[44,64]	[30,54]											
6. Images	3.92	0.76	50**	46**	55**	46**	48**										
			[38,60]	[34,57]	[44,64]	[34,57]	[36,58]										
7. Personal Initiative	4.05	0.56	33**	33**	44**	45**	34**	41**									
			[20,45]	[19,45]	[32,55]	[33,58]	[20,46]	[28,52]									
8. Product Usefulness	4.25	0.61	43**	43**	56**	55**	52**	51**	55**								
			[31,54]	[31,54]	[45,65]	[45,65]	[41,62]	[39,61]	[44,64]								
9. Commercial Value	3.46	0.84	35**	32**	46**	44**	34**	37**	35**	43**							
			[21,47]	[18,44]	[34,57]	[32,55]	[20,46]	[23,48]	[21,47]	[31,54]							
10. Presented Knowledge	3.59	0.80	41**	30**	37**	36**	38**	35**	35**	48**	61**						
			[28,52]	[16,43]	[24,49]	[23,48]	[25,50]	[21,47]	[22,47]	[36,58]	[51,69]						
11. Entrepreneur Identity	4.06	0.72	44**	39**	55**	51**	43**	42**	44**	47**	60**	60**					
			[31,55]	[26,50]	[45,65]	[39,61]	[31,54]	[30,53]	[32,55]	[35,58]	[50,69]	[49,68]					
12. Described Vision	4.24	0.68	58**	45**	60**	62**	60**	45**	46**	61**	47**	45**	47**				
			[48,67]	[32,55]	[50,68]	[52,70]	[30,56]	[33,56]	[34,57]	[51,69]	[35,57]	[33,56]	[35,58]				
13. Repeated Vision	3.70	0.76	45**	29**	47**	55**	45**	42**	38**	47**	47**	43**	43**	62**			
			[32,56]	[15,42]	[35,58]	[44,64]	[33,56]	[29,53]	[25,50]	[35,57]	[35,58]	[30,54]	[31,54]	[52,70]			
<i>Outcomes:</i>																	
14. Inspired	3.66	0.89	58**	50**	71**	65**	59**	60**	54**	65**	63**	59**	72**	65**	58**		
			[47,67]	[39,60]	[63,78]	[55,72]	[49,68]	[50,68]	[43,64]	[56,73]	[53,71]	[49,68]	[64,78]	[56,72]	[47,67]		
15. Opportunity	3.51	0.79	47**	42**	58**	57**	43**	55**	57**	61**	69**	64**	66**	55**	52**	87**	
			[35,57]	[30,53]	[48,67]	[47,66]	[30,54]	[44,64]	[46,66]	[51,69]	[61,76]	[55,72]	[57,73]	[44,64]	[40,61]	[83,90]	
16. Success	0.13	0.34	24**	12	20**	13	13	16**	27**	19**	25**	24**	23**	20**	16**	31**	37**
			[10,37]	[−02,26]	[06,34]	[−01,27]	[−01,27]	[02,30]	[13,40]	[05,33]	[11,38]	[10,37]	[09,36]	[06,33]	[01,30]	[18,44]	[24,49]

Note. Decimal points deleted from correlations for space constraints; M and SD are mean and standard deviation, respectively; N= 185; values in square brackets indicate 95 percent confidence intervals for the correlations. * = $p < .05$; ** = $p < .01$.

Table 5. Standardized loadings of the four factors of principal component analysis (Study 2).

#Code Scheme	Predictors	Peripheral— paralinguistic (Factor 1)	Central— Entrepreneur Prototype (Factor 2)	Peripheral— Emotional Appeal (Factor 3)	Central— Entrepreneurial Purpose (Factor 4)	h^2
1	Variation Speed, Voice	.68	.21	.39	.08	.67
2	Gestures	.64	.19	.04	.26	.52
3	Passion, Enthusiasm	.52	.26	.39	.37	.63
4	Listeners' Values	.26	.24	.60	.39	.63
5	Looked Authentic	.68	.20	.31	.16	.62
6	Images	.47	.22	.23	.37	.46
7	Personal Initiative	.20	.24	.23	.57	.47
8	Product Usefulness	.34	.30	.32	.56	.62
9	Commercial Value	.16	.70	.25	.19	.62
10	Presented Knowledge	.21	.73	.17	.15	.62
11	Entrepreneur Identity	.29	.62	.21	.30	.60
12	Described Vision	.42	.28	.59	.28	.68
13	Repeated Vision	.23	.34	.58	.20	.54
Cronbach's alphas		.84	.82	.81	.71	—
Eigenvalues		2.44	2.04	1.77	1.43	—

Note. H^2 is communality of the item; VARIMAX rotation; the strongest factor loadings for each factor in bold; the numbering of factors was based on content, not on size of eigenvalues or as suggested by the FA output.

partially reproduced the theoretical differentiation between central and peripheral predictors.

However, instead of two factors, as suggested by the system1/system 2 theory and by Petty and Cacioppo (1986), we found four factors; two of the three items that we could not a priori assign to one of the routes (the mixed group) ended up in the factors related to emotional appeal, and thus, to the peripheral route (see, for example, Table 5. Table 5 also shows Cronbach's alphas). Factors 1 and 3 are based on peripheral items; factor 1 is related to the paralinguistic factor as part of the peripheral route, and we call it peripheral-paralinguistic, because it includes items about how communication is performed (for example, with gestures); this is similar to charismatic inspirational communication (Frese et al., 2003). Factor 3 is also peripheral and includes emotional appeal, such as values and emotional goals like vision and repeating the vision. Factors 2 and 4 are based on central conscious and reflective variables. Factor 2 is related to describing the commercial value of the enterprise, showing knowledge and experience of entrepreneurship, and identity as an entrepreneur; we say this factor consists of a consciously constructed entrepreneurship prototype. Factor 4 includes the items on entrepreneurial

purpose, product usefulness, and personal initiative, which includes innovativeness.

The factor analytic results suggest two colloraries to the two routes theory by Petty and Cacioppo: The peripheral route includes two factors: the paralinguistic communication that emphasizes the sincerity and intensity of the pitch, and a second factor focused on direct emotional appeal to values of the listener and vision communication. The two central factors (2 and 4) are oriented to the prototypical entrepreneurial issues and entrepreneurial purpose.

Despite our use of an orthogonal VARIMAX rotation, there were again high intercorrelations among the four new factor-derived variables. The intercorrelations are, on average $\bar{r} = .61$ (Table 6), which means there is a danger of multicollinearity. Therefore, we used the best approach to understand the multiple effects of predictors by examining determination coefficients—the R^2 in a linear regression predicting inspiration and opportunity, as well as the pseudo- R^2 for the logistic regression with success as the dependent variable. Table 6 shows the determination coefficient (multiple correlations) of the factors with the success variables. They are sizable: For inspiration, the $R^2 = .72$, and for market opportunity, $R^2 = .70$. The pseudo R^2 for success is a pseudo- $R^2 = .20$. We used Nagelkerke's calculation because it is somewhat comparable to the least square determination coefficients. This R^2 cannot be tested for normal significance; however, deviance = 2.033, suggesting that this model is statistically different from a null model ($p = .00065$). The pseudo- R^2 of Nagelkerke is often more conservative and smaller than determination coefficients from linear regressions. Therefore, the most meaningful relationships are the correlations of the factors with Slush success, and they are all significant from $\bar{r} = .19$ to $\bar{r} = .28$ (see, for example, Table 6).

Table 6. Intercorrelations and R^2 of the factor-derived predictors and the criteria of success (Study 2).

	M	SD	1	2	3	4	a	b	c
<i>Predictors:</i>									
1. Factor 1 Peripheral—Paralinguistic	4.11	0.58							
2. Factor 2 Central—Entrepreneurial Prototype	4.11	0.58	.68**						
			[.59, .75]						
3. Factor 3 Peripheral—Emotional Appeal	4.15	0.51	.61**	.65**					
			[.52, .70]	[.56, .72]					
4. Factor 4 Central—Entrepreneurial Purpose	3.70	0.68	.57**	.61**	.56**				
			[.46, .66]	[.51, .69]	[.45, .65]				
<i>Outcomes:</i>									
a. Inspired	3.66	0.89	.74**	.73**	.68**	.75**			
			[.67, .80]	[.65, .79]	[.60, .75]	[.68, .81]			
b. Opportunity	3.51	0.79	.61**	.64**	.67**	.77**	.87**		
			[.51, .70]	[.54, .72]	[.58, .74]	[.71, .83]	[.83, .90]		
c. Success	0.13	0.34	.21**	.19*	.26**	.28**	.31**	.37**	—
			[.07, .33]	[.05, .33]	[.12, .39]	[.14, .41]	[.18, .44]	[.24, .49]	
Multiple R^2 of the four predictors							.75***	.69***	—
Pseudo R^2 (Nagelkerke)									.20

Note. M and SD for mean and standard deviation. In square brackets, 95 percent confidence interval * indicates $p < .05$. ** indicates $p < .01$. *** indicates $p < .001$.

The sample is highly select, which reduces the validity coefficients due to range restrictions (Hunter & Schmidt, 2004). Study 2 presenters were pre-selected on two counts. Only the best 100 teams per year were admitted to present their pitches. Moreover, there was self-selection and optimization by the teams to get their presentation right (also, only one person from each team presented—another selection factor; most likely, the teams chose the best presenter of the pitch). We were not able to adjust for range restrictions because the standard deviation of the starting group is not known. However, at least we could correct for measurement error. The highest correlation of the factors with Slush success was $r = .28$, with the factor entrepreneurial purpose. When using the correction of attenuation formula correcting for the reliability of this factor (which is .71, see, for example, Table 5) and assuming a high reliability of .70 for Slush success, the corrected correlation increases to $r_{\text{corr}} = .40$. Thus, the effects sizes are appreciable for criterion validity given that the correlations would be much higher had we been able to control for range restriction as well.

Overall discussion and conclusion

Funders and investors rely on pitches to inform their judgments and decisions, and for entrepreneurs, it is often the most important avenue to get to know investors. To the best of our knowledge, this article is the first attempt to produce a reliable and valid scale for evaluating pitches. Moreover, its approach of using behaviorally anchored items goes beyond the usual approach of scale construction in entrepreneurship research. We have benefited from the strong literature that exists in this area of pitches and based our scale on a scoping review.

A scale such as ours is supposed to be helpful for training, as well as for research. The literature in this area tends to be fragmented with a multitude of theories, such as pro-sociality, passion theory, evolutionary psychology and emotional expression, self-determination theory, warm-glow theory, signaling theory, role theory, identity theory, role congruity theory, to mention a few. There is nothing wrong with using any of these theories, but it might help to have a common core of important areas that determine the functionality of pitches; we hope that our scale is a step in this direction. The EPS scale can be used to widen the scope, and it may allow cross-referencing different approaches and thus, potentially producing cumulative knowledge more easily.

Pitches are meant to persuade. We positioned our theoretical orientation on the two-factor approaches of system 1/system 2 thinking (Kahneman, 2003; Sloman, 1996) and the elaboration likelihood model (Petty & Cacioppo, 1986). Petty and Cacioppo's (1986) elaboration likelihood theory differentiates a peripheral route of persuasion from a central route.

Hypotheses 1 and 2 relate to these theories. The peripheral influence (or system 1 thinking) of a pitch appears without detailed analysis or deep processing based on emotions and habits. The central (system 2) route is based on conscious and analytical thought. Getting a realistic picture of the team and the product/service behind the pitch is relevant for investors. Market opportunities, potential profitability, and viability of the entrepreneurial team need to be assessed. Petty and Cacioppo (1986) suggested that when confronted with significant decisions (and financial investments are often important), the central route may be utilized more frequently. Indeed, one of the central factors (Factor 4, entrepreneurial purpose) shows the highest correlation of all factors (Table 6).

However, in line with Hypothesis 1, both peripheral and central routes are related to pitch success. Indeed, the second-highest correlation with success appears for the peripheral route Factor 3, emotional appeal. Pitches by new entrepreneurial teams cannot produce verifiable information; therefore, investors also depend on peripheral information (such as gut feelings influenced by positive values and emotionally appealing visions) (Table 6). We can also confirm this on the item level using the rated dependent variables being inspired and convinced of market opportunities: All items were strongly and significantly correlated with these two outcome variables (Table 2). Similarly, most items were significantly correlated with Slush success—the latter is a much more conservative test of criterion validity. Thus, in agreement with Hypothesis 1, the results demonstrate that both central and peripheral routes are important for success. Indeed, there are no clear significant differences between the different routes.

This poses an empirical paradox, however, because a number of articles concentrated in a small subset of areas display high relationships with pitch success; for example, the study by Clarke et al. (2019) illustrates appreciable relationships of strong gesturing and figurative speech with investments provided. The high intercorrelations between the predictors might help put these results into perspective. There seems to be a *pars-pro-toto* phenomenon: Each part of the pitch can be considered as a good signal of the rest of the pitch. When judges are impressed by momentum and energy, they assume the same behavior when entrepreneurs are confronted with normal problems of market share enhancement. Similarly, if a pitch is good in showing the market value of the products, the listener might assume that the same work ethic applies in emotionally difficult situations. Passion itself may be intuitively judged to be the result of the preliminary successes of the entrepreneurial teams. A similar phenomenon has been shown in the relationship between effort and passion. Effort leads to a higher degree of passion, thus connecting the two paths of persuasion—the emotional one (passion) and the rational one (strong effort) (Gielnik et al., 2015).

The *pars-pro-toto* phenomenon—parts of the pitches may be considered important for the whole impression—is important to understand why, in some cases, our studies did not replicate the exact same behaviors studied in the literature that emphasized the peripheral route (for example, Allison et al., 2022; Oo et al., 2019).

In addition, differences with published results may also be due to differences in the setting studied. The following three items in Study 2 are not correlated significantly with Slush success: gestures, referring to listeners' values, and looking authentic. This stands in contrast to empirical articles (Clarke et al., 2019; Oo et al., 2019). This does not mean that there is something wrong with the results of these articles. We believe that different environments may have led to different relationships with pitch success. This is in line with Hypothesis 3, which suggests that items show lower or higher predictive value depending on the different settings. There is some weak evidence for this hypothesis when comparing the two studies reported in this article. Study 1 is based on pitches by business school students, in contrast to Study 2's real-life competition. Comparing columns 3 and 5 and 4 and 6 of Table 2 shows a few correlational differences. The item on passion and enthusiasm is significantly less strongly correlated with inspiration in the college sample than in the real-life competition ($r = .56$ in Study 1 and $r = .71$ in Study 2; $z = 2.02$, $p = .043$). Commercial value's correlation with inspiration is higher in the college sample than in the Slush competition ($r = .77$ in Study 1 and $r = .63$ in Study 2; $z = 2.21$, $p = .03$). Presenting knowledge is much more important for inspiration in the college sample than in the Slush competition ($r = .79$ in Study 1 and $r = .59$ in Study 2; $z = 3.13$, $p = .002$). There is also one significant correlational difference with regard to the dependent variable market opportunity: The item on presenting knowledge is more highly correlated with opportunity in Study 1 than in Study 2 ($r = .83$ in Study 1 and $r = .64$ in Study 2; $z = 3.42$, $p = .0006$). Given that these observations are post-hoc, we cannot rule out random effects. However, it makes theoretical sense that the pitches of Study 1 were meant to persuade professors and peer students in a university setting. Showing entrepreneurial experience and knowledge may be more important in the university setting than in the real-life Slush competition. In contrast, showing passion may be more important for the investors in the Slush competition and, therefore, lead to stronger correlations with inspiration. Thus, correlational differences in different settings give initial and partial support for Hypothesis 3 on pitches' success being differentially effective depending on settings and purposes. Further empirical studies in this area are necessary.

Another set of findings that need interpretation relates to the fact that all items and all factors show very high intercorrelations (see, for example, Tables 3–5). Similarly, there are also very high correlations between the two outcome variables, inspiration and market opportunity. There are some possible

explanations for these high correlations. First, the persuasive routes radiate to the other routes of persuasion; this means, for example, that given a strong emotional appeal of the pitch may lead judges to take all parts of the entrepreneur's pitch more seriously (*pars-pro-toto*). This leads to some overlap between the peripheral and central routes.

A second reason for strong intercorrelations could lie in the preparation for the pitch. Entrepreneurs prepare and train beforehand and consider what investors might want to hear. Thus, they would not leave out potentially important issues from their pitches, and good preparation might lead to "better pitches" that relate to many of the facets described in the entrepreneurial pitching success scale (EPS scale).

Third, Gestalt psychology argues that there is a tendency to prefer good Gestalts (good patterns) (Arnheim, 1986). Such a good Gestalt in pitching may include both emotional and rational routes of persuasion instead of one of them. Thus, there are high correlations between these routes because entrepreneurs attempt to produce a good "whole" of the pitch. Further research could examine whether higher Gestalt impressions are correlated with pitch success and whether such a holistic approach is better in most situations or is effective only in certain environments.

Fourth, the major conclusion of our article is that the many facets of pitches are important and that one should not argue for just one of the two routes to the detriment of the other route. The various parts of the pitch may need to be related because the unitary function of the multifactorial work demands of entrepreneurship requires both emotional as well as rational approaches. Any reductionistic approaches to pitches would likely fail: It is precisely the art of pitching that seemingly contradictory requirements need to be artfully integrated. Our two outcome variables—being inspired by the pitch and seeing positive market opportunities—are both important, but they are also significantly correlated with each other and with the Slush success variable. Thus, the most basic overall result of our studies is that both routes—the peripheral as well as central routes—are important for pitching success.

Hypotheses 2a and 2b suggest that emotional appeal items should be more highly related to the outcome variable, being inspired, and the rational persuasion items should be more highly related to being convinced of the market opportunities of the product/service. These hypotheses are best tested with the factors from Table 5. The correlations of the factors with the dependent variables, inspiration and market opportunity, show overlapping confidence intervals. Thus, Hypotheses 2a and 2b need to be rejected. Again, we see support for a holistic interpretation. Thus, while the theories were useful to develop items, big differences between the routes did not appear—rather, the general picture of multifaceted predictors of pitching success seems to be supported.

Some hypotheses discussed in the relevant pitch literature were not supported in our studies. Although all 13 predictors had some effect on the dependent variables—being inspired and judgment on opportunity in the market—some of the peripheral items related to gestures and referring to potential values of the listeners were not significantly related to success. This may suggest future studies to determine the generalizability of gestures (Clarke et al., 2019) and ingratiation (Sanchez-Ruiz et al., 2021). Another example is entrepreneurial passion and enthusiasm—item 3; we thought entrepreneurial passion and enthusiasm would be particularly good exemplars of the peripheral route; this is also in line with suggestions in some articles (Allison et al., 2022; Cardon et al., 2009, 2017; Chen et al., 2009; Li et al., 2017). Passion is related to both inspiration of the listener as well as convinced of market opportunity. Thus, passion seems to be important for both as a signal of entrepreneurial motivation (Steigenberger & Wilhelm, 2018) and as an emotion with a contagion effect (Hubner et al., 2020). This example shows how difficult it is to produce purely peripheral versus purely central items (a problem that may have led to high cross-loadings in the factor analysis). Passion displayed during pitching signals high motivation to overcome problems while building the venture. Thus, it makes sense that this item is related to market opportunity and inspiration alike.

Strengths and limitations, and future research

At first sight, the major limitation of Study 1 relates to a potentially high common method variance. This could explain the high intercorrelations among the predictors and the high correlations with the outcome variables market opportunity and inspiration (Podsakoff et al., 2012). However, our study design worked against a simple common method variance interpretation. We used the average of two (Study 1) and three coders (Study 2) to produce the raw input to the correlation tables, thus reducing common method variance based on individual preferences. High intercorrelations should not automatically be seen as symptoms of common method variance: Even coders who are careful in differentiating between different facets of the pitching performance have a holistic impression of very good and not so good performance, and this holistic impression leads to high intercorrelations. Fortunately, the behaviorally anchored scales used in Study 2 may counter this trend to some extent. Also, as suggested before, good pitch performers are likely to do most of the things well, thus increasing the part of intercorrelations that is not due to common method variance.

A particularly good way to counter common method variance is exemplified in Study 2. Here, Slush success was measured by professional investors' ratings (allowing 13 percent of all candidates to advance). Since success was determined by someone other than our coders, there was no common method

variance influence on the significant correlations of the EPS items with Slush competition success. The Slush competition pitches were usually of high quality. The videos we observed were shot during the second round for the participants. Weaker projects might have been weeded out in the first round. Thus, there is a range restriction effect, which reduces the size of correlations (Hunter & Schmidt, 2004). In addition, the reliability problems of investors' judgments reduce the correlations. Thus, we need to interpret the correlations between the EPS predictors and the Slush success variable to be at the lower bound of the validity correlations.

While we liked our study design, it did not get investors to fill out questionnaires (we only relied on their judgments, described as success in Study 2). Petty and Cacioppo (1986) would suggest that "need for cognition" and personal relevance levels affect which persuasion route is preferred by the recipient of the pitch. Future research may measure such recipient person variables, and this could help make the theory more powerful in its explanation of the effects of pitches.

Moreover, there is good reason to assume that different "types" of investors will have different criteria. As discussed in the introduction, humanitarian investors will look for different criteria than investors who are interested in the payback of their investment. The time perspectives of investors will also influence their decisions (quick win versus long holding shares in the new companies). Also, some investors may be mainly interested in supporting innovations, whereas others may put the social effects of the enterprise in the foreground of their attention, and they have different criteria of excellence for new products and services.

Our scale should also help our understanding of how pitches by intrapreneurs influence decision-makers within the companies; again, there will be additional important issues (for example, does the idea fit the company's mission and vision, and so on) (Parker, 2011). However, we hope that the EPS scale may represent a certain "core" that is relevant in many different settings. Given the different areas in which pitches are important, we conceptualize our instrument to be an "open" scale that can be adjusted to different applications. There may be interactions between the different facets of the EPS and the function of the platforms that rely on pitches for the first meeting of entrepreneurs and investors. Our data would suggest that both routes of impact will be important in various ways and, thus, Hypothesis 1 should be replicable in various investors' platforms.

Our scoping review is based on empirical studies on pitching as sources to develop items (see, for example, Table 1). No scoping review is exhaustive, and given the dynamics of the field, additional issues relevant for pitching will be discovered. Scholars may want to add items to the EPS pitch scale based on new theories and new findings. Good pitches are adjusted to appeal to the intended audience. However, we assume that some mixture of both, the

emotional appeal and the rational calculation of future viability, will be upheld.

We hope to stimulate research to be interested in more complex questions of “pitch-environment interactions” from a theoretical perspective, similar to the person-environment interaction and “fit” perspective (Edwards et al., 2006). Also, there is some discussion on one- or two-sided communication to be more effective in persuasion research (O’Keefe, 1999). In general, persuasion research has found highly interesting interactions of how communication influences other people (Lee et al., 2017). Similarly, appeals to examples and norms may have a positive influence on persuasion (Cialdini, 2001). The literature on charismatic leadership communication is also relevant as combined with system 1 versus system 2 perspectives (Antonakis et al., 2022; Hubner et al., 2020). On a more methodological note, future research may be interested in developing equal interval response anchors for the behaviorally anchored ESP (Casper et al., 2020).

We argued in the beginning of this article that the literature on pitches is in danger of being overdeveloped and underdeveloped—overdeveloped because there are so many different articles that appear fragmented and in need of integration, and underdeveloped because a common metric of requirements for good pitches has not been developed; the literature seems to be in need of comprehensive approaches. We hope that this article and the development of a pitching observational scale help to overcome both of these problems.

Practical implications of the EPS scale

The global venture capital industry has reached a value of \$198 billion, with a high predicted growth (Megginson, 2004), which renders one of its instruments of selection, namely pitching, important and produces keen interest in practical advice for entrepreneurs. The EPS can help prepare entrepreneurs for their pitches. We have used the EPS in teaching entrepreneurship by encouraging students to go with their first ideas and present a pitch. That pitch is then evaluated with the help of the EPS scale by all participants. Those areas (items) that were found wanting were then discussed as to how they could be improved. From this exercise, entrepreneurs do not just learn from their own mistakes, but also from others’ errors they evaluate. In this way, general improvements of pitches appear. In principle, such teaching could be part of start-up support programs.

These are the conclusions we learned from our studies:

First, the high intercorrelations of all items and between the two coded outcome variables (being inspired and being convinced of the market viability) and their similar correlations with Slush success all speak to a holistic understanding of pitching.

Second, the functionality for success is more similar across the two routes of persuasion (system 1/system 2) than we had anticipated because there are

strong cross-over influences. It is also interesting how high the correlations were between feeling inspired and being convinced of market opportunities. The holistic approach is also in line with neuroscientific results emphasizing the strong interconnections between brain regions; thus, the strong interconnectedness of the rational and the habitual, “gut-driven” and affective processes suggests that there is no easy differentiation between the various systems (Levine, 2022).

Third, given the multitude of effects and processes that go into the effects of pitching, it is not surprising that selecting the “right” entrepreneurs is extremely difficult and leads to sobering results in meta-analyses of investors’ decisions and the success of those chosen by investors (Rosenbusch et al., 2013). Our choice of looking at both the central as well as the peripheral routes was partially successful; the data suggest that exclusive one-sided approaches may lead to wrong conclusions. Thus, neither investors nor entrepreneurs should zero in on just the inspirational and emotional side or concentrate only on the cool, rational approach of calculating market opportunity based on market analysis.

Fourth, the two sides of pitching—system 1/system 2, as well as the central and peripheral routes—may help in the debate on the usefulness of business plans (Honig & Karlsson, 2004). Obviously, we did not study the impact of business plans, but business plan calculations and ideas are often used as part of the central route of convincing people of the market opportunities (for example, market share analyses, and so on). Business planning may be a signal of the emotional value and passion attached by entrepreneurs to the start of a company, and it may also provide good (or not so good) data to convince investors of the market viability of the new enterprise. If entrepreneurs only target the central route by exclusively concentrating on the rational persuasion approach and leaving out system 1 and peripheral routes when pitching, they may risk lower appeal to investors.

Different funding options for startups to raise capital may require different approaches. Thus, we believe that the setting matters because it leads to different approaches and strategies by the investor. There are crowdfunding efforts geared toward needy entrepreneurs in return for a unique reward and experience of helping, such as KIVA. Famous among crowdfunding websites are Kickstarter and Indiegogo, which often have a marketing focus and not just an appeal for investment (Brown et al., 2017). In contrast stand competitions, such as TechCrunch Startup Disrupt or MIT 100k competition (the business plan competition organized by the MIT Entrepreneurship Center). The latter would probably be more similar to the Slush 100 competition that we utilized in Study 2.

Pitching is useful whenever a person or a team wants to get something from another party and has very little time to make the case for it; thus, pitching

may be relevant at work, in dealing with authorities, or communicating with other resource providers. Thus, pitching is of general importance in various communication situations. The EPS-scale, introduced here, may be a good starting point for understanding pitch success in general. Our major conclusion is to take the multifaceted approaches to pitching seriously to understand the holistic structure of influence via pitching.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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