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CHARISMA AND GENDER IN PITCHING

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FACULTÉ DES HAUTES ÉTUDES COMMERCIALES
DÉPARTEMENT DE COMPORTEMENT ORGANISATIONNEL

CHARISMA AND GENDER IN PITCHING

THÈSE DE DOCTORAT

présentée à la

Faculté des Hautes Études Commerciales
de l'Université de Lausanne

pour l'obtention du grade de
Doctorat en Management

par

Anely BEKBERGENOVA

Directeur de thèse
Prof. Marianne Schmid Mast

Co-directeur de thèse
Prof. John Antonakis

Jury

Prof. Boris Nikolov, Président
Prof. Franciska Krings, experte interne
Prof. Janine Bosak, experte externe

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Charisma and Gender in Pitching

sans se prononcer sur les opinions exprimées dans cette thèse.

Lausanne, le 22.09.2023

Professeure Marianne Schmid Mast, Doyenne



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and have found it to meet the requirements for a doctoral thesis.

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“If it is endurable, then endure it. Stop complaining.” (Marcus Aurelius)

“We are what we repeatedly do. Excellence, then, is not an act, but a habit.” (William Durant)

“It always seems impossible until it's done.” (Nelson Mandela)

Charisma and Gender in Pitching

Although charismatic leadership has been the topic of many research articles, many findings are not informative for leadership theory or practice (Antonakis et al., 2016; Banks et al., 2017). There are still many unexplored issues that surround the concept; for instance, it is unclear whether charismatic leadership is equally effective for women and for men (Banks et al., 2017) and whether women and men use charisma in the same manner. Also, is charismatic leadership equally effective in the academic or entrepreneurial settings out of scope of traditional leadership? I try to answer these questions in this doctoral dissertation, seeking to expand the knowledge about areas of effectiveness of charisma and to investigate whether charisma's effectiveness for women and men.

Using field and experimental studies, these papers tackle the questions about charisma through four different perspectives. The first paper builds on evidence that charismatic signaling matters in informal contexts (Tur et al., 2021) and explores whether charisma is effective in the academic context, through the investigation of public speaking competitions for doctoral students. We analyze whether the use of charismatic signaling can boost the likelihood of individuals succeeding in advancing in the competition. The second paper looks at the impact of verbal charisma and gendered communication styles in the entrepreneurial pitches for women and men entrepreneurs. Also, I investigate whether women and men naturally use gendered communication styles in their charismatic speeches. I pursued this avenue because it was important to understand first how women and men express themselves and how this could affect the perception of entrepreneurial pitches and if necessary to recommend a style to choose in the pitching context. Finally, in the third paper I disentangled the verbal and nonverbal charisma using virtual humans in entrepreneurial pitching. I was curious to investigate the pure effect of verbal and nonverbal charisma, but to be careful to not have the effect of feminine or masculine nonverbal behavior interfere with the effect of

charisma. In the papers I applied technology such as OpenPose (Cao et al., 2019) in case of the field studies to extract nonverbal behavior from individuals, deepfake algorithms (Mahmud & Sharmin, 2021) to project nonverbal behavior on to faces of individuals, and the use of virtual humans (Burden & Savin-Baden, 2019) to create the exact vignettes that we need.

Paper 1 – Charismatic Signaling in Academic Settings: Evidence from Thesis Competitions

Charisma is associated with increased follower motivation (Awamleh & Gardner, 1999), influence in social media (Tur et al., 2021), and influence in politics (Jacquart & Antonakis, 2015). The aim of this research is to investigate whether charismatic signaling can increase the likelihood of success in public speaking competitions in the academic setting. We investigate the French and English-speaking doctoral student competition “Ma Thèse en 180 secondes” (MT180) and “Three Minute Thesis” (3MT), during which contestants summarize their research in a three-minute talk.

In Study 1, I used data from 218 participants, doctoral students from universities in Switzerland and France, who participated in the MT180 competition. In Study 2, the data were from 296 doctoral students from universities in the United Kingdom who participated in the 3MT competition.

In Study 1, human coders coded the verbal and nonverbal charismatic tactics. In Study 2, we used an algorithm to code for verbal charismatic tactics. Furthermore, we used an algorithm to mask the appearance of the contestants and to only show the nonverbal behavior, which was then rated by a coding panel of online participants.

The findings of Studies 1 and 2 provide evidence of the potency of verbal charismatic signaling in the academic context. Furthermore, in Study 2, expressive nonverbal behavior also contributed to success in the competitions. There was no difference in the effect of

charisma between women and men in their use of verbal or nonverbal charisma. Nevertheless, in Study 2, being a woman reduced the likelihood of reaching the finals of the competition.

Paper 2 – Gendered Language in Entrepreneurial Pitching

In general, women entrepreneurs raise less venture funding than do men (Greene et al., 2003); this observation is partially due to the backlash effect (Rudman & Glick, 2001), because women's agentic professional role (Gupta et al., 2009) is incongruent with their communal gender role (Eagly, 1987). This paper investigates whether using charisma can mitigate the backlash effect, which would have important practical implications (i.e., help to diminish the gender funding gap). Furthermore, we investigate whether combining charisma and gendered communication styles is beneficial for the perceived market potential of a firm (Studies 1 and 2), and whether individuals naturally use a gendered speech style in managerial discourse (Study 3).

In Study 1, 551 on-line participants were randomly assigned to read an entrepreneurial pitch of a fictitious company, showcasing either a woman or man entrepreneur written in a non-charismatic, charismatic gender-neutral, charismatic gender-incongruent, charismatic gender-congruent style. In Study 2, 560 participants in an online study watched a 10-second video of male or female individual posing as an entrepreneur and then read one of the pitches. In Study 3, 308 participants, university students, wrote motivational speeches in French using charismatic tactics, that were then rated by a coding panel for perceived genderedness.

In Study 1, the charismatic gender-congruent writing style led to a lower perceived market opportunity for both women and men entrepreneurs. In Study 2, such an effect was not observed. There was no significant difference between non-charismatic and charismatic gender-neutral pitches for entrepreneurs in both Studies 1 and 2. In Study 3, metaphors in speeches produced by women and men writers were not judged as more female or male-gendered; however, raters more often identified the speech writer as man.

The findings of Studies 1 and 2 suggest that a gender-neutral writing style for entrepreneurial pitching might be preferable. The use of charisma did not lead to better outcomes for funding. However, future research is needed to investigate if the use of the combined verbal and nonverbal charisma can diminish the venture funding gap.

Paper 3 – Charisma in Entrepreneurial Pitching: Investigating with Virtual Humans

Entrepreneurship and start-up creations are major contributors to the global economy, job creation, and innovation (Haltiwanger et al., 2009), but not all are treated equally; women entrepreneurs raise less funding than men (Greene et al., 2003; Lins & Lutz, 2016). This paper investigates whether using charisma could lead to more investment for entrepreneurs, and hence help diminish the gender funding gap; specifically, we look at too whether verbal or nonverbal charisma is more influential in potentially raising capital for entrepreneurs. Given we investigate these questions using virtual humans, in a preliminary study we test whether charisma leads to the same effects when used by virtual humans compared to real humans. After, we investigate whether verbal or nonverbal charisma results in a higher perceived market potential of ventures and whether this effect is similar for women and men entrepreneurs.

In the preliminary study, 275 participants in an online study were randomly assigned to watch one of four videos of a real or virtual human giving a speech about the rules of a public goods game in either a charismatic or a non-charismatic manner. In the main study, 558 participants in an online were randomly assigned to watch one of 16 videos of a virtual human (woman or man) delivering a pitch high or low in verbal charisma entrepreneurial pitch in a manner high or low in nonverbal charisma.

The findings of the preliminary study show that charisma was perceived to the same extent when enacted by real or by virtual humans. The findings of the main study suggest that

using verbal or nonverbal charisma does not make a significant difference on the perceived market potential of the venture when used by female or male entrepreneurs.

Contributions

The initial goal of this thesis was to investigate whether charisma was equally effective for women and men, whether women and men used charisma differently, and whether it was effective in the academic and entrepreneurial settings. In the papers, we investigated the intersectionality of gendered language styles and charisma, disentangled the effects of verbal and nonverbal charisma, and investigated the effects of charisma in new settings. Furthermore, we outline methodological contributions of using nonverbal behavior extraction and using virtual humans in the development of vignettes.

In the first paper, we revealed that in the setting of academic competitions, both in French and English-speaking versions of the competition, utilizing verbal charismatic tactics was linked to success in passing to the next round of the competition. Furthermore, when masking the appearance of individuals, nonverbal expressivity, specifically expressive body gestures, were linked to success in achieving the next level of the competition. These results confirm previous findings about the effectiveness of charismatic signaling in informal leadership settings. Furthermore, I provide evidence that masking the appearance of individuals when rating their nonverbal behavior can alleviate a certain level of bias. Thus, it would be useful to implement and promote this method in the future.

When focusing purely on verbal charisma in paper 2 we introduced the interplay of charisma and gendered writing styles into the entrepreneurial pitch. The versatility of verbal charismatic signaling enables one to investigate how gendered styles can influence the effectiveness of the message. These results show us that a gender-neutral style is preferable to masculine or feminine pitch styles, which is that we provide experimental evidence to existing research (Balachandra et al., 2021) that a gender-neutral language style is preferential in an

entrepreneurial setting. Contrary to what others have claimed (Greene et al., 2003), there was no gender gap between in perceived market potential between the pitches done by women or men entrepreneurs. This result is promising because it suggests that charismatic communication (in text at the least) could be beneficial in the funding process.

In paper 3 we disentangle verbal and nonverbal behavior and outline a methodology of transfer of nonverbal behavior onto virtual humans. We did not find any differences of the perceived market potential of the venture depending on the entrepreneur's gender. Indeed, in combination with the results of paper 3 there are no different perceived market potential for women or men entrepreneurs contrary to the existing gender gap in entrepreneurial financing (Greene et al., 2003). These findings reveal that with careful design and standardization between conditions there appear to be no differences in perceived market potential between women and men entrepreneurs. In the future it would be interesting to investigate whether there would also be no gender differences in case of ventures that operate in an industry dominated more by women or men.

The findings of the thesis show a different effect of charisma in paper 1 compared to papers 2 and 3 (i.e., charisma having a positive effect in the academic competition setting, and no effect in the entrepreneurial pitch setting). The differing settings partially explain the difference in the study results. On one hand the doctoral students in paper 1 take part in an academic public speaking competition and are evaluated by a panel of judges on criteria that partially coincide with charismatic leadership tactics. On the other hand, in the entrepreneurial pitch setting the information pertaining to the venture remained constant, whereas the level of charisma and the gender of the entrepreneur in the respective pitches varied. Participants were asked to take on the role of potential investors and to evaluate the perceived market potential of the venture. It is possible the information about the venture, which remained constant throughout the pitches overpowered the influence of the charismatic tactics present in the

pitch. Furthermore, in paper 2 we only used verbal charismatic tactics, which might have constituted a weaker form of charisma, not reaping all the effects. In paper 3 we used both verbal and nonverbal tactics but utilizing a novel method – a virtual human and not an actor. Possibly, the full effects of charisma might have been diminished because of using a real and not a virtual human.

Finally, an overall contribution of the three papers is that we apply methodological innovations. Specifically in paper 1, we demonstrated how the use of OpenPose (Cao et al., 2019) to assess the nonverbal behaviors of individuals, while masking their appearance. Comparing the results of the assessment of the nonverbal behaviors of the original videos and the videos treated with OpenPose reveal that raters were influenced by the gender of the individual shown and by the verbal charismatic tactics. Furthermore, in paper 2, we demonstrate how to use deepfake (Mahmud & Sharmin, 2021) for the creation of materials used in experimental studies. In paper 3 we explore how to map nonverbal behavior onto women and men virtual humans.

Future Research

These three papers lead to several avenues for future research. I provide evidence that masking the appearance of individuals when rating their nonverbal behavior can alleviate a certain level of bias. Thus, it would be useful to implement and promote this method in the future. Furthermore, that charisma is effective in the academic setting shows it is a broad method of influence that works even in technical areas with intellectually sophisticated audiences. Another fruitful direction to explore would be to test the effect of charisma in influencing individuals to adopt sustainable and environmentally friendly measures. This topic is very important nowadays and especially to given that charisma appears to have potent effects in morally charged settings. Future research can also address whether charisma is

useful in the classroom in the sense that it aids in comprehension and retention of complex information.

Finally, the findings of this thesis suggest that charisma is not essentially effective in entrepreneurial pitching. Future research should investigate this using a field study with data from startup competitions and then understand whether this result was due to our use of purely text or our use of virtual humans. Perhaps the level of realism of the virtual human interferes with the impact of the pitch. It would thus be opportune to compare our results with the results of having a real human performing the role of an entrepreneur.

Conclusion

Gender differences in being able to influence others in leadership, academia, and entrepreneurship is interesting from a basic research point of view, but also has important practical implications. Using the framework of charismatic leadership tactics enables researchers to study interesting and important questions in a systematic fashion. I hope that this thesis contributes to the understanding of these topics.

Taking part in a thesis competition myself and attending multiple entrepreneurial pitch events, led me to witness the power of charisma in the pitching process and the versatility of how charisma can be used. This thesis has made the steps to investigating gender differences in how charisma is perceived based on the gender of the speaker answering a call for research of the effects of socio-demographics on charisma (Banks et al., 2017).

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Charismatic Signaling in Academic Settings: Evidence from Thesis Competitions

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Author Note

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Abstract

We investigate the effects charismatic signaling performed by doctoral students in the context of the “My Thesis in 180 seconds” (MT180) competition held in France and Switzerland and the “Three Minute Thesis” competition (3MT) held in the United Kingdom.

In our sample, in Study 1 218 doctoral students from 17 universities took part in the MT180 competition. In Study 2 237 doctoral students from 71 universities in the United Kingdom took part in the 3MT competition. In Study 1 we investigated the effects of only verbal charismatic signaling, whereas in Study 2 we tested both verbal and nonverbal charismatic signaling.

In Study 1 we observed a main positive effect of verbal charismatic signaling on the success of reaching the next round of the competition. In Study 2 we observed a main effect of verbal charismatic signaling and nonverbal body expressivity on the success on reaching the next round of the competition. Furthermore, in Study 2, unlike in Study 1, facial attractiveness positively influenced the likelihood of reaching the finals, while being a woman, negatively influenced the likelihood of reaching the finals. The findings of Studies 1 and 2 provide evidence of the potency of verbal charismatic signaling in the academic context.

Keywords: charisma, academic setting, public speaking

Charismatic Signaling in Academic Settings: Evidence from Thesis Competitions

Is charisma effective at yielding influence in the academic setting? Charisma is an important construct in leadership literature whether in business, political, or social-media settings (Antonakis et al., 2021; Awamleh & Gardner, 1999; Bastardo, 2021; Fanelli et al., 2008; Grabo et al., 2017; Howell & Frost, 1989; Meslec et al., 2020). However, whether using charismatic leadership tactics can be effective — that is, help in being persuasive—in the academic setting is unclear.

Charisma has been theorized to be effective at a distance and through digital means of communication (Antonakis & Atwater, 2002) and is effective too when there is no formal authority on the part of the intended influencer (Tur et al., 2021). Given the unique setting of the academic context, I set to test out whether charisma would help gain influence in a tournament setting—that is, in a thesis pitching competition. Specifically, I will investigate whether using charismatic signaling tactics in an academic public speaking competition will influence the chances of contestants reaching the final round of the competition. Our investigations will focus on the French and English-speaking academic public-speaking competitions: “My Thesis in 180 Seconds” (MT180) and the “Three Minute Thesis competition” (3MT), where contestants (doctoral candidates) have three minutes to summarize their thesis research in a compelling and understandable way in front of a panel of judges and an audience. The goals of these competitions are to enhance the dialogue between academia and the general public, while promoting scientific research. This setting provides us with a standardized framework of the videos and a rich set of data to test whether using verbal and nonverbal charismatic leadership tactics can lead contestant success in the competition.

In the present research I will use objective ratings of verbal charisma completed by human coders (Antonakis et al., 2011) and a novel technology to generate objective ratings of verbal (Garner et al., 2019) and nonverbal charisma (Cao et al., 2019; Simon et al., 2017) to

analyze whether verbal and nonverbal charismatic signaling have an impact on contestant success. Concretely, in Study 1 (MT180) I will solicit human coders to mark the presence of the objective verbal charismatic tactics (Antonakis et al., 2011; Tur et al., 2021), while in Study 2 (3MT) I will use algorithms to mark the presence of verbal (Garner et al., 2019) and nonverbal tactics (Cao et al., 2019). Using algorithms to treat the videos reduces bias because it masks the appearance of the contestants; unlike humans, the algorithm is not influenced by stereotype-driven information processing (e.g., the sex, appearance, corpulence, etc. of the target). As such, omitted variable bias—endogeneity (Antonakis et al., 2014)—in the ratings of nonverbal behavior is reduced.

Our research has important theoretical and practical implications for leadership and informal leadership in the academic setting. If using verbal and nonverbal charisma positively impacts the success rate of contestants, this discovery could mean that using charisma is effective in the academic setting and education. Charismatic signaling could provide a structured training plan for doctoral students and educators, given that charisma can be taught (Antonakis et al., 2011).

Charismatic Signaling

Charismatic leadership is a well-researched construct (Bass, 1985; House, 1977; Shamir et al., 1993; van Knippenberg & Sitkin, 2013), defined as “values-based, symbolic, emotion-laden leader signaling” (Antonakis et al., 2016, p. 304). Charismatic leadership has been identified as important for leaders in the top echelons of organizations (Fanelli et al., 2008), managers (Awamleh & Gardner, 1999; Howell & Frost, 1989), politicians (Jacquart & Antonakis, 2015), entrepreneurs (Bekbergenova et al., 2023), and in informal leadership through social media (Tur et al., 2021). Charismatic signaling increases, positive perceptions about the leader, such as positive affect (Antonakis et al., 2011), trust for the leader (Podsakoff et al., 1996), the competence of the leader (Antonakis et al., 2011), and perceived

leader effectiveness (Awamleh & Gardner, 1999). Charisma also has tangible effects on follower motivation and performance (Antonakis et al., 2021), views on social media (Tur et al., 2021), contributions to moral causes (Meslec et al., 2020), and even on stay-at-home behaviors, following charismatic U.S. Governor speeches, during the COVID-19 pandemic (Jensen et al., 2021).

From an evolutionary perspective, charisma can signal the ability of the leader to coordinate complex actions in a short amount of time (Grabo et al., 2017). Analyzing charisma through the lens of signaling, that is behaviors designed to communicate and reduced information asymmetries (Spence, 2002), symbolic signals trigger mental visualizations or associations of concepts (Mio et al., 2005), emotion-laden signaling transmits affective states, such as passion (Antonakis et al., 2011). Value-based signals appeal to the values of individuals (Hogg, 2001).

Scholars have identified objective verbal and nonverbal signals that are linked to triggering the charismatic effect (Awamleh & Gardner, 1999; Den Hartog & Verburg, 1997; Towler, 2003). These signals have been formally conceptualized into nine verbal signals (i.e., stories and anecdotes, metaphors and analogies, three-part lists and repetitions, contrasts, rhetorical questions, moral conviction, sentiment of the collective, setting ambitious goals, and expressing confidence in goal achievement) and three nonverbal signals (i.e., animated facial expressions, expressivity in the voice, and gesturing; Antonakis et al., 2011). These signals can be objectively and reliably measured. These signals lead the speaker to deliver (a) substantive statements and (b) frame the message while creating a vision (Antonakis et al., 2011; Jacquart & Antonakis, 2015). The substantive statements help to foster leader-follower similarity, convey moral justification of the mission, align efforts toward a common goal, and to convey confidence that this goal will be achieved. Theoretically, framing and creating a vision enables the speaker to elicit an image and create proximity using a narrative, simplify

the message using a metaphor or analogy, create an intrigue using a rhetorical question, emphasize what a vision should and should not be using a contrast, and distil the message into essential points, using a three-part list (Jacquart & Antonakis, 2015).

A study that has similarity to the present study is that of Tur et al. (2021). They analyzed 240 randomly selected TED talks and measured the objective verbal charismatic tactics and perceptions of facial attractiveness. They controlled for nonverbal charismatic tactics (gesturing, vocal modulations, and voice pitch intensity), elements about the speaker, the event, and the speech itself and measured how these elements influenced the number of views, a proxy for influence, the talk would manage to achieve. The results revealed that the speaker using more verbal charismatic tactics gained more views. I argue that in the academic setting, similar to the case of TED, charismatic signaling can be beneficial to the success of contestants in the thesis competitions. Like in the case of TED, in the case of MT180 and 3MT, contestants like TED speakers, must communicate complex information in an engaging manner, signaling their intellectual ability and charismatic leadership. Could charismatic signaling be useful in the academic setting?

Charismatic Signaling in the Academic Setting

Rhetorical elements linked to charismatic effects (Den Hartog & Verburg, 1997) have not only been useful elements in leadership but are also effective tools in knowledge transfer and the academic setting (Alterio & McDrury, 2003; Duit, 1991; Hakkarainen, 2008; Saban, 2006; Ware & Williams, 1975). Concerning the verbal tactics, metaphors and analogies can serve as a powerful educational device (Duit, 1991; Saban, 2006), helping to assimilate difficult concepts (Webb, 1985) by drawing parallels between new and existing knowledge. Metaphors help listeners grasp unknown knowledge with the support of already existing knowledge (Mac Cormac, 1985). I posit that metaphors can be instrumental in the case of thesis competitions as they would evoke already pre-existing knowledge possessed by the

judges and the audience, enabling the contestants to communicate their thesis research in an understandable (Saban, 2006) and vivid manner (Lakoff & Johnson, 1980) in the limited time of three minutes.

Further, using stories, another verbal charismatic tactic, is linked to positive outcomes in education. Storytelling fosters developmental outcomes in children (Hakkarainen, 2008), and serves as a tool to stimulate critical thinking and a deeper understanding of the topic (Alterio & McDrury, 2003). Whereas digital storytelling is a popular pedagogical tool (Wu & Chen, 2020) used to help students take different perspectives. In the context of the thesis competitions, storytelling could enable the members of the jury or audience to better envision the phenomenon that is being discussed and to identifying with the speaker.

Concerning nonverbal charismatic tactics, gestures play an important role in communication and the cognitive processes in problem-solving in the classroom (Stam & Ishino, 2011) and help to provide common ground between the teacher and the students linking new concepts to already familiar ones (Nathan & Alibali, 2011). Using mimicking gestures when studying mathematical concepts and nonlinear graphs helped students internalize the subject (Gerofsky, 2011). Metaphorical gestures help to assimilate abstract constructs, while iconic and deictic gestures provide narrative and grounding functions (Roth, 2001). Studies have shown that lecturers displaying charisma, expressiveness, personality, humor, and friendliness increased student satisfaction ratings and test scores (Ware & Williams, 1975). Research has also shown that transformational leadership of school principals had an indirect positive effect on the performance of the students (Koh et al., 1995).

The current study will focus on the setting of the “My Thesis in 180 Seconds” (MT180) and “3 Minute Thesis” (3MT) competitions. To participate in these competitions, doctoral students must summarize their dissertation in three minutes in front of an audience and a panel of judges, to showcase their academic, presentation, and communication skills, in

a way that is accessible to a non-expert general audience. Given that doctoral students must communicate the goal, the scientific background, and the findings related to their thesis with a strict time limit, I posit that charismatic signaling will increase the likelihood of doctoral students to become finalists in the competitions.

Hypothesis: Using charismatic signaling will increase the chances of doctoral students to earn a place in the next round of the MT180 (the semi-final round) and 3MT (the final round) competitions.

A Standardized Study Context

The “My Thesis in 180 Seconds” (MT180) and the “Three Minute Thesis” (3MT) are competitions open to doctoral students in French-speaking countries and the United Kingdom (UK), during which doctoral students must vulgarize and distil the meaning of doctoral thesis into a three-minute talk. The competitions are held in a highly standardized manner. The 3MT competition had originated in Queensland Australia in 2008, according to the 3MT website (Three Minute Thesis, 2023) and is held in English, while the MT180 was inspired by the 3MT and had the first competition held in Quebec, Canada in 2012, according to the MT180 website (Ma Thèse en 180 Secondes, 2023). The latest editions of the competition were held across 85 countries in over 900 universities. Currently, the 3MT is carried out in four separate competitions based on geographic location with each competition having a slightly different competition process due to the number of doctoral students, faculties, and universities.

The competition setting constitutes a controlled field study, providing us with a platform to test the effects of charismatic signaling. Such “unconventional” settings (Bamberger & Pratt, 2017), permit us to bring a level of control, stripping away potential confounds and exploring a relevant real-life setting. Notable examples of using similar methods in the past similar to the study of TED videos (Tur et al., 2021), governor speeches (Jacquart & Antonakis, 2015), the effect of female leader wins in Brazilian mayoral elections

on the gender composition of the staff (Arvate et al., 2018), the traits of sport team leaders in the London Olympics (Elgar, 2016), and leadership emergence in all-women groups (Schock et al., 2019).

Like in the mentioned examples, the format of the MT180 and 3MT competitions provides a homogenous environment, limiting endogeneity: All contestants are undergoing their doctoral studies, give their talk in front of a room or auditorium, have a background slide behind them, and have exactly three minutes to give their speech. These settings provide a controlled field setting to estimate the effects of charismatic signaling, facial attractiveness, and gender, on the doctoral students' success in advancing in the next stage of the competition.

The MT180 and 3MT competition guidelines recommend having between three and six judges, including academics and communication and marketing professionals. In the MT180, contestants were evaluated on their talent in public speaking and implication in the project (vocal clarity, gesture fluidity, stage presence), simplifying and popularization of the research (language accessibility, relevance of stories and metaphors used, relevance of the PowerPoint slide), and the structure of the presentation. Judges could also award a point to a presentation that they found exceptional (Ma Thèse en 180 Secondes, 2023). In the 3MT, the judges assessed whether doctoral students gave appropriate background about the research question and communicated clearly (explaining the research, method, findings, and impact). Furthermore, the judges assessed whether the language used was appropriate for a non-specialist audience, the PowerPoint slide was appropriate, and whether the student conveyed enthusiasm and managed to capture and maintain the attention of the audience (Three Minute Thesis, 2023).

Overview of Studies

In Study 1 I test the effectiveness of verbal charismatic signaling tactics in the setting of the MT180 competition held in French-speaking countries. Human coders rated the presence of the verbal charismatic tactics; I also control for perceived attractiveness along with the fixed effects of the department and university. In Study 2 I replicate Study 1 by testing the effectiveness of verbal and nonverbal charismatic signaling tactics in the setting of the 3MT competition held in the UK. I also use novel, and arguably more objective methods to measure the verbal (Garner et al., 2019) and the nonverbal charismatic tactics of the contestants (Cao et al., 2019; Simon et al., 2017). Furthermore, I control for perceived attractiveness along with the fixed effects of the department and university.

Study 1: My Thesis in 180 Seconds

Method

Participants

I studied 218 doctoral students (121 women) from 17 universities located in Switzerland and France (e.g., the University of Geneva, Lyon, or Strasbourg). The students were members of 15 faculties (e.g., physics, history, or political science).

Procedure

Doctoral students volunteered to take part in the MT180 competition in their universities and underwent training sessions at their universities held by the organizers. The doctoral students performed their speeches on a stage with professional lighting and microphones used during the recording process. Between one and three doctoral students in each university received prizes awarded by the jury and were sent to the next round of the competition (the final national round). After the competition, the videos were made available via video platforms of the universities.

Materials

I collected 218 videos of the doctoral students' speeches that were made available on the university video channels. I extracted 218 images of the faces of the doctoral students, standardized the size, and recolored them into greyscale. These portrait images were used to assess the doctoral students' perceived attractiveness. I extracted the transcripts of the 218 doctoral student speeches and had them coded for verbal charismatic tactics.

Measures

Verbal Charisma

Three trained coders coded the 218 speech transcripts for the presence of the nine charismatic tactics described by Antonakis et al. (2011) on a sentence-by-sentence basis using a scale from 0 (*absent*) to 1 (*present*). Precisely, the coders coded each sentence for the following tactics: (a) similes and metaphors, (b) three-part lists and repetitions, (c) contrasts, (d) rhetorical questions, (e) stories or anecdotes, (f) moral convictions, (g) sentiment of the collective, (h) ambitious goals, and (i) confidence that these goals will be achieved (Tur et al., 2021). I summed the tactics to have the total score for the speech. The three coders had a high standardized alpha agreement at the speech level ($\alpha = .86$), and a high concordance correlation coefficient (CCC) between coders ($CCC_{AB} = .53$, $CCC_{AC} = .51$, $CCC_{BC} = .64$; Lin, 1989). Given the results from Tur et al., (2021), who showed that human ratings of nonverbal behavior were biased (and they did not matter whether they were added or not to the regression), I did not code for human ratings of non-verbal behavior¹.

Perceived Attractiveness

I recruited 193 raters from the Prolific online platform to rate the 218 photos of the doctoral students for perceived attractiveness using one-item question: "How attractive to you find this person?", on a Likert scale from 1 (*not attractive at all*) to 7 (*very attractive*). I followed the procedure outlined by Tur et al. (2021), meaning that each rater saw 25 photos at

random and each photo was rated by 20 raters which yielded a reasonable *ICC* ($M = 3.93$, $SD = 0.69$, $ICC = .18$; Bliese, 1998).

Sentences

Verbal charisma was counted on a sentence basis; thus, it was important to control for the number of sentences in a speech, which mechanistically positively correlates with the charisma score. The average sentences used was 31.59 ($SD = 6.44$).

University

I created a categorical variable to indicate the 17 universities of the participant (e.g., EPFL, University of Sorbonne, or the University of Lausanne) from which I created dummy variables (to account for the fixed-effects between universities).

Department

I created dummy variables to indicate the 15 departments that the doctoral students were representing and hence the theme of their speech (e.g., psychology, mathematics, or chemistry).

Results

Refer to Table 1 for the means, standard deviations, and correlations of the key variables. To estimate the key hypothesized effects, we followed the estimation method outlined by Tur et al. (2021) by using an instrumental variable regression model. Here the outcome variable is whether the doctoral student passed into the semi-final (i.e., 35 out of the 218 students); given the measurement error in measuring charisma, I “instrumented” the verbal charismatic tactics scores from coder A with those of the scores from coders B and C. Thus, I applied the model-implied instrumental variable (MIIV) estimation method (Bollen, 1996), while controlling for the fixed effects of the university and department/theme. I used a linear probability model with robust standard errors, given its well-known advantages over

probit or logistic regression, especially for cases where the outcome is fully determined by a regressors (Aldrich & Nelson, 1984; Caudill, 1988; Huang, 2022).

Confirming our hypothesis, results (Table 2) show that verbal charismatic tactics had a significant positive impact on the likelihood that doctoral students reached the next round of the competition (Model 2, $B = 0.03$, $p = .011$; Model 4, $B = 0.03$, $p = .014$), robust to faculty effects (Model 3, $B = 0.03$, $p = .003$). In Model 2, the instruments were strong, Cragg-Donald Wald statistic $F(2, 182) = 83.27$, $p < .001$, which is greater than 19.93 (i.e., the Stock-Yogo 10% maximal IV size). The model was also correctly specified and overidentifying restrictions were tenable, Hansen J statistic of overidentification test of all instruments $\chi^2(1) = 1.05$, $p = .307$.

There was no significant effect of participant gender or attractiveness on the success of the doctoral students, unlike the influence attractiveness had on the number of views in social media (Tur et al., 2021) or from thin slices of videos (Tskhay et al., 2017). I checked for interaction effects regarding gender with charisma and attractiveness and found that there were no significant interaction effects between charisma and gender ($B = -0.03$, $p = .263$) or gender and attractiveness ($B = 0.04$, $p = .694$).

Discussion

I aimed at testing whether using verbal charismatic tactics would increase the chances of doctoral students taking part in the MT180 competition reach the next level of the competition, by earning a place on the podium after being assessed by a panel of judges. The doctoral students were ranked on their communication skills and whether they managed to convey the essence of their thesis in a compelling and understandable manner (Corsi et al., 2021). Results showed that using verbal charismatic tactics, indeed, helped contestants (both women and men) reach the next level of the competition. It is possible that framing the message of the thesis through stories, metaphors, contrasting statements, adding clarity using

three-part lists, and stimulating thinking through asking rhetorical questions, were instrumental in communicating the scientific findings while keeping the interest of the audience. Contrary to previous findings linked to social media, facial attractiveness did not affect the likelihood of doctoral students reaching the next level of the competition.

A limitation of this study is that I only used an objective measure of verbal charismatic tactics in Study 1 and I did not test for the impact of nonverbal charismatic tactics (e.g., arm and body gestures, facial expressivity), that are too an essential component of charismatic leadership and charismatic signaling (Antonakis et al., 2016; Awamleh & Gardner, 1999). I thus reexamine the robustness of our results in an English-speaking context, while also adding an objective measure of nonverbal charisma and other covariates such as the person's perceived weight, attire, and content of the slide in Study 2.

Study 2: Three Minute Thesis

Participants

I studied 296 doctoral students (183 women) from 91 universities in the United Kingdom participating in the semi-final round of the competition from 2015 to 2019. The doctoral students were represented by 15 faculties (e.g., law, psychology, or engineering). Due to (a) poor quality of recordings, (b) missing video recordings of the talks, and (c) universities appearing in the sample only once, hence creating singleton dummy variables, which create variance-covariance estimators that are not of full rank (Correia, 2015), I had to exclude videos 59 observations. This resulted in a final sample of videos of 237 observations (149 women) from 71 universities.

Procedure

Doctoral students volunteered to take part in the 3MT competition in their universities and underwent training sessions at their universities held by the organizers. The doctoral students performed their speeches on a stage with professional lighting and microphones used

during the recording process. One doctoral student per university was selected to go to the semi-final round and their video was made available on the platform of VitaeUK, (the organizer of the 3MT in the UK). Out of the semi-finalists, six doctoral students were selected to participate in the final. After the competition, the videos were made available via the video platform of VitaeUK.

Materials

Portraits of Doctoral Students

I extracted images of the faces of each student from the videos of the speeches, standardized the size, and recolored them into greyscale. These portrait images were shown to the raters to assess perceived attractiveness.

Body Image of Doctoral Students

I extracted images 237 of the doctoral students up to their waistline, standardized the size, and blurred out their faces to make sure that the person's face is no longer identifiable. These body images were shown to the raters to assess to what extent the students were under, normal, or overweight.

Nonverbal Behavior of Doctoral Students

I extracted the first, middle, and last 20 seconds of each video, resulting in a one-minute video for each student. After that, we treated the videos using the OpenPose action recognition technology (Cao et al., 2019; Noori et al., 2019; Simon et al., 2017), which extracted the gestures of the students displaying them using an abstract form and masking the appearance of the participant (Figure 2). Some videos only showed the faces of the students, were filmed at a far distance, or featured other people in front of the student, which compromised the quality of the treated video. I had to exclude these 36 videos, however in this analysis I kept the participants coming from the singleton universities. This resulted in a final sample of 286 treated videos that were then shown to raters to assess the doctoral

students' nonverbal charisma. Using the treated videos with no sound enabled us to mask the appearance of the students including gender, ethnicity, age, and attire, decreasing the risk of endogeneity (Lonati et al., 2018).

Transcripts of the Speeches

I extracted the transcripts of the contestant speeches through a vocal recognition software powered by artificial investment available online free of charge (Gaber & Corpas-Pastor, 2021). This resulted in 237 transcripts. I manually checked the transcripts to ensure correct punctuation (so that it could be reliably coded by the deep neural networks).

Measures

Verbal Charisma

To measure the verbal charisma, first, I coded them for the nine charismatic signaling tactics described by Antonakis et al. (2011) using an artificial intelligence system, which assigns a probability for the presences of a signaling tactic (Garner et al., 2019). The transcripts were coded for the following tactics at the sentence level:

(a) similes and metaphors, (b) three-part lists and repetitions, (c) contrasts, (d) rhetorical questions, (e) stories or anecdotes, (f) moral convictions, (g) sentiment of the collective, (h) ambitious goals, and (i) confidence that these goals will be achieved. I created an index by summing the scores ($M = 11.97$, $SD = 3.63$).

Nonverbal Charisma

I gathered an objective measure of nonverbal charisma using the OpenPose (Cao et al., 2019; Noori et al., 2019) treated videos of the nonverbal behavior as stimulus material. I showed 10 randomly selected videos out of the full sample to each of the 523 raters recruited from the Prolific platform. The raters assessed the videos using two items: "To what extent did the individual in the video use expressive arm movements? Using the provided scale ranging from 1 (*not at all*) to 5 (*frequently, if not always*), please indicate the extent to which

you find the individual used rhythmic arm movements” and “To what extent did the individual in the video use expressive body gestures? Using the provided scale (ranging from 1 = not at all to 5 = frequently, if not always), please indicate the extent to which you find the individual used rhythmic body gestures?”. As a result, each video was watched by 19 raters. The raters had a moderate inter-rater reliability (Bliese, 1998) for the arm ($M = 3.66$, $SD = 0.71$, $ICC = .15$) and body (posture, shoulders, legs or feet) movements ($M = 2.94$, $SD = 0.68$, $ICC = .17$). I averaged the scores for the two items, with a higher score meaning more nonverbal charisma ($M = 3.30$, $SD = 0.66$).

Perceived Attractiveness

I followed the procedure for perceived attractiveness used to measure perceived attractiveness (Tur et al., 2021). I recruited 269 raters to rate the black and white portrait photos of the doctoral students on perceived attractiveness. The raters saw 10 randomly chosen photos of the doctoral students in random order and rated them using one item with a one-point scale: “How attractive do you find this person? Using the provided scale (ranging from 1 = not at all attractive to 9 = very attractive), please indicate the extent to which you find the speaker attractive”, with a higher score meaning more perceived attractiveness. As a result, each photo was rated by at least eight raters. The inter-rater reliability was reasonably strong ($M = 4.64$, $SD = 1.14$, $ICC = .27$).

Perceived Weight

I hired 523 raters to rate the doctoral students on their perceived weight. The raters saw 10 photos of the doctoral students in random order and rated them using one item: “Relative to a person of average weight of this sex, how would you rate this person's weight? Using the provided scale (ranging from -2 = below average to +2 = above average), please indicate how you perceive the persons weight compared to the average weight of this sex.” As

a result, each image was seen by at least 16 raters. The inter-rater reliability was not very strong but acceptable ($M = 3.07$, $SD = 0.52$, $ICC = .11$; Bliese, 1998).

Control Variables

I extracted the transcript using software and after deleting any instances that were not related to the speaker (e.g., the organizer of the event), I recorded the number of sentences ($M = 22.34$, $SD = 4.47$). Verbal charisma is measured on a sentence basis (Antonakis et al., 2011), thus it was necessary to record the number of sentences.

I recorded the name of the university (e.g., King's college, University of Edinburgh, or University of Bath), the faculty in which the speaker was enlisted (e.g., the department of forensic sciences, economics, or life sciences), the year of the competition (2015 - 2019), and whether it was the final stage of the competition, from 1 (*semifinal*) to 2 (*final*). I recorded whether the final of the competition was happening in the same city as the same city as the university with a binary variable, from 0 (*no*) to 1 (*yes*). I also recorded the gender of the participant using a binary code 0 (*male*) to 1 (*female*). I recorded whether the participant was wearing glasses (72 speakers wearing glasses) using a binary code 0 (*no*), 1 (*yes*), and whether the participant was wearing red (30 wearing red), using a binary code 1 (*yes*) to 2 (*no*). I controlled for wearing glasses as previous research showed wearing glasses was negatively correlated to perceived charisma (Tskhay et al., 2017). I also recorded the ethnic group of the doctoral students (0 = *mixed*, 1 = *White Caucasian*, 2 = *Black, African, or African American*, 3 = *American Indian or Alaska Native*, 4 = *Asian*, 5 = *Arab, West Asian, Indian, or Pakistani*, 6 = *Southeast Asian*, 7 = *Latin*).

Results

Refer to Table 3 for the means, standard deviations, and correlations of key variables. In the analysis I only used ratings of nonverbal charisma rated by blind coding panels of the faceless and genderless stick-figures². I report the results of the hierarchical regression

analysis, controlling for the fixed effects of the universities, in Table 4. Because I used a fixed effects regression with a cluster-robust estimate of the variance, we excluded singleton dummy variables (due to university). Again, I used a linear probability model (Caudill, 1988; Huang, 2022), and included fixed effects of the universities. The results support our hypothesis that using verbal and nonverbal charismatic signaling positively influences the chances of reaching the finals of the 3MT (Table 4, Model 3). Verbal charismatic signaling ($B = 0.01$, $p = .043$) and body expressivity (using posture, should, leg, feet movements; $B = 0.23$, $p = .001$) increase the chances of reaching the finals, whereas expressive hand movements decreased the likelihood of reaching the finals ($B = -0.13$, $p = .047$). When observing the results without the control variables, nonverbal charisma (Table 4, Model 4; $B = 0.10$, $p = .027$) and body expressivity increase the likelihood of reaching the finals (Table 4, Model 5; $B = 0.22$, $p = .002$).

As for control variables (Table 4, Model 3), being a woman significantly decreased the likelihood of reaching the finals ($B = -0.15$, $p = .033$), whereas facial attractiveness significantly increased the chances to reach the final round of the competition ($B = 0.07$, $p = .021$), which is in line with past analysis of views on social media platforms (Tur et al., 2021). I controlled for all interaction effects with the gender of the doctoral candidates and found no significant interactions between the student gender and other key regressors.

Discussion

In this study I aimed at testing whether using verbal and nonverbal charismatic signaling would help doctoral students participating in the 3MT competition reach the final round of the competition. Our main hypothesis was supported, meaning that verbal charismatic signaling and nonverbal expressivity in the body, like moving around, having an open posture (rather than simply arm gestures), moving the legs and feet, contributed to the doctoral students' success in reaching the final round of the competition. It is possible that the

nonverbal presence of the doctoral students on the stage was better reflected with the expressivity on the body level, rather than on the arm level. Furthermore, perhaps hand gestures were distracting to the audience. I tested whether hand gesturing had a non-linear (inverted U-shape) relationship to success in achieving the final, meaning that using hand gestures would be beneficial to a certain point, however that was not the case.

In our sample, facial attractiveness of the doctoral students increased the likelihood that they will pass into the final, while being a woman decreased the likelihood of reaching the final. Nevertheless, our analyses contained missing data, as during the research process videos were made unavailable, or they could not be treated by OpenPose (Cao et al., 2019), or contained singleton observations of panel data (Correia, 2015).

General Discussion

The aim of this research was to test whether using verbal and nonverbal charismatic signaling helped doctoral students taking part in the MT180 and 3MT thesis competitions to reach the next round of the thesis competitions, in the case of MT180 the semi-finals and in the case of the 3MT, the finals. This research would investigate the effectiveness of charismatic signaling in the academic setting while using objective measures of verbal and nonverbal charismatic signaling. Study 1 focused purely on verbal signaling, while Study 2 investigated both verbal and nonverbal charismatic signaling.

Results of Studies 1 and 2 showed that verbal charismatic tactics helped doctoral students reach the next round of MT180 and of the 3MT. The MT180 and the 3MT competitions were held in French and English respectively. Despite the language and cultural differences put a different weight on rhetorical tactics or that the level of training was more uniform across universities in the 3MT competition. In the MT180 I had access to the contestants competing to enter the semi-final, while in the 3MT we had access to the semi-finalists competing to enter the final round of the competition. Perhaps, the 3MT contestants

who had already qualified to be in the semi-final, were already competent in verbal charismatic signaling, given they underwent an initial round of selection. Concerning nonverbal charismatic signaling was linked to reaching the next round of the 3MT competition.

Furthermore, even though the competitions had the same format and tested the contestants for their public speaking ability, the specific evaluation criteria slightly differed between the MT180 and the 3MT. Judges in both competitions were instructed to assess the use of appropriate language of the contestants, however in the MT180 the evaluation guidelines specifically referred to the use of stories or metaphors, whereas the 3MT evaluation guidelines did not. This discrepancy in the evaluation criteria could explain the differing results of the studies. Assessing through the lens of the elaboration likelihood model of persuasion (Petty & Cacioppo, 1986), the members of the judge panel must have taken the central route of the elaboration likelihood model when assessing the doctoral students, strictly adhering to the predefined assessment criteria, which for example included elements linked to the quality of the popularization of the material and the clarity of explanation. This could further explain why verbal charisma did not have a stronger effect in the 3MT competition, as the assessment criteria did not precisely require doctoral students to utilize metaphors in their pitches. It is possible that the members of the judging panel did develop an appreciation of the charismatic tactics but had to adhere to the assessment criteria.

On another note, the judges in the 3MT competition had a higher proportion of academic staff compared to members of the media, whereas in the MT180 competition the judging panel was more balanced between members of academia and the media. It is possible that the judges of the 3MT competition were more sensitive to the scientific content of the pitches, whereas the judges of MT180 were focused more on the style of the presentation.

In both studies I controlled the fixed effects of the universities. In Study 1 I controlled for doctoral student gender, attractiveness, faculty, and the number of sentences in the speech. In Study 2, I expanded the control variables, controlling not only for doctoral student gender, attractiveness, faculty, and the number of sentences, but also for doctoral student perceived weight, ethnicity, whether they were wearing glasses, and whether the final was held in the same city of the university. In Study 1 was completed chronologically prior to Study 2. After revealing that verbal charisma had a positive effect on doctoral student's success to passing to the next level of the competition in Study 1, I conducted a more rigorous analysis in Study 2, adding nonverbal charisma and more control variables to expand upon the findings of Study 1. Concerning doctoral student gender, both women and men gained equally when using charisma.

In Study 1 facial attractiveness did not influence whether doctoral students reached the semi-finals or not, whereas in Study 2 facial attractiveness had a significant positive impact on reaching the finals. Attractiveness had been previously linked to positive outcomes for individuals, being perceived as more qualified for a job (Quereshi & Kay, 1986), receiving better hiring recommendations (Gilmore et al., 1986), receiving higher compensation (Frieze et al., 1991) as more perceived charisma (Tskhay et al., 2017), more views on social media (Tur et al., 2021). A similar effect has been observed between weight and gender, in that woman with a higher than average weight were penalized in salary compared to women with weight below average (Judge, 2011). Facial attractiveness was measured following the same method in Studies 1 and 2. Further if we were to combine data sets from both studies and analyze the effects of contestant gender, facial attractiveness, and the number of sentences in the speeches, the results yield an overall nonsignificant of facial attractiveness on the success of passing into the next round. Perhaps, given the clear evaluation criteria, which focuses more on the content and delivery of the pitches, as well as the experienced profile of the

judges (professionals in research, academia, and communications), judges were not influenced by the facial attractiveness of the participants.

This research contributes to theoretical implications for conducting research involving assessing the nonverbal behavior or nonverbal expressivity of individuals. The OpenPose technology (Cao et al., 2019) used in Study 2 is a powerful method to control for differences in nonverbal behavior between individuals, as it masks the physical appearance and gender of the target, revealing only the nonverbal behavior of individuals. I collected ratings of nonverbal behavior from human coders who could observe the regular videos with no sound and compared them to the ratings of a blind coding panel. Results revealed that the human coders were influenced by the doctoral student gender and verbal charismatic tactics.

Although Study 1 and Study 2 provide evidence to support our hypothesis, there are several limitations that should be considered. I had missing data in Study 2, which could have introduced bias in our results. Furthermore, OpenPose technology did not capture the facial expressivity of the students, and I did not control the variations of the vocal tone of the doctoral students. Furthermore, the assessment criteria of the MT180 and 3MT had slight differences.

Despite limitations, this research demonstrated that charismatic signaling is potent not only in leadership, but also for researchers communicating their findings to the wider public. Future research could address the mechanisms of this effect of charisma and investigate whether the use of charismatic signaling by academic instructors could lead to more positive learning outcomes for students.

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Tables and Figures

Table 1

Study 1: Correlation Matrix of Key Variables

Variables	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.
1. Semi-final	.16	.37	-						
2. Coder A	9.62	3.83	.13	-					
3. Coder B	7.11	3.13	.17*	.68***	-				
4. Coder C	6.87	3.32	.21**	.67***	.64***	-			
5. Sentences	31.59	6.44	.11	.48***	.36***	.44***	-		
6. Attractiveness	3.93	0.69	.05	.09	.10	.10	.07	-	
7. Gender (female)	.56	.50	-.04	-.06	-.00	-.01	-.09	.14*	-

Note. $N = 218$.

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

Table 2*Study 1: Estimates Predicting Reaching the Next Round*

Variables	(1) Semi- final	(2) Semi- final	(3) Semi- final	(4) Semi- final
Sentences	0.01** (2.97)	0.00 (0.15)	-0.00 (-0.06)	0.00 (0.13)
Attractiveness	-0.00 (-0.03)	-0.02 (-0.48)	-0.03 (-0.57)	
Gender (female)	-0.00 (-0.06)	-0.00 (-0.04)	-0.03 (-0.63)	
Faculty effects	Excl.	Excl.	Incl.	Excl.
Verbal charisma (instrumented)		0.03* (2.56)	0.03** (2.95)	0.03* (2.45)
Constant	-0.13 (-0.79)	-0.08 (-0.49)	0.05 (0.26)	-0.15 (-1.68)
Overall R-squared	0.01	0.02	0.06	0.02

Note. $N = 218$; Model 1 is a linear model with fixed effects of the universities, showing robust t -statistics in parentheses. Models 2, 3, and 4 are instrumental variable two-stage least square models for panel data, showing robust Z statistics in parentheses.

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

Table 3*Study 2: Correlation Matrix of Key Variables*

Variables	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Final	.12	.33	-									
2. Arm gestures	3.66	0.71	.22***	-								
3. Body gestures	2.94	0.68	.35***	.79***	-							
4. Nonverbal charisma	3.30	0.66	.30***	.95***	.94***	-						
5. Verbal charisma	11.97	3.63	.02	.12	.05	.09	-					
6. Sentences	22.34	4.47	-.05	.02	.02	.02	.55***	-				
7. Attractiveness	4.64	1.14	.12	.08	.05	.07	-.06	.03	-			
8. Gender (female)	0.63	0.48	-.03	-.07	.00	-.04	-.05	.07	.34***	-		
9. Perceived weight	3.07	0.52	-.08	-.07	-.08	-.08	-.16*	-.06	-.23***	.03	-	
10. Wearing glasses	.23	.42	-.05	-.05	-.03	-.04	-.02	-.02	-.21**	-.06	.08	-
11. Wearing red	.10	.30	-.04	.06	.07	.07	-.04	.05	.01	.14*	.01	-.05
12. Text on slide	1.90	0.77	.10	-.06	.01	-.03	-.08	-.01	-.03	.03	.04	-.01
13. Images on slide	2.69	0.72	.09	-.05	.03	-.01	-.07	-.04	-.10	.01	.02	.03
14. Colors on slide	1.84	0.48	.10	-.01	.05	.02	-.05	-.03	-.08	.01	.05	.00
15. Hometown final	.04	.19	-.07	.06	-.02	.02	.01	-.05	-.01	.11	.09	.00

Note. *N* = 237* $p < .05$. ** $p < .01$. *** $p < .001$.

Study 2: Correlation Matrix of Key Variables

Variables	<i>M</i>	<i>SD</i>	11.	12.	13.	14.	15.
1. Final	.12	.33					
2. Arm gestures	3.66	0.71					
3. Body gestures	2.94	0.68					
4. Nonverbal charisma	3.30	0.66					
5. Verbal charisma	11.97	3.63					
6. Sentences	22.34	4.47					
7. Attractiveness	4.64	1.14					
8. Gender (female)	0.63	0.48					
9. Perceived weight	3.07	0.52					
10. Wearing glasses	.23	.42					
11. Wearing red	.10	.30	-				
12. Text on slide	1.90	0.77	-.06	-			
13. Images on slide	2.69	0.72	-.03	.22***	-		
14. Colors on slide	1.84	0.48	-.12	.44***	.79***	-	
15. Hometown final	.04	.19	.01	.05	.02	.07	-

Note. $N = 237$.

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

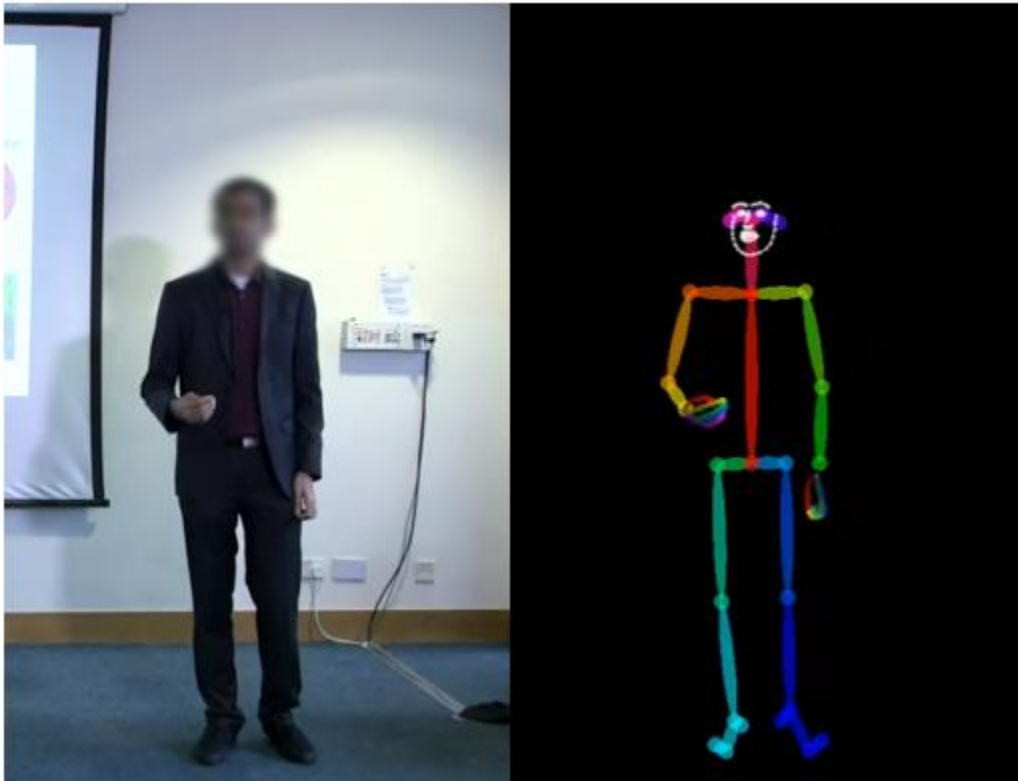
Table 4*Study 2: Estimates Predicting Reaching the Final*

Variables	(1) Final	(2) Final	(3) Final	(4) Final	(5) Final
Sentences	-0.01 (-0.96)	-0.01 (-1.28)	-0.01 (-1.75)	-0.01 (-1.00)	-0.01 (-1.39)
Gender (female)	-0.13* (-2.02)	-0.12 (-1.84)	-0.15* (-2.18)		
Attractiveness	0.06* (2.41)	0.06* (2.12)	0.07* (2.36)		
Perceived weight	0.01 (0.16)	0.03 (0.47)	0.04 (0.74)		
Wearing glasses	-0.09 (-1.47)	-0.08 (-1.23)	-0.09 (-1.51)		
Wearing red	-0.12 (-1.24)	-0.11 (-1.13)	-0.09 (-0.98)		
Hometown final	-0.01 (-0.07)	-0.02 (-0.15)	0.06 (0.45)		
Year effects	Incl.	Incl.	Incl.	Excl.	Excl.
Ethnicity effects	Incl.	Incl.	Incl.	Excl.	Excl.
Faculty effects	Incl.	Incl.	Incl.	Excl.	Excl.
Nonverbal charisma		0.09 (1.56)		0.10* (2.26)	
Verbal charisma		0.01 (1.43)	0.01* (2.06)	0.00 (0.60)	0.01 (1.08)
Arm gestures			-0.13* (-2.02)		-0.10 (-1.78)
Body gestures			0.23** (3.39)		0.22** (3.27)
Constant	-0.31 (-0.88)	-0.71* (-1.79)	-0.60 (-1.56)	-0.12 (-0.60)	-0.02 (-0.11)
R-squared	0.18	0.21	0.25	0.04	0.09

Note. $N = 237$. Robust t -statistics in parentheses. All controls are included in models 1, 2, and

3. All models control for fixed effects of the universities, including singletons.

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

Figure 1*Study 2: Demonstration of an OpenPose Video Transformation*

Note. This is a demonstration of a participant and the extracted nonverbal movement using the Open Pose action detection technology.

Footnotes

¹Note, we measured nonverbal signaling in Study 2 using human coding and what should be a bias-free human coding (using stick figures to represent body movements of pitchers).

Because this procedure is costly to undertake, and because we were not aware of this procedure, we chose to not include body language for Study 1.

²Two trained human coders rated all the videos without sound. Furthermore, a panel of coders rated the faceless, genderless avatar videos generated from contestant videos using Open Pose.

To test whether the human coders or the coding panel were subject to bias (e.g., gender, attractiveness, weight) or were influenced by the verbal tactics, we conducted a multivariate regression, regressing the panel's ratings of the arm gestures, body gestures, the resulting nonverbal tactics, the trained coders ratings of the facial expressivity, body gestures, and the resulting nonverbal tactics on the perceived attractiveness of the contestants, their gender, perceived weight, whether they had glasses, the verbal tactics, number of sentences, ethnicity, and the university (Table 5). The trained human coders' ratings of the facial expressivity were significantly affected by the gender of the participant (Model 4; $B = 0.73$, $p < .001$) and the verbal charismatic tactics (Model 4; $B = 0.08$, $p = .002$). As a result, the nonverbal tactics resulting from the ratings of the human coders was affected by the participant gender (Model 6; $B = 0.31$, $p = .048$) and verbal charismatic tactics (Model 6; $B = 0.06$, $p = .007$).

Furthermore, we conducted a test of the slopes of attractiveness, gender, perceived weight, glasses, verbal tactics, sentences, and ethnicity, to see whether it significantly differed from 0. The test results revealed that there was no bias in the blind coding panel ratings of the arm gestures, $F(12, 148) = 0.83$, $p = .623$, body gestures, $F(12, 148) = 0.50$, $p = .914$, or the resulting rating of nonverbal tactics, $F(12, 148) = 0.57$, $p = .865$. Concerning

the human raters, bias was detected in the ratings of the facial expressiveness, $F(12, 148) = 3.16$, $p < .001$, but not in the body gestures, $F(12, 148) = 1.23$, $p = .270$. Bias was detected in the resulting rating of the nonverbal tactics by the human coders, $F(12, 148) = 1.96$, $p = .031$.

Table 5*Nonverbal Tactics: Blind Coding Panel vs. Human Coders*

Variables	(1) Arm gestures	(2) Body gestures	(3) Nonverbal charisma	(4) Facial expressions	(5) Body gestures	(6) Nonverbal charisma
Attractiveness	0.11 (1.97)	0.06 (1.14)	0.08 (1.66)	-0.05 (-0.58)	0.15 (1.88)	0.05 (0.66)
Gender (female)	-0.15 (-1.21)	0.03 (0.27)	-0.06 (-0.53)	0.73*** (4.07)	-0.12 (-0.72)	0.31* (2.00)
Perceived weight	-0.02 (-0.21)	-0.07 (-0.74)	-0.05 (-0.49)	-0.26 (-1.66)	-0.04 (-0.29)	-0.14 (-1.05)
Glasses	-0.12 (-0.90)	-0.02 (-0.20)	-0.07 (-0.59)	-0.03 (-0.14)	-0.21 (-1.15)	-0.12 (-0.72)
Verbal tactics	0.03 (1.74)	0.01 (0.57)	0.02 (1.25)	0.08** (3.10)	0.04 (1.70)	0.06** (2.74)
Sentences	-0.02 (-1.14)	-0.00 (-0.19)	-0.01 (-0.73)	-0.00 (-0.01)	-0.00 (-0.21)	-0.00 (-0.14)
Constant	3.25*** (3.96)	2.82*** (3.75)	3.03*** (4.07)	2.35 (1.95)	2.26* (2.00)	2.27* (2.18)
Ethnicity effects	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
University effects	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
R-squared	0.48	0.50	0.49	0.49	0.46	0.49

Note. $N = 229$. Eight observations were missing from human coders. Multivariate regression

t -statistics are in the parentheses; in models 1, 2, and 3 raters coded the video of the figure developed by OpenPose. In models 4, 5, and 6 two trained coders watched videos of the contestants with no sound.

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

Gendered Language in Entrepreneurial Pitching

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Abstract

Women entrepreneurs raise less venture funding than do men, in part due to a backlash effect: Their agentic professional role seems incongruent with their communal gender role. This paper investigates whether using a gendered charisma style in entrepreneurial pitches influences the perceived market potential of the ventures. We investigate whether combining charisma and gendered pitch styles influences potential funding (Studies 1 and 2), and if individuals naturally use gendered speech styles in managerial discourse (Study 3).

In Study 1, 551 online participants were randomly assigned to read an entrepreneurial pitch by either a woman or man entrepreneur written in a non-charismatic, charismatic gender-neutral, gender-incongruent, or gender-congruent style. In Study 2, 560 online participants watched a 10-second video of the face of a woman or man and then read a pitch. In Study 3, 308 university students, wrote motivational speeches in French using charismatic signaling tactics, which were then rated by a coding panel for perceived femininity.

There was no difference between the non-charismatic and charismatic gender-neutral style for entrepreneurs in Studies 1 and 2. In Study 1, the charismatic gender-congruent style led to lower perceived market potential for entrepreneurs. In Study 2, there was no such effect. In Study 3, metaphors in speeches of women and men participants were not judged differently in terms of perceived femininity.

The findings of Studies 1 and 2 suggest that using charisma does not influence perceived market potential of the venture. Furthermore, the genderedness of the pitch did not influence perceived market potential. Our studies might not have yielded significant results due to their low information content (e.g., use of text and not combining verbal and nonverbal behaviour, either live or over video recordings).

Keywords: entrepreneurial pitches, charisma, gender role congruence, women entrepreneurs, pitching

Gendered Language in Entrepreneurial Pitching

Entrepreneurship is a major contributor to the global economy, job creation, and innovation. However, not all entrepreneurs are treated equally. Men typically raise more venture funding than do women (Greene et al., 2001). For example, early-stage startups led by women face more hurdles in obtaining financing than do startups headed by men (Ewens & Townsend, 2020). Identical pitches are judged to be more fact-based and logical when pitched by men (Brooks et al., 2014), and women systematically receive more prevention focused questions (e.g., how they will retain customers rather than grow their sales) during pitch competitions than do men (Kanze et al., 2018), which results in lower funding.

We set out to test whether using charisma in an entrepreneurial pitch could influence the perceived market potential of a venture but with a twist: We examine whether pitches using metaphors (a charismatic tactic) that are stylistically congruent with the gender of the entrepreneur result in higher perceived market potential of the venture. If using charisma attenuates the gender differences in perceived market potential of the venture, then teaching women entrepreneurs to use it in their pitches would be beneficial for them. In the same vein, if gender-congruent metaphors in the entrepreneurial pitch combined with other charismatic tactics can help women by reducing potential backlash effects (Rudman & Glick, 2001), may help level the gender gap in entrepreneurial outcomes.

Besides knowing the effects of charisma and gender-congruency in entrepreneurial pitches on the perceived market potential, knowing whether women and men differ in the genderedness of the metaphors they naturally use in motivational pitches may also be important. If, for instance, women tend to naturally use male-gendered (gender-incongruent) metaphors, but it is gender-congruent metaphors that bring more investment, there is a clear need to train women entrepreneurs in using female-gendered metaphors.

We therefore first set out to test whether charisma and/or gender-congruity of the metaphors used in an entrepreneurial pitch affect funding outcomes and whether the benefit is the same for women and men (Studies 1 and 2); we then see whether women and men differ in their natural use of gendered metaphors (Study 3).

Entrepreneurship, Gender, and Venture Funding

Women entrepreneurs obtain less funding than men entrepreneurs (Brooks et al., 2014; Carter & Rosa, 1998; Greene et al., 2001); identical entrepreneurial pitches are judged as more persuasive, logical, and fact-based when presented by a man entrepreneur rather than a woman entrepreneur (Brooks et al., 2014). The way entrepreneurs are described by investors also differs based on gender (Malmström et al., 2017). These results can be explained by the fact that characteristics attributed to men highly correlate with characteristics attributed to entrepreneurs (Gupta et al., 2009). Entrepreneurship is considered a stereotypically male profession (Bird & Brush, 2002; Bruni et al., 2004). To illustrate, Malmström et al. (2017) conducted an analysis of 125 applications for a Governmental Venture Capital (VC) funding project in Sweden. Despite there being no distinct gender differences in the application quality, the committee of VCs described women entrepreneurs in more communal terms: 56 % of the attributes used to describe the women entrepreneurs were communal attributes (e.g., requiring support). The candidates who were men had their agentic attributes (e.g., being assertive) underpinned and were referred to in a more positive light. Moreover, when the entrepreneurial team was comprised of a woman and a man, the VCs described the woman as being a “complement” to the man (Malmström et al., 2017, p. 15). This seemed to have a direct impact on the funding as men entrepreneurs received 52% of the amount demanded, while women entrepreneurs only received 25% of the amount demanded, despite the initial demands being smaller (Malmström et al., 2017).

Because being an entrepreneur is typically more associated with being a man (Ahl, 2006; Alsos & Ljunggren, 2017), the perceived incongruity of women entrepreneurs might negatively impact their funding prospects (Lee & Huang, 2018; Malmström et al., 2020). This process may work similarly as it does with women managers who are perceived to have a “lack of fit” (Heilman, 1983) from which they are likely to face backlash (Heilman et al., 2004; Heilman & Okimoto, 2007). Entrepreneurs are perceived as having predominantly masculine and not feminine characteristics (Gupta et al., 2009). That is, women entrepreneurs may be less favorably evaluated because they do not fit the agentic expectations people have for entrepreneurs. Given that the venture funding, especially in the early stages, depends on positive assessments of the entrepreneur by investors (Huang & Pearce, 2015), women entrepreneurs may be at a disadvantage. The lack of fit of women in the entrepreneurship field may lead to negative assessments of women entrepreneurs, which then can negatively impact funding (Lee & Huang, 2018) and hence putting the success of female-led ventures at risk.

Specifically, there is a common assumption amongst investors (e.g., angel investors or VCs) that women entrepreneurs consistently underperform compared to their male counterparts. On an aggregate level, women-led firms appear to be less profitable than firms led by men, nevertheless, when conducting a multivariate regression, controlling for industry, type of business, size, growth prospect, growth propensity, existence of a credit line, and whether the firm was working at its full capacity, female-led firms tend to perform at the same level as male-led firms in terms of profitability, employment growth, and numbers of orders, except for real sales growth (Du Rietz & Henrekson, 2000). Nonetheless, the misperception persists.

A hypothetical way to overcome this lack of fit for women entrepreneurs might be to adapt their behavior according to the expectations of the entrepreneurial role. Research shows

that entrepreneurs adopting certain styles of nonverbal (Balachandra et al., 2019; Clarke et al., 2018) or verbal behavior (Kanze et al., 2018) in the context of an entrepreneurial pitch, are more successful with respect to funding outcomes. For example, within the framework of the regulatory focus theory (Higgins, 2012), promotion-oriented behaviors in entrepreneurship would emphasize the growth of the venture and prevention-oriented behaviors would emphasize not losing capital (Brockner et al., 2004). The association individuals make for men entrepreneurs (promotion orientation) and women entrepreneurs (prevention orientation) is linked to VCs to typically ask promotion-oriented questions mostly to men entrepreneurs and prevention-oriented questions to women entrepreneurs (Kanze et al., 2018). The type of questions and replies in either the promotion or prevention focus, significantly impact the fundraising success of entrepreneurs (Kanze et al., 2018). Women were typically asked prevention-oriented questions, which was linked to raising \$2.3 million in funding, whereas men were typically asked promotion-oriented questions, was linked to raising \$16.8 million in funding (Kanze et al., 2018). Nevertheless, when answering these questions in a promotion-focused way, women entrepreneurs managed to increase the amount raised up to \$7.9 million.

In terms of nonverbal behavior, research shows that masculine nonverbal behavior had a positive influence on the way entrepreneurs are evaluated (Balachandra et al., 2019): In an entrepreneurial competition in a North American university, women and men entrepreneurs who showed feminine nonverbal behaviors (i.e., being jovial, warm, sensitive, and expressive) during the entrepreneurial pitch were perceived as being less competent, less prepared, and as being weaker leaders and were less likely to be selected as finalists in the competition. Masculine behaviors (i.e., being forceful, dominant, and assertive) during the pitch were beneficial for both women and men entrepreneurs. This research shows that

adopting male-typical nonverbal behavior is beneficial for women entrepreneurs and can potentially overcome the lack of fit for women entrepreneurs.

However, there is also research showing that male-gendered language (e.g., linked to power, achievement, work) was not directly linked to success in the pitching competition (Balachandra et al., 2021): Elements of male-gendered language, such as items connected to “inspiration” were positively associated with success, items connected to “work” were negatively associated with success. Female-gendered language items about “ambivalence” were also negatively associated to success in the pitching competitions. Thus, it is not possible to say that there is a clear-cut relationship between a male-gendered language style and success in entrepreneurship.

Women entrepreneurs using a masculine communication style might also be perceived by investors as having a lack of fit between the communication style and the gender of the entrepreneur. Integrating female-gendered themes into entrepreneurial discourse of women entrepreneurs might increase the role congruity and thus reduce lack of fit and thus backlash. To illustrate, on crowdfunding platforms, women entrepreneurs typically use more language associated with positive emotions (e.g., optimism) and inclusion (i.e., implying a direct connection between the crowdfunders and the project) than do men entrepreneurs (Gorbatai & Nelson, 2015). These language styles, coincide with prosocial language (Pietraszkiewicz et al., 2017) and both language types have been linked to higher success in crowdfunding campaigns (Gorbatai & Nelson, 2015).

In the present research, we plan to investigate whether integrating charisma in entrepreneurial pitching can influence the outcomes about *the perceived market potential of the venture* for both women and men entrepreneurs. The perceived market potential of the venture is to what extent investors coordinate their actions (i.e., the investment) with the other stakeholders (e.g., other investors, consumers, the entrepreneur; Mehta et al., 1994).

Research has shown that the charisma of CEOs is positively associated to the market value of companies in case of ambiguous performance measures (Tosi et al., 2004), which is similar to early-stage entrepreneurship when future performance is uncertain. Further, we analyze whether including gendered themes incorporated in the pitch through charisma will have a different impact on perceived market potential of the venture for women and men entrepreneurs.

Entrepreneurial Pitch and Charisma

Charismatic leadership was first described as a supernatural quality (Weber, 1947), then as a leadership style associated with carefully crafting of an idealized vision of the future (Conger & Kanungo, 1987) and communicating important values (Shamir et al., 1993). Charisma used by leaders could be defined as “values-based, symbolic, emotion-laden leader signaling” (Antonakis et al., 2016, p. 304), operationalized via charismatic leadership tactics (CLTs), which can be measured or manipulated: Nine verbal charismatic signaling tactics (e.g., metaphors, similes, or contrasts) and three nonverbal tactics (i.e., animated facial expression, gestures, animated voice; Antonakis et al., 2011).

Indeed, using charisma has a positive association with getting elected as president of the USA or being retained as a CEO (Jacquart & Antonakis, 2015), with impact in social media settings (Tur et al., 2018), on the company share price (Tosi et al., 2004), and impacts employee productivity (Howell & Frost, 1989). Charisma also increases the positive affect towards the leader (Antonakis et al., 2011). Furthermore, leader charisma is as effective as monetary incentives in increasing the work effort of individuals (Antonakis et al., 2021; Meslec et al., 2020). In a field study, researchers asked workers to stuff envelopes for a hospital fundraising campaign (Antonakis et al., 2021). Given the potency of charisma in various domains and the observable economic benefits associated with a leader’s charisma,

we expect that entrepreneurial pitches with charismatic tactics will result in a stronger perceived market potential of the venture.

Hypothesis: Charismatic entrepreneurial pitches will result in a higher perceived market potential of the venture compared to non-charismatic pitches.

Further, are women and men perceived differently in terms of charisma? Typically, women tend to exhibit more nonverbal behaviors linked to charisma (Groves, 2005), and are perceived as more passionate (Eagly et al., 2003). Banks et al. (2017) investigated whether women were perceived as more charismatic given that they express themselves using more emotions: The researchers found little support to their hypothesis that women were perceived as more charismatic, and suggested that implicit leader prototypes (Lord et al., 2001) might be responsible for women not being perceived as charismatic leaders, a stereotypically agentic role (Schein & Davidson, 1993). Nevertheless, there is a current call for research to investigate the interaction between charisma and gender (Banks et al., 2017).

In the present research we address the effectiveness of charisma for women and men entrepreneurs. There is a dearth of studies comparing how the same charismatic versus a non-charismatic speech is perceived depending on whether it is given by a woman or a man whether in a managerial or the entrepreneurial setting. It is possible that given the benefits associated with charisma (Michel et al., 2013), that the charismatic leader is perceived as warmer, which could attenuate the current gender funding gap. However, considering that women are not perceived as more transformational leaders, despite exhibiting the qualities of transformational leaders more often than men, it remains unclear whether entrepreneur charisma will interact with entrepreneur gender, attenuating the perceived market potential. This question we will address in Studies 1 and 2.

RQ1: Is the gender difference in perceived market potential of the venture attenuated when using charismatic versus non-charismatic entrepreneurial pitches?

Furthermore, in the present study we investigate gender-congruent and incongruent themes that have been elaborated by using charismatic tactics, such as metaphors. Researchers suggest that women in agentic roles (e.g., managers) are perceived as having a communality deficit (Heilman & Okimoto, 2007): Society perceives that given that they succeed in their agentic role, they underperform in their communal role. Thus, one can argue that women entrepreneurs are in a double bind. On one hand they must demonstrate their agency to satisfy perceptions necessary for entrepreneurship, while on the other hand they must also show that they fulfil their communal gender role expectations. We explore whether using charisma (i.e., metaphors) in combination with gender-congruent themes could address the implied communality deficit and thus be beneficial to women entrepreneurs. Indeed, Lee and Huang (2018) found that only women entrepreneurs benefited from increased perceived warmth when using a social impact framing which led to their ventures having an increased perceived business viability. Perhaps using a charismatic gender-congruent theme in the pitch could have a similar effect. However, a gender-congruent theme could also increase the perceived lack of fit between the professional role of the entrepreneur and the social gender role of women. Women professionals who emphasize their communal qualities without thoroughly emphasizing their agentic qualities can be perceived as less agentic and competent (Scott & Brown, 2006), possibly undermining their success in pursuing venture funding, thus it is unclear whether a gender-congruent theme would affect the perceived market potential of the venture positively or negatively. Thus, this leads us to pose a series of research questions that we will address in Studies 1 and 2.

RQ2: Do charismatic gendered themes (congruent and incongruent) in an entrepreneurial pitch by a woman or a man affect the perceived market potential of the venture?

Entrepreneurship and Gendered Language

The differences in how women and men are evaluated and how their ventures are perceived in terms of market potential can stem from the differences in language used in business discourse. In self-descriptions, men use more agentic concepts, whereas women use more communal concepts (Diehl et al., 2004). This difference in expression also seems to distinguish entrepreneurs. On the social media platform Twitter, women entrepreneurs post more content related to a communal role, such as diversity and inclusion (Bendell et al., 2022). Yet, Balachandra et al. (2021) analyzed 185 entrepreneurial pitches for the presence of men or women-gendered language and found that neither women nor men had a prevalence in use of a female- or male-gendered language; however, women used more words related to positive emotions and less words related to negative emotions. On another note, research shows that women increase the level agentic terms used in self-presentations for masculine- versus feminine-framed leadership positions (Pietraszkiewicz et al., 2022). Thus, it is unclear whether there a gender difference in how women and men pitch or give speeches in naturalistic settings. That is, do women use more women-stereotypical metaphors and men more male-stereotypical metaphors? This is the question we address in Study 3.

RQ3: Do women and men naturally use more gendered language in charismatic communication?

Overview of Current Studies

We set out to investigate to what extent using charisma and gender-congruent themes in an entrepreneurial pitch affects the perceived market potential of the venture and whether women entrepreneurs' profit more from using charismatic gender-congruent themes in their

itches than men (Studies 1 and 2). In Study 1, we only use the text of the pitch, whereas in Study 2 we use the pitch in combination with a video of the entrepreneur to analyze how charisma and gender-congruent theme in entrepreneurial pitch affect perceived market potential of the venture. In Study 3, we address whether women and men differ in the genderedness of the metaphors they use in a motivational speech.

Study 1: Charisma and Gender-Congruity in Entrepreneurial Pitches

Method

Participants

We recruited 560 participants (280 women) via the Prolific online platform¹. We selected only participants who were native English speakers and citizens of the United Kingdom, the United States, or Ireland. Participants were randomly assigned to one of the eight experimental conditions and received a fixed payment of £1.50 and a variable payment ranging from £0 to £0.25. We excluded nine participants who failed at least one attention check question (explained below). The final sample consisted thus of 551 participants (274 men, 275 women, 2 other). The average age was 37.00 years ($SD = 13.50$, $range = 18 - 74$). The employment status of the participants was: 45.37% employed full-time, 10.71% employed part-time, 9.80% self-employed, 10.89% unemployed, 10.16% with another type of employment, and 13.07% were still completing their studies.

Procedure

Participants accessed an online questionnaire and after providing informed consent, read the entrepreneurial pitch about the company Foodfix (Appendix A). They were randomly assigned to one of eight different pitches in a 2 (entrepreneur gender: woman vs. man) by 4 (pitch style: non-charismatic, charismatic gender-neutral, charismatic gender-incongruent, charismatic gender-congruent) between subject design (Figure 1). We asked participants to suppose the text was a transcribed entrepreneurial pitch. After reading the

pitch, the participants assessed the perceived market potential of the venture in an incentivized investment task (our main dependent variable).

Furthermore, we measured the participants' hypothetical propensity to invest, how they perceive the entrepreneur in terms of entrepreneurial success, perceived entrepreneur ability to execute, and how they perceive the potential growth of the startup (Appendix B). Participants also reported their perceptions of the entrepreneur's competence, dominance, honesty, and warmth, and reported their socio-demographic information and prior investment experience. Attention check questions were distributed within the questionnaire and served as a basis for exclusion of participants.

Materials

Entrepreneurial Pitches

We wrote four entrepreneurial pitches equivalent in information content and length (Appendix A). The pitch concerned a fictional company "Foodfix" operating in the food delivery industry. The pitch is structured like a business pitch first stating (a) the financing needs, (b) the company mission and the origin story, (c) the service description, and (d) expansion plans. The informational content of the pitches was held constant throughout the experimental conditions.

Gender-Neutrality of the Food Industry. We pretested whether the food industry was perceived as gender neutral. We recruited 100 participants (48 women, 3 other) from the Prolific online platform to complete an online questionnaire. The participants were between 18 and 65 years old, with their modal range being between 35 and 44 years². One participant was excluded for failing an attention check question, leaving us with a final sample of 99 participants with the same age range and modal range. The participants read the non-charismatic pitch about Foodfix and reported their perceptions about the genderedness of "Foodfix" (the company mentioned in the pitch) on a five-point Likert scale from 1

(*completely masculine*) to 5 (*completely feminine*), and whether they spontaneously associated the company with a man, woman, or neither. The results showed that “Foodfix” was considered a gender-neutral company, $t(98) = 1.52, p = .131$ (t -test of the perceived genderedness of “Foodfix” as a company against 3, the midpoint of the scale) and that it was associated with neither women nor men, $\chi^2(2, N = 99) = 44.06, p < .001$ (Chi-2 test comparing whether “Foodfix” was equally associated with women, men, or neither). Further, the United States bureau of labour statistics indicates that the restaurant industry is rather gender neutral with 52% of women workers (Ko et al., 2015).

Genderedness of the Pitch Themes. We first generated a list of topics that we thought were associated more with women, men, or neither. The list comprised thirteen different topics and activities (e.g., taking care of younger siblings, running, or playing the violin). We recruited 101 participants on the Prolific platform, and one participant was excluded due to failing an attention check, leaving us with a final sample of 100 participants (49 women). Their average age was 34.30 years ($SD = 11.93, range = 18 - 75$) completed an online questionnaire to rate to what extent they thought those activities or industries were mostly performed or associated with women or men. Participants were asked: “In your opinion people who work in restaurant kitchens are mostly men or mostly women?”, rated on a continuous scale with the anchors -100 (*mostly women*), 0 (*women and men equally*), and +100 (*mostly men*). We randomized the items, including “mostly women or mostly men” in half of the time.

We conducted a series of t -tests of the average rating of each activity against 0, meaning that the activity was conducted by women and men equally. Results not significantly different from 0 would mean the activity was perceived as conducted equally by both genders, significantly greater than 0 meant that it was mostly conducted by men, and significantly smaller than 0 meant it was mostly conducted by women. The results of this

pretest revealed that taking exams, running, going to school, and taking public transport, such as the metro were performed or associated with neither women nor men. Climbing mountains, suffering from avalanches, and working in a restaurant kitchen were perceived as mostly performed by men. The story of Cinderella, taking care of household chores, taking care of siblings, playing the violin, waiting in the queue, and swimming were perceived as actions or themes mostly performed by or associated with women. The means, standard deviations, and results of the *t*-tests are in Table 1.

Manipulation Checks for Pitches. We then produced one non-charismatic gender-neutral pitch, three charismatic gender-neutral pitches (i.e., running, taking exams, taking the underground), one male-gendered pitch (i.e., climbing up a harsh mountain), and one women-gendered pitch (i.e., house-hold chores and Cinderella) using the topics in the previous test as the basis for the metaphors in the charismatic pitches. For the gendered pitches we selected the topics that were associated the most with women or men respectively.

To test whether the pitches were perceived in the intended way, we recruited 561 participants from the Prolific platform and 10 participants were excluded (six based on failed attention checks and four based on not indicating their gender). The final sample consisted of 555 participants (275 men, 276 women, and 4 other). Their average age was 36.88 years ($SD = 13.55$, $range = 18 - 77$). Participants logged into an online questionnaire and after reading the informed consent they were randomly assigned to read one of the six pitches. The name or gender of the entrepreneur was not revealed in the pitch. Participants then reported their opinions of the perceived genderedness rated on a five-point Likert scale from 1 (*completely masculine*) to 5 (*completely feminine*), answered to an incentivized measure of charisma (Jensen et al., 2021), where the participants had to guess how others would perceive the pitch with respect to charisma, measured on a five-point scale from 1 (*very non-charismatic*) to 5 (*charismatic*), and answered scales about the leader prototypicality of the speaker (GLI;

Cronshaw & Lord, 1987), measured on a five-point scale from 1 (*not at all*) to 5 (*very much*), and the multifactor leadership questionnaire (MLQ; Bass & Avolio, 1995), measured on a five-point scale from 1 (*not at all*) to 5 (*frequently if not always*).

The male-gendered pitch was perceived as more masculine ($M = 2.46$, $SD = 0.74$), than the female-gendered pitch ($M = 2.70$, $SD = 0.86$), $t(135) = -1.74$, $p = .042$. Also, the male-gendered ($M = 3.79$, $SD = 0.70$) and female-gendered ($M = 3.91$, $SD = 0.54$) pitches did not differ in perceived charisma, $t(135) = -1.12$, $p = .267$, or the composite measure of charisma ($M = 3.62$, $SD = 0.55$, $M = 3.57$, $SD = 0.63$; female and male-gendered pitches respectively), $t(135) = -0.42$, $p = .674$. These are the important manipulation checks, because our main hypothesis predicts that gender-congruent pitches attract more investment and focuses thus on the charismatic female and male-gendered pitches.

Moreover, the non-charismatic pitch was perceived as less charismatic ($M = 3.43$, $SD = 0.85$) than the charismatic gender-neutral pitch about taking public transport ($M = 3.78$, $SD = 0.65$, $t(139) = -2.69$, $p = .008$), the charismatic male-gendered pitch ($M = 3.79$, $SD = 0.70$, $t(139) = -2.70$, $p = .008$), and the charismatic female-gendered pitch ($M = 3.91$, $SD = 0.54$, $t(136) = -3.96$, $p < .001$).

We created a composite variable from incentivized measure of charisma, the GLI, and the MLQ, (across conditions $M = 3.52$, $SD = 0.68$, $\alpha = .826$). Using the composite measure, the non-charismatic pitch was perceived as less charismatic ($M = 3.29$, $SD = 0.76$) than the charismatic gender-neutral pitch about taking public transport ($M = 3.56$, $SD = 0.66$, $t(139) = -2.25$, $p = .026$), the charismatic male-gendered pitch ($M = 3.57$, $SD = 0.63$, $t(139) = -2.40$, $p = .018$), and the charismatic female-gendered pitch ($M = 3.62$, $SD = 0.55$, $t(136) = -2.92$, $p = .004$).

The charismatic gender-neutral pitch about taking public transport ($M = 3.78$, $SD = 0.65$) was not significantly different in perceived charisma from the charismatic male-

gendered pitch ($M = 3.79$, $SD = 0.70$, $t(138) = -0.14$, $p = .887$), or the charismatic female-gendered pitch ($M = 3.91$, $SD = 0.54$, $t(139) = -1.34$, $p = .183$). When using the composite variable the results were the charismatic gender-neutral pitch about taking public transport ($M = 3.56$, $SD = 0.66$) was not significantly different in perceived charisma from the charismatic male-gendered pitch ($M = 3.57$, $SD = 0.63$, $t(138) = -0.15$, $p = .877$), or the charismatic female-gendered pitch ($M = 3.62$, $SD = 0.55$, $t(139) = -0.43$, $p = .666$).

The other charismatic gender-neutral pitches were perceived as charismatic as the non-charismatic pitch, so we discard them to ensure a strong manipulation.

Manipulation of Entrepreneur Gender. To manipulate the entrepreneur gender, the entrepreneur introduces him or herself with a man's or woman's name in the beginning of the text pitch. We used two man-woman name pairs (i.e., Brian vs. Karen, Jack vs. Jane) that were matched in terms of perceived age, attractiveness, and competence (Kasof, 1993).

Measures

Perceived Market Potential of the Venture

We used a one-item incentivized decision task based on the coordination game (Mehta et al., 1994) and on the incentivized measure developed by Jensen and colleagues (2021). We asked the participants to imagine that they are investors and then assess Foodfix as an investment opportunity from 1 (*very bad investment*) to 5 (*very good investment*). We also informed them that they had the opportunity to earn £0.25 if their answer was within 0.5 point of the condition average, and £0.10 if their answer was within 1 point of the condition average. A higher score meant that Foodfix was perceived as having more market potential as it would be perceived as a better investment by others (across conditions $M = 3.41$, $SD = 0.83$). This task did not directly assess the willingness to invest of the participants, but the overall assessment of whether others would find Foodfix as having a strong market potential and being a good investment opportunity or not, we used this task because it has less demand

characteristics (not being simply a self-report measure) for it being an incentivized measure and it mirrors quite well the thought process involved when making investment decisions (Jensen et al., 2021; Khademi et al., 2021; Lonati et al., 2018). This process mirrors the thought process of investors, when they must consider the opinions of other stakeholders involved in the process, such as other investors, potential consumers, and the entrepreneurs themselves, and thus predict the market potential of the venture. To complete the incentivized measure, we additionally used a series of self-report measures (Appendix B).

Attention Checks

To identify whether the participants were paying attention to instructions when completing the questionnaire, three attention check items were included. A sample item is, “Please select agree” on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). The responses to the items served as an exclusion criterion for the participants. As a result, we excluded nine participants who failed to answer at least one of the three attention check questions.

Socio-Demographic Variables and Past Experiences

We collected information about the age, gender, education, and professional status of the participants, because research has shown that age and gender could influence investment behavior (Bajtelsmit & Bernasek, 1997; Korniotis & Kumar, 2011). Further, using one item per question, we collected information about whether they had previous work experience in the food delivery business ($M = 1.35$, $SD = 0.72$), food industry in general ($M = 1.82$, $SD = 1.08$), in investing in business ($M = 1.58$, $SD = 0.95$), or in financial investing ($M = 1.75$, $SD = 1.00$), all means and standard deviations are calculated across conditions. The participants were asked: “Do you have previous experience in the food delivery business?”, rated on a five-point Likert scale from 1 (*no experience at all*) to 5 (*very strong experience*). Given that previous experience in investing (i.e., business, financial) could influence how the

participants reacted to the incentivized measure (Kaustia & Knüpfer, 2008). These items served as control variables in our data analysis.

Results

We only present the results pertaining to our main dependent variable, the perceived market potential of the venture. The results concerning the other dependent variables (i.e., propensity to invest, perceived entrepreneurial success, perceived entrepreneur ability to execute, perceived company growth, perceived personality of the entrepreneur) are in Appendix B.

To test the hypothesis of whether charismatic entrepreneurial pitches would result in a higher perceived market potential of the venture, we regressed the pitch style (non-charismatic, charismatic gender-neutral) on the perceived market potential of the venture (Table 2)². The regression results (Table 2) showed that the effect of the charismatic gender-neutral style was not significant ($B = 0.05$, $p = .590$), and this result remained robust when including covariates ($B = 0.06$, $p = .537$). In this context, using charismatic tactics in a gender-neutral text pitch did not increase the perceived market potential of Foodfix, thus we failed to reject the null hypothesis of no difference.

Is the gender difference in the perceived market potential of the venture attenuated when using charismatic versus non-charismatic entrepreneurial pitches? To answer research question 1, we regressed the pitch style (non-charismatic, charismatic gender-neutral) and the entrepreneur gender (woman vs. man) on the perceived market potential (Table 3). Results showed no such gender gap in perceived market potential of the venture ($B = -0.02$, $p = .849$), which was robust to covariates ($B = -0.01$, $p = .910$); on average, men entrepreneurs ($M = 3.47$, $SD = 0.80$) elicited comparable levels of perceived market potential of the venture as compared to women entrepreneurs ($M = 3.45$, $SD = 0.80$), contrary to finding in the literature (Greene et al., 2003). Furthermore, there was no interaction effect between charisma and the

entrepreneur gender ($B = 0.12, p = .532$); again, adding the covariates did not alter inference ($B = 0.12, p = .547$). Charisma did not attenuate the perceived market potential of the venture gender gap, as the gap was not present.

Do charismatic gendered themes affect the perceived market potential of the venture? To answer research question 2, we regressed the different pitch styles (charismatic gender-congruent, charismatic gender-incongruent) on the perceived market potential of the venture (Table 4). Results show a significant effect of the charismatic gender-congruent style ($B = -0.28, p = .006$), again robust to covariates ($B = -0.26, p = .010$). Surprisingly, gender-congruent pitches ($M = 3.22, SD = 0.90$) resulted in a lower perceived market potential of the venture compared to gender-incongruent pitches ($M = 3.51, SD = 0.80$; Figure 2).

How does pitching in a charismatic gender-congruent style affect the perceived market potential of the venture and is the effect different for women and men entrepreneurs? To answer research question 3, we regressed the entrepreneur gender (women vs. men) and the different pitch styles (charismatic gender-congruent, charismatic gender-incongruent) on the perceived market potential of the venture (Table 5). Results show a significant effect of the charismatic gender-congruent ($B = -0.28, p = .006$), which was robust to covariates ($B = -0.26, p = .011$). There was no interaction between entrepreneur gender and the gendered pitch style ($B = 0.05, p = .810$), whether or not we included covariates ($B = 0.04, p = .848$): Gender-congruent pitches resulted in a lower perceived market potential of the venture compared to gender-incongruent pitches for both women and men entrepreneurs (Figure 2).

In an exploratory manner, we investigated the effect of gendered pitches compared to the gender-neutral pitches. What perceived market potential would the gendered pitch elicit compared to the gender-neutral pitches? We regressed the pitch style (non-charismatic, charismatic gender-neutral, charismatic gender-incongruent, charismatic gender-congruent) and the entrepreneur gender on the perceived market potential (Table 6). Charismatic gender-

congruent pitches led to a lower perceived market potential ($B = -0.21, p = .044$). The mean perceived market potential of charismatic gender-congruent pitches ($M = 3.23, SD = 0.90$) was significantly lower than the combined mean ($M = 3.47, SD = 0.80$) of the charismatic gender-incongruent, charismatic gender-neutral, and non-charismatic gender-neutral pitches, $F(1, 546) = 8.33, p = .004$ (Figure 3).

Discussion

We aimed at investigating the effects of using charisma and specifically charismatic gendered entrepreneurial pitches on the perceived market potential of the venture and whether this effect would be the same for women and men entrepreneurs. Results showed that charisma did not affect the perceived market potential, neither for women nor for men entrepreneurs. Using a gender-congruent text-only pitch hurt the perceived market potential of the venture compared using a gender-incongruent pitch for women and men entrepreneurs.

Contrary to what we expected for charisma, it did not affect the perceived market potential of the venture, although we know that the texts objectively differed in the number of charismatic tactics and were also perceived differently in terms of charisma—the charismatic pitch was perceived as more charismatic than was the non-charismatic pitch. Perhaps participants were cognitively overloaded by trying to deduce what others were thinking in terms of the perceived market potential of the venture, which overrode the impact of charisma.

Another explanation of the lack of results is that the differences in perceived charisma and perceived genderedness of the entrepreneurial pitches were very small, despite being perceived as significant. It is possible that the small difference in the stimulus material also contributed to not having significant results; future manipulations should be stronger. Perhaps too, our information content regarding the venture per se was so similar, that rationally, the

participants just focused on that aspect of the objective information and ignored the stylistic delivery, the charisma tactics.

Research shows that displaying communion without intentionally displaying agency can disadvantage women professionals and lead them to be assumed having less agency than men, being perceived as less competent, and less leader like (Scott & Brown, 2006; Zheng et al., 2018). Metaphors used in the female-gendered pitch could have been perceived as communal and lacking in agency, leading to a decreased perceived market potential for the venture. Perhaps introducing a metaphor that would blend agency and communion (Kark et al., 2012; Zheng et al., 2018), showing communal behavioral aspects, but focusing on themes related to the business and not household chores like in the existing study would have led to different results for female entrepreneurs.

That the gender-congruent pitch resulted in a lesser perceived market potential of the venture probably resulted from the possibility perceivers did not find the text very interesting: It simply confirmed their stereotypical beliefs about women and men entrepreneurs and that was perceived most likely as uninspired or dull, not demonstrating innovative thinking so sought out in entrepreneurs (Ahlin et al., 2014).

To see whether we can replicate those results in a setting that is closer to the real world setting of entrepreneurial pitching, we added a video of the entrepreneur to the written pitches in Study 2. Because video pitches are more common (Brooks et al., 2014; Clarke et al., 2018), we surmised it would enhance ecological realism (Lonati et al., 2018).

Study 2: Charisma and Gender-Congruity in Entrepreneurial Pitches

Method

Participants

We recruited 560 participants (280 women) from the Prolific online platform. Their average age was 40.32 years ($SD = 13.65$, $range = 18 - 80$). We selected participants who

were native English speakers and citizens of the United Kingdom, the United States, or Ireland. Participants were randomly assigned to one of the eight experimental conditions. The participants received a fixed payment of £1.20 and a variable payment ranging from £0 to £0.50. No participants were excluded. The employment status of the participants was: 49.82% employed full-time, 15.36% employed part-time, 10.71% self-employed, 7.50% unemployed, 9.82% with another type of employment, and 7% were still completing their studies.

Procedure

After giving their informed consent participants accessed the questionnaire and were randomly assigned to one of the eight experimental conditions, replicating the between subject design of Study 1 (Figure 1), 2 (entrepreneur gender: woman vs. man) by 4 (pitch style: non-charismatic, charismatic gender-neutral, charismatic gender-incongruent, or charismatic gender-congruent) between subject design, replicating Study 1. We showed them a short video of either a woman or a man and asked them to imagine that the person in the video was the founder of the fictitious company Foodfix. After watching the video, participants were randomly assigned to read one text, that we asked them to imagine the text was a transcribed entrepreneurial pitch. After watching the video and reading the pitch, participants assessed the quality of the pitch in an incentivized decision task (our main dependent variable). Furthermore, we measured the participants' propensity to invest, how they perceived the entrepreneur in terms of entrepreneurial success, ability to execute, and how they perceived the potential growth of the startup. The participants also reported their perceptions of the entrepreneur's competence, dominance, honesty, and warmth, as well as their socio-demographic information (Appendix C). Attention check questions were distributed within the questionnaire.

Materials

Videos of the Entrepreneurs

The video stimulus material for the main experiment consisted of eight 10-second videos of women and men entrepreneurs. The literature on thin-slicing suggests that being exposed to less than 10 seconds is sufficient to develop inferences about personality traits of the target (Weisbuch & Ambady, 2011). The production of the videos involved (a) taking photographs of 12 women and 13 men participants, (b) transforming the 12 original women photographs into men photographs and the 13 original men's photographs into women's photographs (25 transformed images in total), (c) filming the desired entrepreneur movements (nodding and smiling) with an actor and transposing the movements of the entrepreneur onto the 25 original images and the 25 gender transformed images.

To avoid idiosyncratic differences among the entrepreneurs affecting our results, we recruited 12 women and 13 men participants. We asked them to be dressed uniformly in a black shirt to avoid differences in attire. We took standardized portrait photographs of the 25 participants and applied the gender transformation process, meaning that using an algorithm we transformed the faces of women participants into men's faces, similarly transforming faces of men participants into women's faces, resulting in a total of 50 images (Zhu et al., 2020). Because of an unsuccessful gender transformation, we had to exclude four images of men's faces transformed into women's faces and the four original images of the men's faces (eight in total), leaving us with a total of 42 images (12 real women, 12 women transformed to men, 9 men, 9 men transformed to women faces). After that we filmed one actor looking into the camera, nodding, and smiling. We then, using another algorithm, transposed the nonverbal behavior of the actor onto the 42 images, which then resulted in 42 deep fake videos (Mahmud & Sharmin, 2021). This process reduced idiosyncratic differences in the nonverbal behavior depicted in the faces and ensured a standardized length of the videos (see

Figure 4 for an example of the resulting image of the face and link to video). We told the participants to imagine that the person in the video is the entrepreneur introducing him or herself. Given that video-pitches are more and more common for entrepreneurs (Brooks et al., 2014; Clarke et al., 2018), we thought that our video introduction of the entrepreneur would increase external validity (Lonati et al., 2018).

Following the creation of the videos, we conducted a pre-test to select the faces, matching them on perceived age, realism, and competence. Also, we wanted to ensure that there were no differences based on the transformation within the gender. We recruited 60 participants (31 women) on the Prolific Academic online platform. Their average age was 32.53 years ($SD = 10.70$, $range = 18 - 64$) and in random order showed them 10 of the 42 videos (12 real women, nine transformed women, nine real men, 12 transformed men). Afterwards, we asked them whether they thought it was a woman or a man; what age they thought the individual was on a continuous scale between 18 and 60 years; the perceived attractiveness using a five-point Likert scale going from 1 (*not at all attractive*) to 5 (*very attractive*), the perceived realism (five items with one reverse item) assessed with five-point Likert scale going from 1 (*strongly disagree*) to 5 (*strongly agree*), and competence of the individual in the video using a four item scale each going from 1 (*strongly disagree*) to 5 (*strongly agree*). We selected a balanced sample videos featuring two real women's faces, two women's faces transformed from men's faces, two real men's faces, and two men's faces transformed from women's faces. The women's and men's faces were matched and thus did not significantly differ in terms of perceived age, $t(113) = 0.07$, $p = .942$, perceived realism, $t(113) = -0.44$, $p = .659$, and perceived competence (Eagly et al., 2019), $t(113) = 0.89$, $p = .378$ (the averages of men's faces vs. women's faces for perceived age, realism, and competence). Women's faces were perceived as more attractive than men's faces, as is usually the case in reality (McLellan & McKelvie, 1993), $t(113) = 2.54$, $p = .012$; note, real

women's faces were perceived as attractive as transformed women's faces, $t(56) = 0.73, p = .467$, and real men's faces were perceived as attractive as transformed men faces, $t(55) = -0.91, p = .365$. The intended gender was perceived correctly for all the individuals in the videos (for means by condition see Appendix D). Thus, the final video stimulus material consisted of eight videos: Two real women entrepreneurs, two transformed women entrepreneurs, two real men entrepreneurs, and two transformed men entrepreneurs that were reasonably-well balanced on some observables. All the faces in our selection belonged to different individuals.

Entrepreneurial Pitch

We used the same entrepreneurial pitches as in Study 2 (Appendix B). For this study, however, we only used the name pairs Jane and Jack to indicate the gender (Kasof, 1993), given that the results for our main dependent variable, the perceived market potential, did not differ based on the different names, for women entrepreneurs ($t(272) = 0.33, p = .740$; mean perceived market potential for Karen vs. Jane) and for men entrepreneurs ($t(272) = -0.42, p = .674$; mean perceived market potential for Brian vs. Jack).

Measures

Perceived Market Potential

We used the same investment task as in Study 1. A higher score meant that Foodfix was perceived as a better investment ($M = 3.37, SD = 0.89$). To complete the incentivized measure, we additionally used a series of self-report measures (Appendix C).

Attention Checks

To identify whether the participants were paying attention to instructions when completing the questionnaire, three attention check items were included. A sample item is, "Please press agree" on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). The responses to the items served as an exclusion criterion for the

participants, meaning that if the participants answered more than two attention check question incorrectly, their responses were not considered in the data. All participants passed the attention checks.

Results

We only present the results pertaining to our main dependent variable, the perceived market potential. The results concerning other dependent variables (i.e., propensity to invest, perceived entrepreneurial success, perceived entrepreneur ability to execute, perceived company growth, perceived personality of the entrepreneur) are in Appendix C. For all tests examining the effect of the manipulated conditions on the outcomes, we included too measured covariates as a robustness check in the model. All results are reported in the tables and showed that substantive findings never changed.

To test the hypothesis of whether charismatic entrepreneurial pitches would result in a higher perceived market potential of the venture, we regressed the pitch style (non-charismatic, charismatic gender-neutral) on the perceived market potential of the venture (Table 7). The regression results (Table 7) showed that the effect of the charismatic gender-neutral style was not significant ($B = 0.09, p = .409$), meaning that using charismatic tactics in a gender-neutral pitch did not increase the perceived market potential of Foodfix; we thus rejected the substantive hypothesis.

Is the gender difference in the perceived market potential of the venture attenuated when using charismatic versus non-charismatic entrepreneurial pitches? To answer research question 1, we regressed the entrepreneur gender (woman vs. man) and pitch style (non-charismatic, charismatic gender-neutral) on the perceived market potential (Table 8). The regression results (Table 8) showed that the effect of the charismatic gender-neutral style was not significant ($B = 0.09, p = .409$), meaning that using charismatic tactics in a gender-neutral pitch did not increase the perceived market potential of Foodfix. There was no entrepreneur

gender effect on the perceived market potential of the venture ($B = 0.02, p = .861$).

Furthermore, there was no interaction between entrepreneur gender and the pitch style ($B = 0.03, p = .894$).

Do charismatic gendered themes affect the perceived market potential of the venture?

To answer research question 2, we regressed the different pitch styles (charismatic gender-congruent, charismatic gender-incongruent) on the perceived market potential of the venture (Table 9). Results show no significant effect of the charismatic gender-congruent style ($B = 0.01, p = .900$).

How does pitching in a charismatic gender-congruent style affect the perceived market potential of the venture and is the effect different for women and men entrepreneurs? To answer research question 3, we regressed the entrepreneur gender (women vs. men) and the different pitch styles (charismatic gender-congruent, charismatic gender-incongruent) on the perceived market potential of the venture (Table 10). Contrary to Study 1, results show no main effect of the gender-congruent pitch ($B = 0.01, p = .900$). Likewise, there was no significant interaction between the entrepreneur gender and the gender-congruent style ($B = -0.21, p = .299$).

In an exploratory fashion, we investigated the effect of gendered pitches compared to the gender-neutral pitches. What perceived market potential would the gendered pitch elicit compared to the gender-neutral pitches? We regressed the pitch style (non-charismatic, charismatic gender-neutral, charismatic gender-incongruent, charismatic gender-congruent) and the entrepreneur gender on the perceived market potential (Table 11). Again, unlike in Study 1, gender-congruent pitches did not significantly differ from the non-charismatic pitch ($B = 0.12, p = .255$), which can be observed in Figure 5.

Discussion

We aimed at testing the robustness of the results in Study 1, in a setting closer to the real world, where participants could see the entrepreneur in addition to reading the text of the pitch. In Study 1, we did not see an effect of charisma on the perceived market potential of the venture; however, again, we found no difference in Study 2 even though the pitches differed in the number of tactics and were perceived differently in terms of charisma.

Results also showed that there was no difference in the perceived market potential of Foodfix depending on whether gender-incongruent or gender-congruent themes were used in the entrepreneurial pitch. When exposed to videos, people tend to engage in heuristic thinking, taking mental shortcuts (Kim & Sundar, 2016), and not processing the information in a systematic way. Even with a short video, perhaps the use of heuristic decision making could still explain why participants did not differentiate between the gender-congruent and gender-incongruent pitches. Participants could have been distracted from the content of the pitch by the video of the entrepreneur, leading participants to pay less attention to the style differences in the pitches.

In the present study, we used four different women's, and four different men's faces in the videos to appear as the entrepreneurs. Despite having different faces matched on perceived age, realism, and competence it is possible that there was an unaccounted difference that we have not matched the faces on (Wulff et al., 2023), which introduced endogeneity (Antonakis et al., 2014) to the results.

Despite finding conflicting results about how the gender-incongruent and gender-congruent pitches were perceived, to get a full picture of the phenomenon we investigate how women and men naturally express themselves in the context of charismatic speeches. This will enable deepening the understanding of gendered themes used in professional discourse. Specifically, we will analyze whether women and men spontaneously express themselves in a gendered way in a context of a managerial speech in Study 3.

Study 3: Charismatic Managerial Speeches

Method

In Study 3 we investigated whether women and men spontaneously use gendered language style in the metaphors used in their speeches. We analyzed a sample of metaphors written in the context of a charismatic and motivating speech. We focus our analysis on the metaphors because the speeches oftentimes revealed the gender of the author because they were written in French. The metaphors did not reveal the gender of the writer.

Participants

Participants were 344 students (127 women) in an undergraduate class in the business and economics faculty of a Swiss university. Participation was voluntary as part of a class assignment involving writing a charismatic motivational speech. We excluded speeches that did not use metaphors (36 speeches). Speeches written by 308 students (111 women participants) were retained.

Materials

As part of the class assignment, participants were instructed to produce a written motivational speech of 250 to 300 words in length, using at least eight different charismatic tactics in the speech. The speech was supposed to motivate an employee whose performance decreased in the past two months. Prior to completing the assignment, participants received a class on how to use charismatic tactics (e.g., explanations of each tactic, examples of tactics from business leaders or politicians³). Participants accessed an online form and gave their consent to participate in the study. They had to paste the text of their speech into the online form and indicate which sentence or part of the sentence corresponded to a charismatic tactic by copying the text of the speech into a designated box in the online submission form, labelled by the name of the tactic. Following that, the researchers verified whether the metaphor was used correctly.

We used the entire metaphor (e.g., “Without you, the whole ship would sink. This is why you are an essential member of our crew”), as well as the nouns (e.g., “ship”, “member”, and “crew”) and verbs (e.g., “sink” and “to be”) used in the metaphor to assess genderedness of the metaphors. We wanted to investigate whether purely the content (nouns and verbs together or separately) or the construction of the sentences (metaphors) influenced the perceived genderedness.

Measures

To rate female or male-gendered language used in the metaphors, we recruited 60 raters (29 women) via the Prolific online platform. Their average age was 31.03 years ($M = 31.03$, $SD = 9.58$, range = 19 – 58). The raters were native French speakers, and citizens of France, Belgium, or Switzerland⁵.

Raters were separated into four panels in groups of 15. Raters in panels 1, 2, and 3 were asked to rate perceived genderedness after reading all the metaphors (panel 1), after reading the noun and verb groups (i.e., all nouns and verbs within one metaphor were grouped together and received one rating; panel 2), the noun groups and verb groups separately (panel 3), and raters in panel 4 read the entire metaphor and were asked whether they believed the metaphor was written by a man or a woman.

Upon the completion of the study, raters were thanked and paid £ 8.70 for 80 minutes of work in panel 1, £ 5.75 for 53 minutes of work in panel 2, £ 4.65 for 43 minutes of work in panel 3, and £ 9.6 for 91 minutes of work in panel 4. The payment varied with the duration of the task and was based on an hourly wage of £ 6.50.

Perceived Genderedness (Femininity)

To assess perceived genderedness, external raters read either the entire metaphor (panel 1), the nouns and verbs of the metaphor grouped together (panel 2), or the nouns and verbs of the metaphor separately (panel 3). They were asked: “To what extent do you find the

writing style of this text feminine or masculine?” and reported their answer on a five-point Likert scale ranging from 1 (*masculine*), 3 (*neither masculine nor feminine*) to 5 (*feminine*). Given the scale we use, the results are presented as degree of perceived femininity because higher values indicate more *perceived femininity*.

All raters in panel 1 assessed all 308 metaphors (presented for all raters in random order), all raters in panel 2 assessed all 308 groups of nouns and verbs (presented for all raters in random order) and all raters in panel 4 assessed all 305 groups of nouns and 304 groups of verbs (presented for all raters in random order)⁴. Ratings were averaged and a higher value means more perceived femininity (panel 1: $M = 2.79$, $SD = 0.53$, $ICC = .85$; panel 2: $M = 2.73$, $SD = 0.72$, $ICC = .92$; panel 3 for nouns: $M = 2.66$, $SD = 0.82$, $ICC = .92$; and panel 3 for verbs: $M = 2.95$, $SD = 0.13$, $ICC = .26$). The ICC of the verbs in panel 3 is low, but it is still acceptable (Bliese, 1998).

Perceived Gender of the Writer

Raters of panel 3 were asked “Do you think this text was written by a man or a woman?”, to be answered on a binary scale of 0 (*woman*) to 1 (*man*). All raters read all of the 308 metaphors and had to report whether they thought the metaphor was written either by a woman or a man. For each metaphor, we averaged the ratings, resulting in higher values indicating increased *perceived likelihood of written by a man* (panel 4: $M = .58$, $SD = .28$, $ICC = .84$).

Accuracy of judging the gender of the writer. The perceived writer gender was scored on accuracy (Baratloo et al., 2015). We assigned the value of 1 for a correct answer and the value of 0 for an incorrect answer. For each of the metaphors, the answers were averaged across panel members, with a higher score meaning a more accurate response ($M = .52$, $SD = .28$).

Results

We wanted to answer the research question of whether women and men naturally use more gender congruent language styles. If natural use is gendered, women should generate more feminine metaphors and males more masculine ones and this gendering should be perceived by observers. Means, standard deviations, and correlations are presented in Table 12. Comparing perceived genderedness of metaphors produced by women participants with that of metaphors produced by men participants, results (Figure 6) showed that there was no significant difference in perceived femininity, $t(306) = 0.64, p = .522$ ($M_{women} = 2.81, SD = 0.53; M_{men} = 2.77, SD = 0.52$) or in the noun and verb groups, $t(306) = 0.46, p = .647$ ($M_{women} = 2.76, SD = 0.79; M_{men} = 2.72, SD = 0.68$); similarly there was no difference in the noun groups $t(303) = 0.22, p = .827$ ($M_{women} = 2.67, SD = 0.84, M_{men} = 2.65, SD = 0.80$), or the verb groups, $t(302) = 0.80, p = .426$ ($M_{women} = 2.96, SD = 0.13; M_{men} = 2.95, SD = 0.13$).

Another way of testing the same hypothesis would be to look at whether metaphors produced by men participants would show increased perceived likelihood of being written by a man compared to metaphors produced by women participants. Results showed (Figure 7) that participants were not able to detect the gender of the writer: $t(306) = -1.06, p = .290$ ($M_{women} = .57, SD = .28; M_{men} = .60, SD = .28$). Nevertheless, the results were somewhat different in the accuracy of evaluating the participant gender⁶. In sum, our results show that women and men do not use gender-congruent language when writing metaphors, neither are the metaphors produced by women participants perceived as more feminine nor are they perceived as more likely to be written by a woman.

Discussion

In this study we aimed to see whether women and men naturally use more gendered language in their charismatic speeches. Raters in a coding panel did not perceive metaphors written by women and men different in terms of femininity and they were unable to correctly

guess the gender of the writer of the metaphor. These results suggest that the way women and men wrote metaphors was not significantly different, despite the existing gender stereotypes.

Nevertheless, the fact that we presented only the metaphor to the coding panel is a limitation in our study. The speeches were written in French and the gender of the participant was often revealed in the speech; thus, the raters could not read and rate the whole speech. A possible solution for this issue would be to replicate this study with speeches written in English and instruct the participants not to reveal personal details (e.g., in the speech).

General Discussion

The aim of this research was to investigate whether charisma in entrepreneurial pitches benefited the perceived market potential for women and men entrepreneurs. We investigated the impact of charismatic gender-congruent and incongruent speeches on the perceived market potential of the venture for women and men entrepreneurs. Furthermore, we wanted to determine whether women and men used gendered speech in their motivational speeches and if this gendering was detectable by observers.

Contrary to what we have seen in recent literature, we found in Studies 1 and 2 that using charisma did not make a significant difference in the perceived market potential of the venture. Given that the information about the company Foodfix, the investment needs, and the percentage of equity in exchange was constant and presented well across the conditions, participants may have simply (and rationally) just used this information in their judgments. Also, although the difference of perceived charisma in the pitch text statistically significant, the effect was small; thus, perhaps a weak manipulation explained the null findings.

The idea of Foodfix was based on a successful real-life start-up and all pitches contained the exact information regarding the business idea and financing expectations. Perhaps, given the common key information, using charisma did not override the financial factors and increase the perceived market potential.

Similarly, Clarke et al. (2018) found that figurative language used in a pitch, which coincides with charisma, did not directly influence how likely participants were to invest with a company. A possibility would be to integrate nonverbal charisma into the pitch and see whether in that case charisma influences the perceived market potential of the venture.

In Studies 1 and 2 there was no gender gap in the perceived market potential of Foodfix, unlike what is documented in the literature (Greene et al., 2003; Malmström et al., 2020). It is possible that given that participants in our studies received text, they analyzed the text in a systematic way (Kim & Sundar, 2016) and thus attributed an equal perceived market potential to both women and men entrepreneurs. It is possible too that previous research did not ensure proper equivalence between conditions; we went to great lengths to match conditions appropriately and to ensure no confounding factors. Researchers have previously found a gender gap in perceived likelihood to invest, perceived persuasiveness, and logic when showing videos of pitches narrated by either a woman's or a man's voice (Brooks et al., 2014). It is possible that if participants hear the voice of the entrepreneur, triggers implicit bias against women in agentic roles (cf. Kim & Sundar, 2016). Because we ensure information equivalence, it is possible that participants could not see a difference and discounted heuristic-driven information processing. Given that we went to great lengths to ensure maximal standardization across conditions, it is possible that with careful design, the gender funding gap tends to dissipate.

In Study 1 we found that gender-congruent themes hurt the perceived market potential for entrepreneurs, whereas we did not observe the same effect in Study 2. We argued that in Study 1, gender-congruent text-only pitches were perhaps perceived as too hackneyed and stereotypical. In Study 2, this effect was no longer there perhaps because participants were enthused by the video of the entrepreneur, which perhaps overrode stereotypical information processing.

In Study 3, raters could not differentiate metaphors written by women and men in terms of perceived genderedness and they could not correctly guess the gender of the writer from the metaphor. Future research is needed to see whether this result holds when the whole speech and not only the metaphor is analyzed. This result is nevertheless encouraging, because it demonstrates that a particular gender cannot be attached to a key element of the communication style in charismatic speeches: the metaphor. A practical implication of this finding would be to integrate a gender-blind review of business plans and transcripts of pitches in the context of entrepreneurial funding.

Results of a field study provide ecological validity to our experimental results, by showing that gendered speech was not correlated with success in pitching competitions (Balachandra et al., 2021); thus, it could be judicious for entrepreneurs to refrain from using overtly gender-typed language or themes in their entrepreneurial pitches. Nevertheless, future research is needed to investigate whether the effects of gendered speech are persistent when combined with the nonverbal behavior of an entrepreneur.

The existing venture funding gender gap can be also linked to other differences between entrepreneurs and founders, such as their nonverbal behavior (Balachandra et al., 2019), their appearance (Brooks et al., 2014), and the industry their business operates in (Elam et al., 2019). Businesses owned by women typically concentrate in retail and service sectors, while businesses owned by men concentrate in technology, mining, and manufacturing, which require more financing (Du Rietz & Henrekson, 2000; Elam et al., 2019). Contrary to the initial communication between the investors and entrepreneur in live settings (Clark, 2008), in our research the communication happened through standardized written pitches. Given we did not find a gender gap in the perceived market potential of the venture, it could indicate that communicating in a standardized way could be potentially beneficial to reducing the gender funding gap. From a practical perspective it could be

helpful to apply a standardized approach by switching from in-person pitches to pitch transcripts and possibly short videos of the face of the entrepreneur as in Study 2. Another possibility too is that gendered expectations of entrepreneurs are waning with time, as is prevalent too in the management sphere (Eagly et al., 2019).

Future research is needed to test the robustness of our results and to investigate whether the quality of the business idea or the gender congruity of the industry the venture is attached to interacts with the entrepreneur charisma and gender. Furthermore, it is necessary to investigate whether the combination of verbal and nonverbal charisma may impact entrepreneurial outcomes differentially for women and men. Nevertheless, it is encouraging that we have not found differences in the perceived market potential based on entrepreneur gender. Perhaps, with careful design and standardization, the gender differences dissipate.

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Tables and Figures

Table 1

Study 1: Theme Gender Balance Pre-Test

Genderedness	Action	<i>M</i>	<i>SD</i>	<i>t</i> (99)	<i>p</i>
Masculine	Climbing mountains	31.69	26.47	11.97	.000
	Suffering avalanches	28.16	28.66	9.82	.000
	Working in restaurant kitchen	25.14	27.83	9.03	.000
Neutral	Running	2.76	20.52	1.34	.182
	Taking the metro	2.59	19.01	1.36	.176
	Going to school	2.04	14.71	1.39	.169
	Taking exams	-1.76	14.46	-1.22	.227
Feminine	Swimming	-7.70	20.64	-3.73	.000
	Waiting in line	-13.41	24.68	-5.43	.000
	Playing the violin	-22.09	26.48	-8.34	.000
	Taking care of siblings	-27.31	33.44	-8.17	.000
	Doing house chores	-38.53	26.05	-14.79	.000
	Cinderella	-61.32	32.27	-19.00	.000

Table 2*Study 1: Pitch Style on Perceived Market Potential of the Venture*

Variables	(1)	(2)
Charismatic gender-neutral	0.05 (0.54)	0.06 (0.62)
Participant gender		0.12 (1.08)
Participant age		0.00 (0.95)
Participant education		-0.01 (0.37)
Participant employment		-0.04 (1.08)
Experience 1		0.03 (0.33)
Experience 2		0.01 (0.15)
Experience 3		0.04 (0.45)
Experience 4		-0.07 (0.66)
Constant	3.43* (50.11)	3.27* (11.20)
R-squared	0.00	0.02

Note. Robust *t*-statistics in parentheses. *N* = 273. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 3*Study 1: Entrepreneur Gender and Pitch Style on Perceived Market Potential of the Venture*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	-0.02 (0.19)	-0.08 (0.56)	-0.01 (0.11)	-0.07 (0.48)
Charismatic gender-neutral	0.05 (0.53)	-0.01 (0.06)	0.06 (0.61)	0.00 (0.03)
WE*charismatic gender-neutral		0.12 (0.63)		0.12 (0.60)
Participant gender			0.12 (1.08)	0.12 (1.07)
Participant age			0.00 (0.94)	0.00 (0.97)
Participant education			-0.01 (0.37)	-0.01 (0.34)
Participant employment			-0.04 (1.07)	-0.04 (1.04)
Experience 1			0.03 (0.33)	0.03 (0.34)
Experience 2			0.01 (0.15)	0.01 (0.17)
Experience 3			0.04 (0.45)	0.04 (0.39)
Experience 4			-0.07 (0.67)	-0.06 (0.62)
Constant	3.44* (41.65)	3.47* (36.60)	3.28* (10.82)	3.29* (10.84)
R-squared	0.00	0.00	0.02	0.02

Note. Robust *t*-statistics in parentheses. *N* = 273. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 4*Study 1: Gendered Pitch Style on Perceived Market Potential of the Venture*

Variables	(1)	(2)
Charismatic gender-congruent style	-0.28*	-0.26
	(2.76)	(2.58)
Participant gender		0.31*
		(2.83)
Participant age		-0.00
		(1.14)
Participant education		0.02
		(0.44)
Participant employment		-0.03
		(0.94)
Experience 1		-0.02
		(0.20)
Experience 2		0.04
		(0.75)
Experience 3		-0.09
		(1.08)
Experience 4		-0.02
		(0.30)
Constant	3.51*	3.40*
	(51.86)	(10.40)
R-squared	0.03	0.12

Note. Robust *t*-statistics in parentheses. *N* = 278. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 5

Study 1: Entrepreneur Gender and Gendered Pitch Style on Perceived Market Potential of the Venture

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	-0.13 (1.30)	-0.16 (1.16)	-0.14 (1.46)	-0.16 (1.19)
Charismatic gender-congruent style	-0.28* (2.75)	-0.31 (2.25)	-0.26 (2.56)	-0.28 (2.14)
WE*ch. gender-congruent style		0.05 (0.24)		0.04 (0.19)
Participant gender			0.32* (2.91)	0.32* (2.90)
Participant age			-0.00 (1.26)	-0.00 (1.26)
Participant education			0.02 (0.45)	0.02 (0.43)
Participant employment			-0.03 (0.82)	-0.03 (0.82)
Experience 1			-0.02 (0.20)	-0.02 (0.18)
Experience 2			0.04 (0.70)	0.04 (0.67)
Experience 3			-0.10 (1.13)	-0.10 (1.11)
Experience 4			-0.02 (0.22)	-0.02 (0.23)
Constant	3.57* (43.23)	3.59* (38.92)	3.46* (10.45)	3.47* (10.43)
R-squared	0.03	0.03	0.12	0.12

Note. Robust *t*-statistics in parentheses. *N* = 278. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 6

Study 1: Entrepreneur Gender and All Pitch Styles on Perceived Market Potential of the Venture

	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	-0.08 (1.08)	-0.08 (0.56)	-0.07 (1.06)	-0.07 (0.53)
Charismatic gender-neutral	0.05 (0.52)	-0.01 (0.06)	0.04 (0.46)	-0.01 (0.10)
Charismatic gender-incongruent	0.07 (0.77)	0.11 (0.86)	0.08 (0.83)	0.12 (0.94)
Charismatic gender-congruent	-0.21 (2.02)	-0.19 (1.39)	-0.19 (1.91)	-0.18 (1.36)
WE*charismatic gender-neutral		0.12 (0.63)		0.12 (0.63)
WE*ch. gender-incongruent		-0.08 (0.42)		-0.08 (0.43)
WE*ch. gender-congruent		-0.03 (0.15)		-0.03 (0.14)
Participant gender			0.22* (2.87)	0.22* (2.88)
Participant age			-0.00 (0.25)	-0.00 (0.22)
Participant education			-0.00 (0.03)	0.00 (0.00)
Participant employment			-0.04 (1.38)	-0.03 (1.33)
Experience 1			0.00 (0.06)	0.01 (0.12)
Experience 2			0.03 (0.87)	0.03 (0.83)
Experience 3			-0.03 (0.51)	-0.04 (0.56)
Experience 4			-0.04 (0.68)	-0.04 (0.64)
Constant	3.47* (45.50)	3.47* (36.60)	3.35* (14.98)	3.33* (14.35)
R-squared	0.02	0.02	0.06	0.06

Note. Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 7*Study 2: Pitch Style on Perceived Market Potential of the Venture*

Variables	(1)	(2)
Charismatic gender-neutral	0.09 (0.83)	0.13 (1.30)
Participant gender		0.38* (3.36)
Participant age		-0.02* (4.00)
Participant education		-0.10* (2.94)
Participant employment		-0.10 (2.31)
Experience 1		0.11 (1.29)
Experience 2		0.00 (0.02)
Experience 3		-0.14 (1.56)
Experience 4		0.05 (0.63)
Constant	3.29* (41.31)	4.03* (12.44)
R-squared	0.00	0.21

Note. Robust *t*-statistics in parentheses. *N* = 278. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 8*Study 2: Entrepreneur Gender and Pitch Style on Perceived Market Potential of the Venture*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.02 (0.17)	0.00 (0.03)	-0.02 (0.21)	-0.02 (0.16)
Charismatic gender-neutral	0.09 (0.83)	0.08 (0.49)	0.13 (1.30)	0.13 (0.89)
WE*charismatic gender-neutral		0.03 (0.13)		0.01 (0.03)
Participant gender			0.38* (3.35)	0.38* (3.34)
Participant age			-0.02* (4.01)	-0.02* (4.00)
Participant education			-0.10* (2.94)	-0.10* (2.90)
Participant employment			-0.10 (2.31)	-0.10 (2.30)
Experience 1			0.11 (1.30)	0.11 (1.30)
Experience 2			0.00 (0.00)	0.00 (0.01)
Experience 3			-0.14 (1.56)	-0.14 (1.56)
Experience 4			0.05 (0.63)	0.05 (0.63)
Constant	3.28* (33.81)	3.29* (29.04)	4.05* (12.47)	4.05* (12.48)
R-squared	0.00	0.00	0.21	0.21

Note. $N = 278$. Robust t -statistics in parentheses. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 9*Study 2: Gendered Pitch Style on Perceived Market Potential of the Venture*

Variables	(1)	(2)
Charismatic gender-congruent style	0.01 (0.13)	-0.02 (0.21)
Participant gender		0.42* (3.84)
Participant age		-0.01 (1.66)
Participant education		-0.04 (1.10)
Participant employment		0.04 (0.90)
Experience 1		0.07 (0.77)
Experience 2		-0.01 (0.08)
Experience 3		-0.08 (0.80)
Experience 4		-0.01 (0.14)
Constant	3.40* (46.72)	3.13* (9.34)
R-squared	0.00	0.10

Note. Robust *t*-statistics in parentheses. *N* = 282. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 10

Study 2: Entrepreneur Gender and Gendered Pitch Style on Perceived Market Potential of the Venture

	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.01 (0.07)	-0.10 (0.68)	0.01 (0.11)	-0.05 (0.32)
Charismatic gender-congruent	0.01 (0.13)	-0.09 (0.65)	-0.02 (0.21)	-0.08 (0.56)
WE*ch. gender-congruent		0.21 (1.04)		0.11 (0.55)
Participant gender			0.42* (3.85)	0.41* (3.78)
Participant age			-0.01 (1.64)	-0.01 (1.64)
Participant education			-0.04 (1.09)	-0.04 (1.03)
Participant employment			0.04 (0.91)	0.04 (0.84)
Experience 1			0.07 (0.77)	0.08 (0.82)
Experience 2			-0.01 (0.09)	-0.01 (0.09)
Experience 3			-0.07 (0.80)	-0.08 (0.82)
Experience 4			-0.01 (0.16)	-0.01 (0.12)
Constant	3.40* (38.45)	3.45* (33.87)	3.12* (9.14)	3.15* (8.93)
R-squared	0.00	0.00	0.10	0.10

Note. $N = 282$. Robust t -statistics in parentheses. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table 11

Study 2: Entrepreneur Gender and All Pitch Styles on Perceived Market Potential of the Venture

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.01 (0.17)	0.00 (0.03)	-0.02 (0.24)	-0.03 (0.18)
Charismatic gender-neutral	0.09 (0.83)	0.08 (0.49)	0.11 (1.12)	0.10 (0.70)
Charismatic gender-incongruent	0.11 (1.01)	0.16 (1.06)	0.10 (1.03)	0.14 (0.98)
Charismatic gender-congruent	0.12 (1.14)	0.07 (0.44)	0.08 (0.77)	0.03 (0.24)
WE*ch. gender-neutral		0.03 (0.13)		0.02 (0.11)
WE* ch. gender-incongruent		-0.10 (0.48)		-0.07 (0.36)
WE* ch. gender-congruent		0.11 (0.51)		0.08 (0.43)
Participant gender			0.41* (5.23)	0.41* (5.15)
Participant age			-0.01* (3.84)	-0.01* (3.84)
Participant education			-0.07* (2.74)	-0.07 (2.65)
Participant employment			-0.02 (0.77)	-0.03 (0.82)
Experience 1			0.10 (1.50)	0.10 (1.55)
Experience 2			-0.01 (0.28)	-0.01 (0.28)
Experience 3			-0.11 (1.65)	-0.11 (1.66)
Experience 4			0.02 (0.40)	0.02 (0.42)
Constant	3.29* (37.25)	3.29* (29.05)	3.50* (14.49)	3.51* (14.19)
R-squared	0.00	0.00	0.14	0.14

Note. $N = 560$. Robust t -statistics in parentheses. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

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

Table 12*Study 3: Means, Standard Deviations and Correlations for the Coding Panels*

Coding panels	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Metaphors	2.79	0.53	-					
2. Groups of nouns and verbs	2.73	0.72	.58***	-				
3. Groups of nouns	2.66	0.82	.60***	.91***	-			
4. Groups of verbs	2.95	0.13	.17**	.17**	.15**	-		
5. Perceived gender	.59	.26	-.80***	-.49***	-.50***	-.20***	-	
6. Perceived gender accuracy	.52	.28	-.22***	-.07	-.12*	-.05	.28***	-

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

Figure 1

Study 1: Graphical Representation of the Study Design

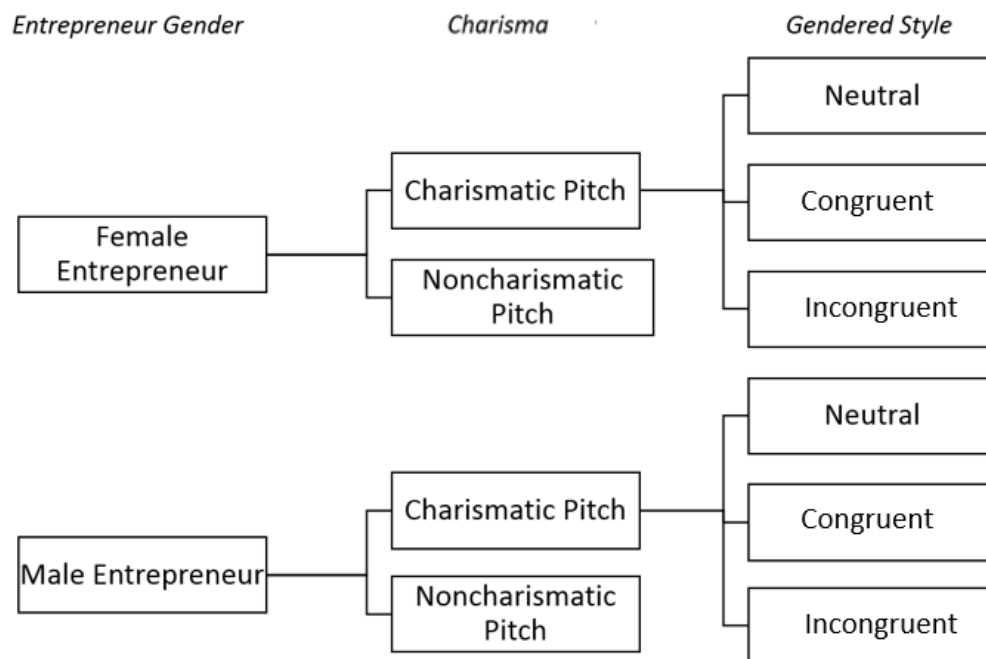


Figure 2

Study 1: Perceived Market Potential of Venture over Gendered Pitch Styles

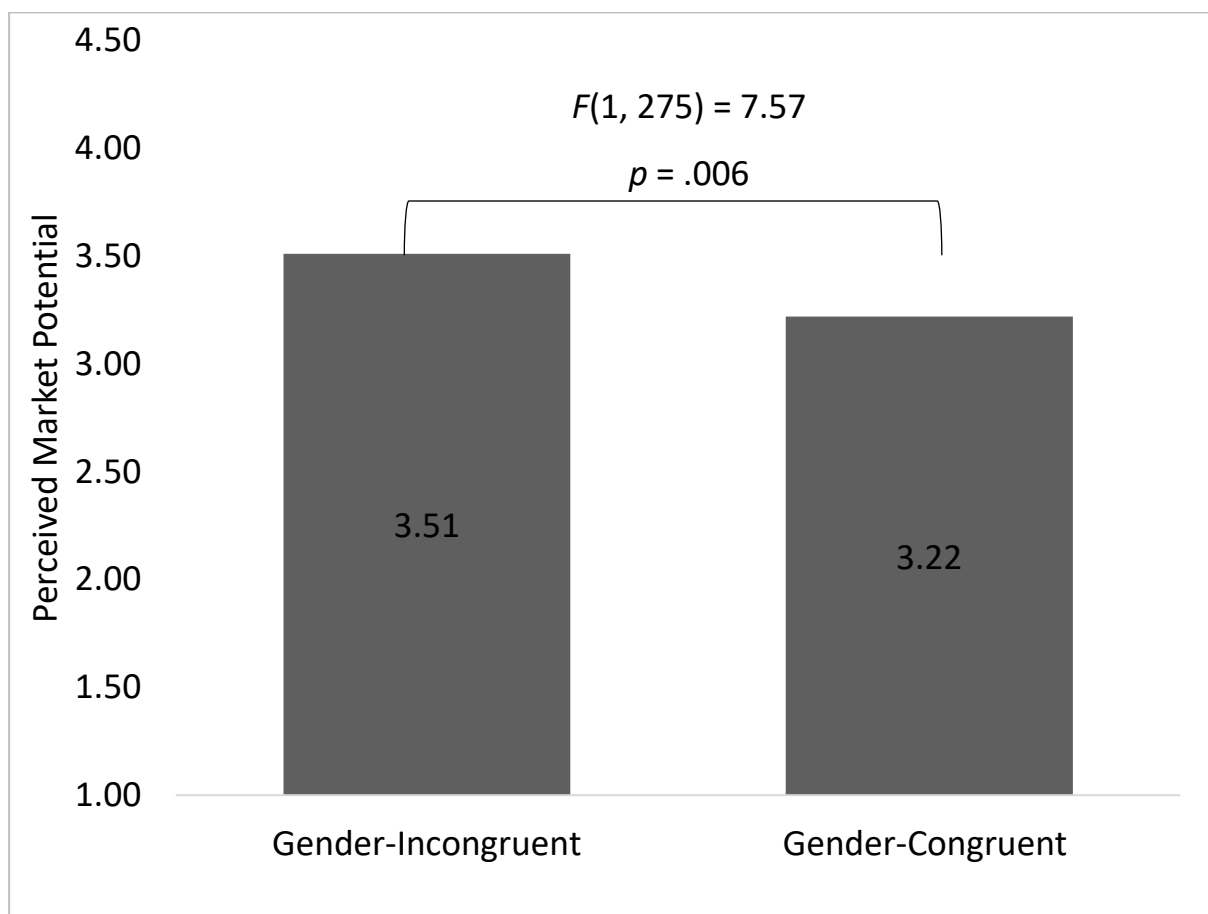


Figure 3

Study 1: Perceived Investment Opportunity of the Venture over Pitch Styles

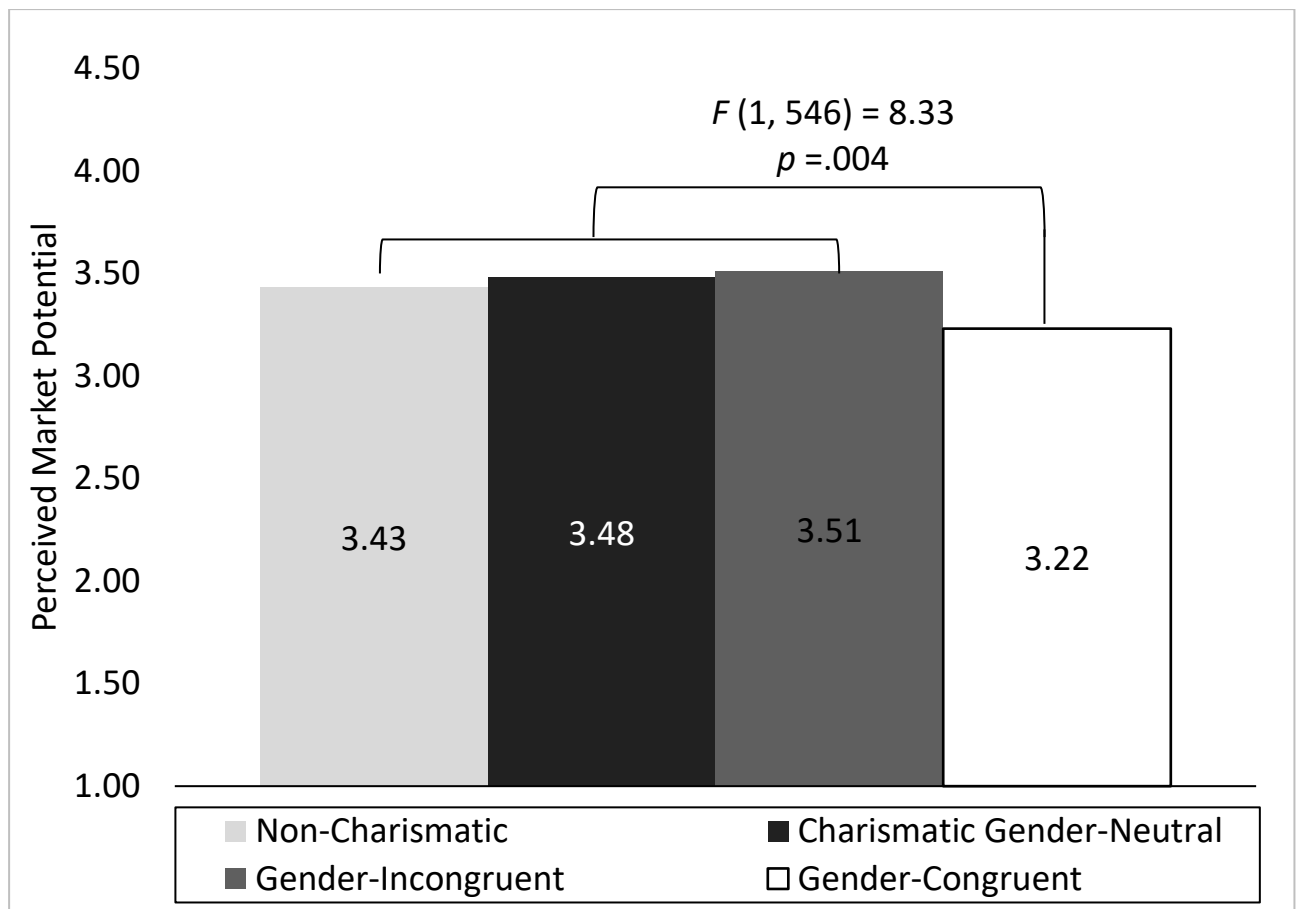


Figure 4

Study 2: Example of a Gender-Transformed Face Image



Note. This image is purely for demonstration purposes. The video animation can be accessed via the following link: <https://drive.switch.ch/index.php/s/BDqiF5weG3AAnQw>

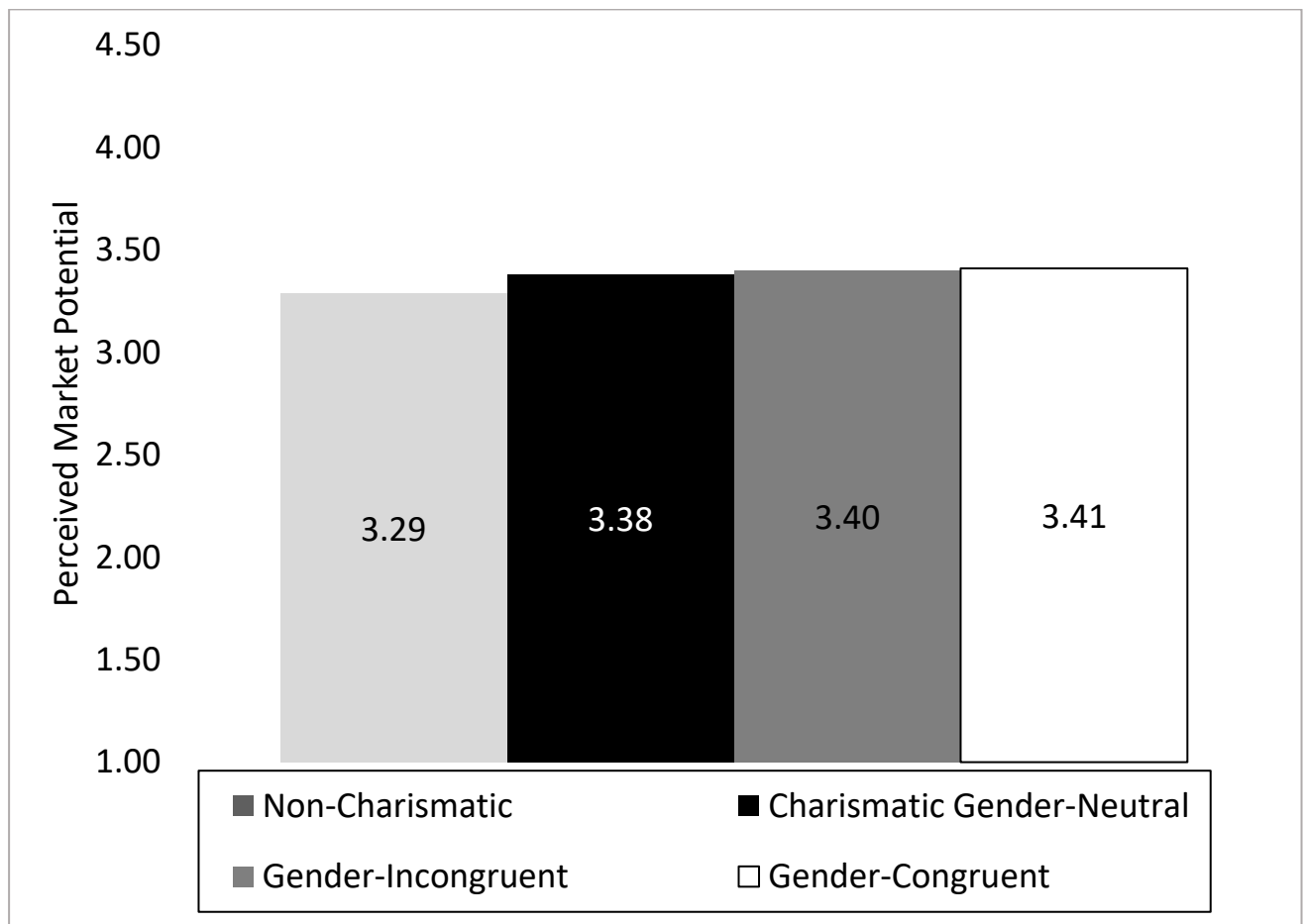
Figure 5*Study 3: Perceived Market Potential of the Venture*

Figure 6

Study 3: Perceived Femininity in Panels 1, 2, and 3

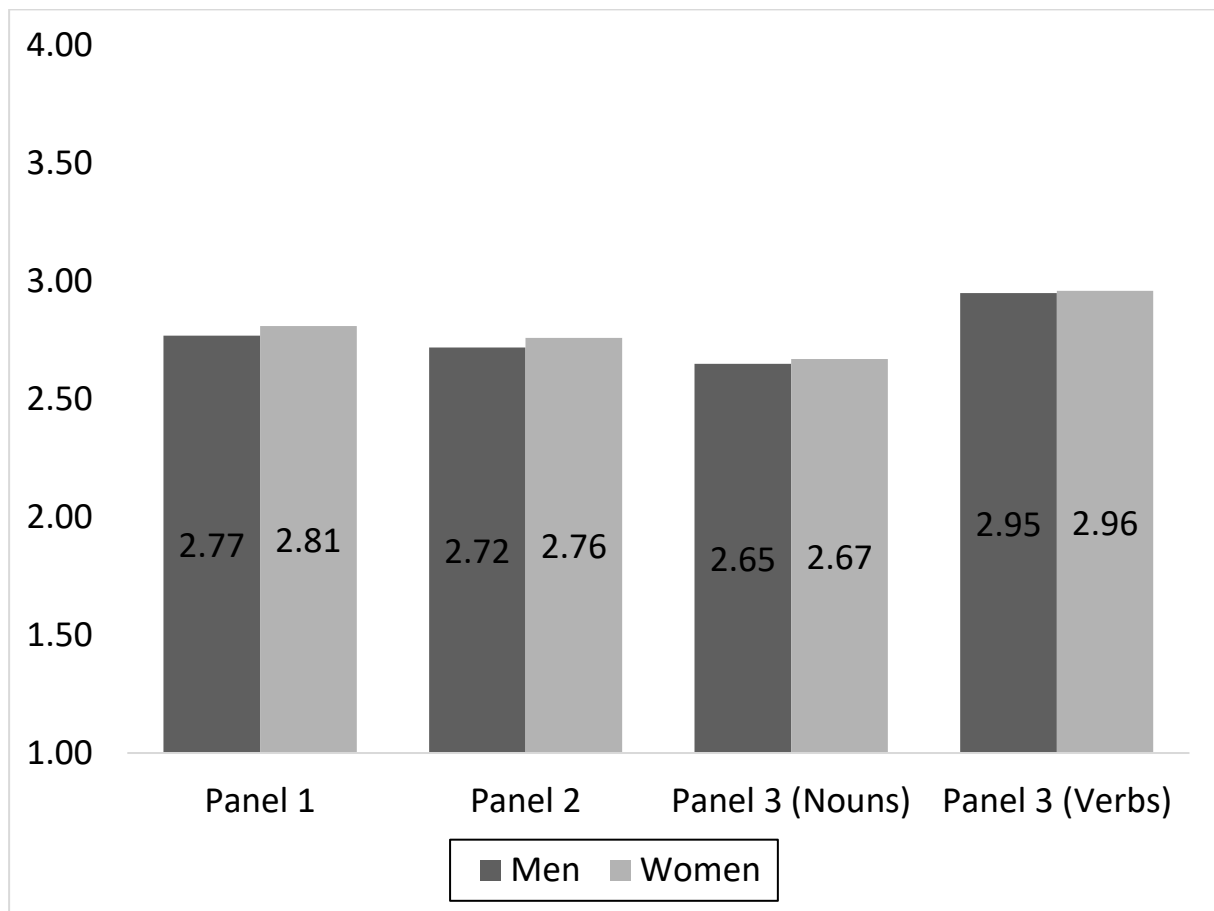
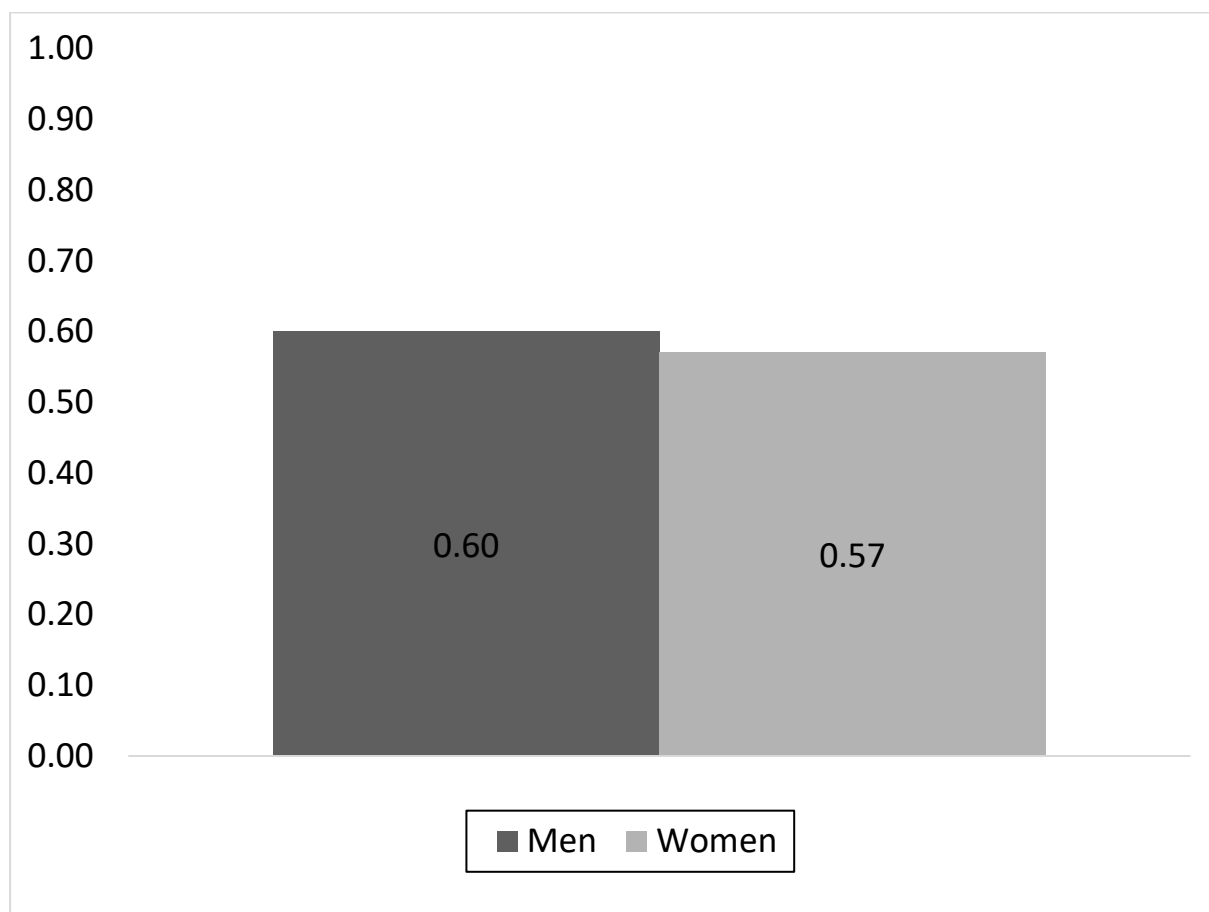


Figure 7*Study 3: Perceived Gender*

Footnotes

¹Kanze et al. 2018 conducted examined whether the prevention or promotion focused questions asked to female and male entrepreneurs would impact the amount of funding their companies obtain in an experimental study with two distinct participant samples: professional investors and Mturk participants. Findings did not differ based on the participant sample. Similarly, Brooks et al. (2014) researched the effect of entrepreneur gender on perceived business viability recruiting both Mturk and lab participants, obtaining similar results across the samples. Prior research encouraged us to recruit online participants from the Prolific online platform, which is similar in terms of data quality to Mturk (Peer et al., 2017).

²In Study 1 we measured 9 dependent variables in total, and thus needed to adjust the alpha level to the Bonferroni family-wise error (Armstrong, 2014), yielding a new alpha level of .006.

³Participants were taught how to use charismatic tactics based on examples from excerpts of speeches from famous politicians (i.e., Barack Obama, Margaret Thatcher, François Hollande, Nelson Mandela), business leaders (i.e., Steve Jobs), or movie characters. We did not conduct a formal pretest on the genderedness of the training examples.

⁴We had 308 noun and verb groups. Because not all metaphors contained both nouns and verbs, we had only 305 noun groups and 304 verb groups.

⁵We collected data about the work occupation via Prolific. The about the work occupation was incomplete, thus we did not report it.

⁶To find out whether perceivers were able to correctly guess the gender of a writer, we compared the percentages of correct guesses made for metaphors written by men ($M = .58$, $SD = .27$) and women ($M = .42$, $SD = .27$) against a guessing level of 50%. We found that metaphors written by men were correctly associated with their gender in significantly more than 50% of the cases, $t(196) = 4.26$, $p < .001$ (t -test against 0.50 of the ratings of accuracy of

judging gender of the writer for men writers only). Metaphors written by women, however, were correctly associated with their gender significantly less than the guessing level, $t(110) = -3.14, p = .002$ (t -test against 0.50 of the ratings of accuracy of judging gender of the writer for women writers only). The difference in correct detection of gender in metaphors written by women and men was significant, $t(306) = -5.07, p < .001$ (t -test comparing the percentage of correct guesses for the women writers vs. men writers). Analyzing this from the perspective of sensitivity and specificity (Baratloo et al., 2015), this means that the sensitivity (being able to y detect a men author correctly) was higher than the specificity (being able to detect a women author correctly). This indicates that metaphors written by men led to an accurate detection of their gender, significantly more than for women.

Appendix A

Study 1: Entrepreneurial pitches

	Non-charismatic	Charismatic gender-neutral	Charismatic male-gendered	Charismatic female-gendered
	Hi investors! I am,			
Gender	Karen	Brian	Jane	Jack
	I am here today to ask you for 400'000 dollars in exchange for 5% equity in our rapidly growing company.			
Charisma	<p>I believe that this could be a valuable investment opportunity for you and the community.</p> <p>Our company works in meal preparation to help people make healthy meals at home.</p> <p>The goal of Foodfix is to provide our customers with healthy and sustainable meals at their homes and help them to eat better. The idea of Foodfix originated when I was still at university.</p>	<p>This is not an ordinary investment deal. This is an investment in a better future for all of us.</p> <p>A future where eating a healthy meal after a busy day is easy and accessible to everyone.</p> <p>In Foodfix, our mission is to help people, like you and, me, eat better, eat healthier, and eat more sustainably at home. I first had the idea of Foodfix when I was studying at university.</p>		

	Non-charismatic	Charismatic gender-neutral	Charismatic male-gendered	Charismatic female-gendered
Style	<p>All of the students were busy with classwork and we needed to attend meetings and deadlines. It was a lot of work.</p> <p>Eating a healthy dinner and making sure that I did not waste groceries was a real challenge. I did not have a lot of energy to do that on top of my studies.</p> <p>It would take extra time and money, also it would not be easy.</p> <p>I knew that I wouldn't be able to go through all the food I bought anyways, so I would end up throwing most of it away.</p>	<p>Every day, going to meetings, classes, and managing deadlines felt like pushing through the busy underground.</p> <p>I remember being so hungry and tired on my way back home in the evening that going to the grocery store to get healthy food felt like getting stuck behind someone on my way out.</p> <p>I knew that I wouldn't be able to go through all the food I bought anyways, so I would end up</p>	<p>Every day, going to meetings, classes, and managing deadlines felt like climbing up a harsh snowy mountain.</p> <p>I remember being so hungry and tired on my way back home in the evening that going to the grocery store to get healthy food felt like getting stuck on an icy patch.</p> <p>It was difficult, time consuming, and expensive.</p> <p>I knew that I wouldn't be able to go through all the food I bought anyways, so I would end up throwing most of it away.</p>	<p>Every day, going to meetings, classes, and managing deadlines felt like being Cinderella facing an endless list of house chores.</p> <p>I remember being so hungry and tired on my way back home in the evening that going to the grocery store to get healthy food felt like adding even more chores to the list.</p>

Non-charismatic	Charismatic gender-neutral	Charismatic male-gendered	Charismatic female-gendered
What I often did instead of cooking was stopping by a fast-food for take-out.	Stopping by a fast food to get take-out was just the easier option.		
Once I started an office job, I had the same problem with getting healthy dinner.	When I moved from the classroom to the office, this problem did not go away. It became worse.		
It was stressful to make time in for my groceries and a healthy dinner.	The underground got even more crowded.	I felt like the climb became an expedition to mount Everest.	As though the Evil Stepmother had doubled my list.
I am convinced that I was not the only one who encountered this kind of problem.	I am sure that you feel this too, when you come back home from a long day at work.		
I was sure there was a better way to have dinner, so I started Foodfix.	I was sure there was a better way to have dinner, so I started Foodfix.		
Foodfix is there to help with your dinner preparation.	Foodfix is there help you navigate your way through the crowd.	Foodfix is there to help you reach the summit.	Foodfix is there to help you with your chores.

Non-charismatic	Charismatic gender-neutral	Charismatic male-gendered	Charismatic female-gendered
<p>The Foodfix service delivers all the ingredients in the exact portions you need to make a chef-designed, delicious meal at home in 30 minutes or less which is also very nutritious.</p>	<p>Foodfix, like a caring crew member, delivers all the ingredients in the exact portions you need to make a chef-designed, delicious, nutritious meal at home in 30 minutes or less.</p>	<p>Foodfix, like an experienced mountain guide, delivers all the ingredients in the exact portions you need to make a chef-designed, delicious, nutritious meal at home in 30 minutes or less.</p>	<p>Foodfix, like your Fairy God mother, delivers all the ingredients in the exact portions you need to make a chef-designed, delicious, nutritious meal at home in 30 minutes or less.</p>
<p>You come to the site, pick out only exactly what you want how much and then we deliver all the ingredients along with recipe cards and instructional videos teaching you how to make a delicious dish at home. It is very easy.</p>	<p>You are only 3 steps away from your next healthy dinner. One, pick out your meal on our web site. Two, wait for the delivery to your doorstep. Three, prepare the meal with the help of our recipe cards or instructional videos.</p>		
<p>A possible next step for us is to expand our business.</p>	<p>Could it be easier? Eating healthy with Foodfix is simple, sustainable, and smart.</p>		
<p>We already won over thousands of clients in our region.</p>	<p>We already won over thousands of clients in our region.</p>		

Non-charismatic	Charismatic gender-neutral	Charismatic male-gendered	Charismatic female-gendered
Foodfix could really help our future customers.	Foodfix will make sure you make your way through the busy crowd.	Foodfix will make sure you conquer any summit you choose.	Foodfix will make sure you can handle any Cinderella list.
Thank you for listening to our pitch!		So, ladies and gentlemen, who's hungry?	

Appendix B

Study 1: Other Measures and Results

Other Measures

Propensity to Invest

This is a four-item self-report measure created by Clarke and colleagues (2018). It assesses the investors' likelihood to pursue the investment process. The questionnaire asks whether the investor wants to take further action by "finding out more information about the business, doing further research into the industry and/or market of the business, meeting with the entrepreneur again, finding out more information about the entrepreneur/management team" (Clarke et al., 2018, p. 31). The items were rated on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). A higher score means a higher propensity to invest ($M = 4.02$, $SD = 0.86$, $\alpha = .93$).

Perceived Entrepreneurial Success

This is a seven-item (three reversed items) self-report measure that assesses to what extent the entrepreneur is perceived to have qualities necessary to be a successful entrepreneur. A list of important entrepreneur qualities created by venture capitalists (MacMillan et al., 1985) served as a source for the items. Participants were asked: "To what extent do you agree that the entrepreneur is ...", rated on a 5-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Entrepreneurial success was assessed with assertions such as being able to perform a sustained effort, able to communicate about the startup well, able to demonstrate leadership. Scores on the items were averaged and higher values indicated more perceived success as an entrepreneur ($M = 3.42$, $SD = 0.58$, $\alpha = .85$).

Perceived Entrepreneur Ability to Execute

This is a seven-item (three reversed items) self-report measure that assesses to what extent the entrepreneur was perceived as being able to execute the task. Research suggests

that in early-stage investments, venture capitalists focus particular attention on their perceptions on the ability of the entrepreneur to execute (Huang & Pearce, 2015). The items were developed by the researchers. A sample item is: “To what extent do you believe that this entrepreneur will be able to execute the business expansion?” rated on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Scores on the items were averaged with higher values indicating more perceived entrepreneur ability to execute ($M = 3.61$, $SD = 0.54$, $\alpha = .83$).

Perceived Company Growth

This is a six-item (three reversed items) self-report measure that assesses the perceived potential growth of the startup. The items were developed by the authors. The participants were asked: “To what extent do you agree that Foodfix will...”, rated on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). The perceived potential of startup growth was measured with phrases, such as grow, flop, or attract financing. Scores on the items were averaged and higher values indicate greater perceived potential for growth ($M = 3.45$, $SD = 0.75$, $\alpha = .93$).

Perceived Personality of the Entrepreneur

This scale was composed of four subscales that measured perceived competence, dominance, honesty, and warmth of the entrepreneur. In total, the scale contained 16 items. Each subscale consisted of four items, including one reversed item. We used four items from the dominance scale developed by Hareli, Shomrat, and Hess (2009), two items from the perceived competence scale developed by DeSarbo and Harshman (1985), four items from the perceived likability scale developed by Bolino and Turnley (2003), and added six items developed by the researchers. Participants were asked: “To what extent do you agree that the entrepreneur is...”, rated on a 5-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Competence was assessed with adjectives such as competent,

qualified, skilled, or incompetent. Dominance was assessed with adjectives such as dominant, controlling, forceful, and submissive. Following a low Cronbach alpha (.567), we excluded the item “submissive”. Honesty was measured with adjectives such as honest, sincere, truthful, and deceitful. Warmth was assessed with adjectives such as warm, approachable, affectionate, or cold. The scores in the items were averaged with higher values indicating higher levels of competence ($M = 3.59$, $SD = 0.59$, $\alpha = .79$), dominance ($M = 2.55$, $SD = 0.65$, $\alpha = .69$), honesty ($M = 3.82$, $SD = 0.56$, $\alpha = .81$), and warmth ($M = 3.95$, $SD = 0.52$, $\alpha = .80$).

Other Results

The correlations are listed in Table B1. For the other results, we regressed the entrepreneur gender and the style of the pitch (non-charismatic, charismatic-gender neutral, gender-incongruent, gender-congruent) on each dependent variable. The regression coefficients of the dependent variables are presented in Tables B2 to B9.

In this research we measured nine dependent variables, thus our alpha level adjusted to the Bonferroni family-wise error is .006 (Armstrong, 2014). In Table B6 (Figure B1), we see that women entrepreneurs ($M = 3.66$, $SD = 0.57$) were perceived significantly more competent than men entrepreneurs ($M = 3.53$, $SD = 0.60$), $F(1, 546) = 7.57$, $p = .006$.

Other Tables and Figures

Table B1

Study 1: Correlation Table

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Perceived market potential	-								
2. Propensity to invest	.45***	-							
3. Perceived entrepreneurial success	.49***	.47***	-						
4. Ability to execute	.50***	.43***	.70***	-					
5. Perceived company growth	.73***	.56***	.61***	.62***	-				
6. Perceived competence	.49***	.46***	.69***	.62***	.62***	-			
7. Perceived warmth	.32***	.39***	.47***	.47***	.41***	.49***	-		
8. Perceived dominance	-.06	.05	.01	-.04	-.03	.06	-.26***	-	
9. Perceived honesty	-.36***	.29***	.49***	.52***	.43***	.52***	.68***	-.21***	-

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

Table B2*Study 1: Propensity to Invest*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.09 (1.17)	0.07 (0.48)	0.09 (1.18)	0.07 (0.47)
Charismatic gender-neutral	0.01 (0.12)	-0.05 (0.37)	-0.00 (0.03)	-0.07 (0.52)
Charismatic gender-incongruent	0.01 (0.11)	0.09 (0.64)	-0.00 (0.03)	0.06 (0.50)
Charismatic gender-congruent	-0.13 (1.16)	-0.17 (1.08)	-0.13 (1.18)	-0.16 (1.07)
WE*charismatic gender-neutral		0.13 (0.66)		0.14 (0.71)
WE*gender-incongruent		-0.15 (0.73)		-0.14 (0.67)
WE*gender-congruent		0.08 (0.34)		0.06 (0.28)
Participant gender			0.06 (0.76)	0.06 (0.79)
Participant age			-0.00 (0.27)	-0.00 (0.25)
Participant education			0.01 (0.45)	0.01 (0.44)
Participant employment			-0.02 (0.78)	-0.02 (0.73)
Experience 1			-0.06 (0.86)	-0.05 (0.76)
Experience 2			0.04 (1.07)	0.04 (1.01)
Experience 3			-0.08 (1.39)	-0.08 (1.41)
Experience 4			-0.00 (0.05)	-0.00 (0.04)
Constant	4.01* (48.35)	4.01* (39.11)	4.12* (17.57)	4.11* (17.03)
R-squared	0.01	0.01	0.02	0.03

Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food

delivery business; experience 2 = work experience in the food industry in general; experience

3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table B3*Study 1: Perceived Entrepreneurial Success*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.08 (1.69)	0.04 (0.32)	0.08 (1.66)	0.03 (0.27)
Charismatic gender-neutral	0.12 (1.75)	0.05 (0.50)	0.11 (1.50)	0.03 (0.33)
Charismatic gender-incongruent	0.05 (0.75)	0.06 (0.66)	0.06 (0.88)	0.07 (0.75)
Charismatic gender-congruent	0.01 (0.17)	-0.02 (0.16)	0.01 (0.16)	-0.02 (0.23)
WE*charismatic gender-neutral		0.16 (1.10)		0.15 (1.10)
WE*ch. gender-incongruent		-0.02 (0.12)		-0.01 (0.10)
WE* ch. gender-congruent		0.06 (0.40)		0.07 (0.48)
Participant gender			0.01 (0.12)	0.01 (0.14)
Participant age			-0.00 (0.96)	-0.00 (0.91)
Participant education			-0.04 (2.09)	-0.04 (2.05)
Participant employment			0.01 (0.64)	0.01 (0.70)
Experience 1			-0.02 (0.33)	-0.01 (0.26)
Experience 2			0.03 (1.08)	0.03 (1.05)
Experience 3			-0.02 (0.47)	-0.02 (0.53)
Experience 4			-0.07* (1.68)	-0.07 (1.64)
Constant	3.33* (57.15)	3.36* (46.21)	3.61* (23.52)	3.63* (22.32)
R-squared	0.01	0.02	0.02	0.05

Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food

delivery business; experience 2 = work experience in the food industry in general; experience

3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table B4*Study 1: Ability of the Entrepreneur to Execute*

Variables	(1)	(2)	(3)	(4)
Women entrepreneur (FE)	0.06 (1.41)	0.12 (1.28)	0.06 (1.38)	0.12 (1.28)
Charismatic gender-neutral	0.10 (1.50)	0.09 (0.98)	0.09 (1.42)	0.09 (1.00)
Charismatic gender-incongruent	0.05 (0.80)	0.14 (1.59)	0.06 (0.86)	0.14 (1.62)
Charismatic gender-congruent	0.03 (0.46)	0.07 (0.73)	0.03 (0.38)	0.06 (0.64)
FE*charismatic gender-neutral		0.02 (0.17)		0.01 (0.07)
FE*ch. gender-incongruent		-0.18 (1.36)		-0.17 (1.34)
FE*ch. gender-congruent		-0.07 (0.51)		-0.06 (0.46)
Participant gender			0.03 (0.60)	0.03 (0.63)
Participant age			-0.00 (0.07)	-0.00 (0.06)
Participant education			-0.03 (1.70)	-0.03 (1.68)
Participant employment			-0.01 (0.43)	-0.01 (0.40)
Experience 1			-0.06 (1.38)	-0.06 (1.29)
Experience 2			0.03 (0.97)	0.03 (0.91)
Experience 3			0.01 (0.20)	0.01 (0.17)
Experience 4			-0.04 (1.10)	-0.04 (1.08)
Constant	3.54* (68.52)	3.51* (55.21)	3.72* (23.26)	3.68* (22.28)
R-squared	0.01	0.01	0.03	0.03

Note. Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table B5*Study 1: Perceived Company Growth*

Variables	(1)	(2)	(3)	(4)
Women entrepreneur (FE)	0.04 (0.58)	0.16 (1.24)	0.04 (0.62)	0.16 (1.24)
Charismatic gender-neutral	0.01 (0.10)	0.07 (0.60)	0.02 (0.19)	0.08 (0.71)
Charismatic gender-incongruent	0.00 (0.02)	0.10 (0.77)	0.01 (0.16)	0.11 (0.88)
Charismatic gender-congruent	-0.17 (1.88)	-0.08 (0.66)	-0.16 (1.81)	-0.08 (0.66)
FE*charismatic gender-neutral		-0.13 (0.71)		-0.13 (0.76)
FE*ch. gender-incongruent		-0.19 (1.05)		-0.19 (1.06)
FE*ch. gender-congruent		-0.17 (0.94)		-0.16 (0.87)
Participant gender			0.20 (2.81)	0.20 (2.82)
Participant age			0.00 (0.62)	0.00 (0.61)
Participant education			-0.04 (1.54)	-0.04 (1.52)
Participant employment			-0.02 (1.03)	-0.02 (1.04)
Experience 1			-0.04 (0.71)	-0.04 (0.68)
Experience 2			0.03 (0.96)	0.03 (0.91)
Experience 3			-0.00 (0.07)	-0.00 (0.06)
Experience 4			-0.04 (0.82)	-0.04 (0.82)
Constant	3.47* (48.80)	3.41* (38.26)	3.39* (16.20)	3.33* (15.17)
R-squared	0.01	0.01	0.05	0.05

Note. Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table B6*Study 1: Perceived Competence*

Variables	(1)	(2)	(3)	(4)
Women entrepreneur (WE)	0.14*	0.15	0.14*	0.15
	(2.75)	(1.46)	(2.80)	(1.48)
Charismatic gender-neutral	0.06	-0.03	0.04	-0.03
	(0.79)	(0.24)	(0.61)	(0.27)
Charismatic gender-incongruent	0.01	0.05	0.01	0.06
	(0.12)	(0.54)	(0.20)	(0.56)
Charismatic gender-congruent	0.01	0.08	0.00	0.06
	(0.17)	(0.74)	(0.02)	(0.63)
WE*charismatic gender-neutral		0.17		0.15
		(1.21)		(1.08)
WE*ch. gender-incongruent		-0.09		-0.09
		(0.64)		(0.60)
WE*ch. gender-congruent		-0.13		-0.12
		(0.89)		(0.85)
Participant gender			-0.01	-0.01
			(0.17)	(0.14)
Participant age			0.00	0.00
			(0.05)	(0.14)
Participant education			-0.03	-0.03
			(1.69)	(1.55)
Participant employment			-0.03	-0.03
			(1.52)	(1.44)
Experience 1			-0.07	-0.07
			(1.36)	(1.28)
Experience 2			0.02	0.02
			(0.66)	(0.66)
Experience 3			-0.00	-0.01
			(0.07)	(0.23)
Experience 4			-0.07	-0.07
			(1.82)	(1.70)
Constant	3.51*	3.50*	3.93*	3.90*
	(60.87)	(47.36)	(25.37)	(24.01)
R-squared	0.01	0.02	0.05	0.06

Note. Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table B7*Study 1: Perceived Warmth*

Variables	(1)	(2)	(3)	(4)
Women entrepreneur (WE)	0.01 (0.17)	0.01 (0.10)	0.01 (0.25)	0.01 (0.13)
Charismatic gender-neutral	-0.06 (1.07)	-0.10 (1.37)	-0.07 (1.23)	-0.11 (1.54)
Charismatic gender-incongruent	-0.02 (0.35)	0.00 (0.04)	-0.02 (0.34)	0.00 (0.04)
Charismatic gender-congruent	-0.09 (1.54)	-0.08 (0.99)	-0.10 (1.57)	-0.08 (1.01)
WE*charismatic gender-neutral		0.08 (0.73)		0.09 (0.78)
WE*ch. gender-incongruent		-0.05 (0.41)		-0.05 (0.41)
WE*ch. gender-congruent		-0.03 (0.21)		-0.03 (0.22)
Participant gender			-0.06 (1.18)	-0.06 (1.17)
Participant age			0.00 (0.24)	0.00 (0.28)
Participant education			0.01 (0.30)	0.01 (0.35)
Participant employment			-0.01 (0.66)	-0.01 (0.62)
Experience 1			0.03 (0.69)	0.03 (0.75)
Experience 2			-0.01 (0.34)	-0.01 (0.36)
Experience 3			-0.03 (0.85)	-0.04 (0.92)
Experience 4			-0.02 (0.43)	-0.01 (0.38)
Constant	3.99* (92.17)	3.99* (76.36)	4.15* (27.19)	4.14* (27.31)
R-squared	0.00	0.01	0.01	0.02

Note. Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table B8*Study 1: Perceived Dominance*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.12 (2.17)	0.04 (0.35)	0.13 (2.37)	0.04 (0.36)
Charismatic gender-neutral	0.12 (1.58)	0.14 (1.42)	0.14 (1.79)	0.14 (1.46)
Charismatic gender-incongruent	0.06 (0.80)	-0.05 (0.53)	0.06 (0.78)	-0.06 (0.56)
Charismatic gender-congruent	0.17 (2.24)	0.10 (0.90)	0.19 (2.44)	0.11 (1.07)
WE*charismatic gender-neutral		-0.04 (0.28)		-0.01 (0.09)
WE*ch. gender-incongruent		0.22 (1.52)		0.23 (1.56)
WE*ch. gender-congruent		0.15 (0.99)		0.15 (0.94)
Participant gender			0.02 (0.40)	0.02 (0.36)
Participant age			0.01 (2.64)	0.01 (2.60)
Participant education			0.04 (1.83)	0.04 (1.78)
Participant employment			0.01 (0.53)	0.01 (0.49)
Experience 1			-0.02 (0.34)	-0.02 (0.45)
Experience 2			0.01 (0.41)	0.02 (0.48)
Experience 3			0.04 (0.97)	0.05 (1.03)
Experience 4			-0.03 (0.75)	-0.03 (0.80)
Constant	2.40* (42.48)	2.44* (36.24)	1.95* (11.16)	2.01* (11.38)
R-squared	0.02	0.03	0.04	0.05

Note. Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

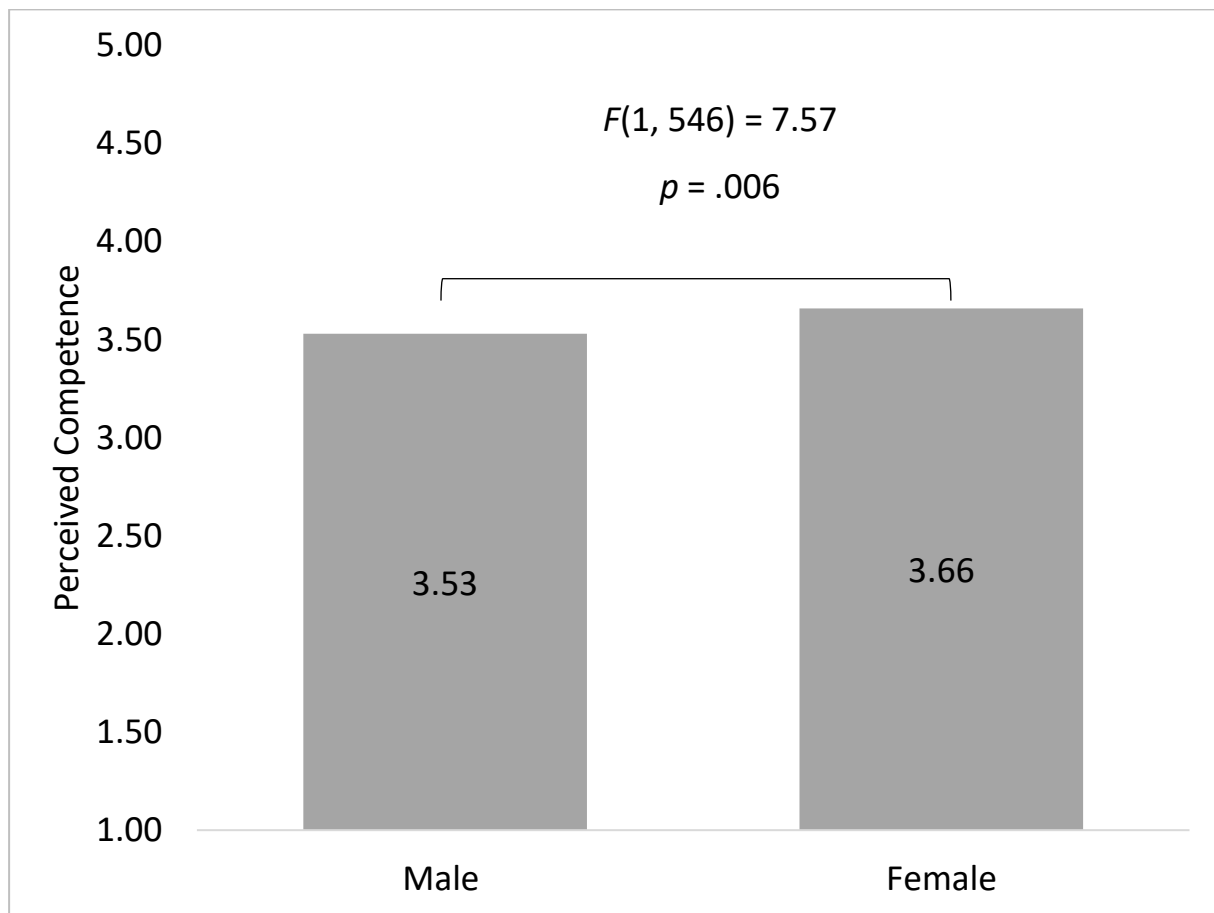
* $p < .006$.

Table B9*Study 1: Perceived Honesty*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.07 (1.39)	0.07 (0.71)	0.07 (1.49)	0.07 (0.78)
Charismatic gender-neutral	-0.03 (0.48)	-0.12 (1.26)	-0.03 (0.46)	-0.11 (1.25)
Charismatic gender-incongruent	0.03 (0.41)	0.04 (0.46)	0.04 (0.65)	0.06 (0.69)
Charismatic gender-congruent	-0.09 (1.34)	-0.03 (0.26)	-0.09 (1.34)	-0.03 (0.30)
WE*charismatic gender-neutral		0.17 (1.32)		0.17 (1.31)
WE*ch. gender-incongruent		-0.03 (0.27)		-0.05 (0.36)
WE*ch. gender-congruent		-0.13 (0.93)		-0.12 (0.87)
Participant gender			0.02 (0.43)	0.02 (0.46)
Participant age			0.00 (0.89)	0.00 (1.00)
Participant education			-0.03 (1.59)	-0.03 (1.43)
Participant employment			-0.03 (1.37)	-0.02 (1.29)
Experience 1			0.06 (1.25)	0.06 (1.31)
Experience 2			-0.04 (1.44)	-0.04 (1.44)
Experience 3			-0.03 (0.72)	-0.04 (0.93)
Experience 4			-0.03 (0.68)	-0.02 (0.55)
Constant	3.81* (71.43)	3.81* (55.00)	3.98* (26.38)	3.96* (25.31)
R-squared	0.01	0.02	0.03	0.04

Note. Robust *t*-statistics in parentheses. *N* = 551. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Figure B1*Study 1: Perceived Competence (Model 1)*

Appendix C

Study 2: Other Measures and Results

Other Measures

Propensity to Invest

We used the same scale to measure the propensity to invest as in Study 1. A higher score meant a higher propensity to invest ($M = 3.98$, $SD = 0.92$, $\alpha = .94$).

Perceived Entrepreneurial Success

We used the same scale to measure the perceived entrepreneurial success as in Study 1. Scores on the items were averaged with higher values indicating greater perceived success as an entrepreneur ($M = 3.46$, $SD = 0.55$, $\alpha = .85$).

Perceived Entrepreneur Ability to Execute

We used the same scale to measure the perceived ability of the entrepreneur to execute as in Study 1. Scores on the items were averaged with higher values indicating more perceived ability of entrepreneur to execute ($M = 3.62$, $SD = 0.57$, $\alpha = .80$).

Perceived Company Growth

We used the same scale to measure the perceived potential of the startup growth as in Study 1. Scores on the items were averaged and higher values indicate greater perceived potential for growth ($M = 3.43$, $SD = 0.77$, $\alpha = .94$).

Perceived Personality Qualities of the Entrepreneur

We used the same scales to measure the perceived competence ($M = 3.59$, $SD = 0.59$, $\alpha = .80$), dominance ($M = 2.48$, $SD = 0.64$, $\alpha = .69$), honesty ($M = 3.83$, $SD = 0.56$, $\alpha = .82$), and warmth ($M = 3.89$, $SD = 0.58$, $\alpha = .84$) of the entrepreneur as in Study 1.

Other Results

The correlations are listed in Table C1. For the other results, we regressed the entrepreneur gender and the style of the pitch (non-charismatic, charismatic-gender neutral,

gender-incongruent, gender-congruent) on each dependent variable. The regression coefficients of the dependent variables are presented in Tables C2 to C9.

In Study 2, we measured nine dependent variables, thus our alpha level adjusted to the Bonferroni family-wise error is .006 (Armstrong, 2014), like in Study 1. Women entrepreneurs were perceived as having more entrepreneurial success ($B = 0.13, p = .006$), however not robust to covariates ($B = 0.11, p = .016$). In Figure C1 we can observe that women entrepreneurs were perceived as possessing more entrepreneurial success ($M = 3.50, SD = 0.55$) than men entrepreneurs ($M = 3.37, SD = 0.55$), $F(1, 555) = 7.67, p = .006$. Furthermore, women entrepreneurs were perceived as being more competent ($B = 0.16, p = .001$), robust to covariates ($B = 0.15, p = .002$). In Figure C2 we can observe that women entrepreneurs were perceived as being more competent ($M = 3.67, SD = 0.58$) than men entrepreneurs ($M = 3.51, SD = 0.58$), $F(1, 555) = 11.26, p < .001$.

Other Tables and Figures

Table C1

Study 2: Correlation Table

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Perceived market potential	-								
2. Propensity to invest	.55***	-							
3. Perceived entrepreneurial success	.55***	.41***	-						
4. Ability to execute	.49***	.44***	.71***	-					
5. Perceived company growth	.76***	.63***	.70***	.64***	-				
6. Perceived competence	.46***	.42***	.72***	.69***	.62***	-			
7. Perceived warmth	.25***	.31***	.44***	.46***	.40***	.50***	-		
8. Perceived dominance	.05	-.02	.09*	.03	.02	.06	-.26***	-	
9. Perceived honesty	.32***	.31***	.50***	.55***	.44***	.58***	.66***	-.19***	-

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

Table C2*Study 2: Propensity to Invest*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.01 (0.17)	-0.10 (0.60)	0.01 (0.10)	-0.13 (0.78)
Charismatic gender-neutral	0.14 (1.21)	0.05 (0.33)	0.15 (1.27)	0.05 (0.31)
Charismatic gender-incongruent	0.03 (0.24)	0.07 (0.40)	0.02 (0.21)	0.04 (0.22)
Charismatic gender-congruent	0.03 (0.30)	-0.15 (0.89)	0.00 (0.01)	-0.19 (1.15)
WE*charismatic gender-neutral		0.18 (0.75)		0.19 (0.84)
WE*ch. gender-incongruent		-0.07 (0.30)		-0.02 (0.09)
WE*ch. gender-congruent		0.37 (1.57)		0.38 (1.67)
Participant gender			0.30* (3.30)	0.30* (3.24)
Participant age			-0.01 (1.80)	-0.01 (1.84)
Participant education			-0.02 (0.58)	-0.01 (0.38)
Participant employment			0.04 (1.26)	0.04 (1.16)
Experience 1			0.12 (1.67)	0.13 (1.81)
Experience 2			-0.00 (0.07)	-0.00 (0.10)
Experience 3			-0.05 (0.67)	-0.06 (0.71)
Experience 4			-0.01 (0.18)	-0.01 (0.14)
Constant	3.88* (41.10)	3.93* (33.22)	3.53* (12.53)	3.60* (12.52)
R-squared	0.00	0.01	0.05	0.06

Note. Robust *t*-statistics in parentheses. *N* = 560. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table C3*Study 2: Perceived Entrepreneurial Success*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.13*	0.18	0.11	0.17
	(2.77)	(1.86)	(2.42)	(1.84)
Charismatic gender-neutral	0.08	0.09	0.08	0.11
	(1.14)	(0.95)	(1.30)	(1.15)
Charismatic gender-incongruent	0.07	0.15	0.06	0.15
	(1.00)	(1.55)	(0.97)	(1.51)
Charismatic gender-congruent	0.09	0.09	0.09	0.09
	(1.43)	(1.01)	(1.38)	(1.01)
WE*charismatic gender-neutral		-0.03		-0.05
		(0.22)		(0.38)
WE*ch. gender-incongruent		-0.17		-0.17
		(1.27)		(1.27)
WE*ch. gender-congruent		0.00		-0.01
		(0.02)		(0.04)
Participant gender			0.09	0.09
			(1.82)	(1.74)
Participant age			-0.00	-0.00
			(2.54)	(2.57)
Participant education			-0.05*	-0.05*
			(2.86)	(2.76)
Participant employment			-0.01	-0.01
			(0.59)	(0.71)
Experience 1			0.10	0.10
			(2.08)	(2.13)
Experience 2			-0.04	-0.04
			(1.45)	(1.40)
Experience 3			-0.08	-0.09
			(2.17)	(2.19)
Experience 4			0.02	0.02
			(0.58)	(0.64)
Constant	3.31*	3.29*	3.64*	3.62*
	(61.14)	(46.55)	(23.80)	(23.25)
R-squared	0.02	0.02	0.08	0.08

Note. Robust *t*-statistics in parentheses. *N* = 560. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table C4*Study 2: Ability of Entrepreneur to Execute*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.12 (2.33)	0.13 (1.28)	0.10 (2.04)	0.12 (1.19)
Charismatic gender-neutral	0.05 (0.63)	0.04 (0.39)	0.05 (0.65)	0.05 (0.46)
Charismatic gender-incongruent	0.08 (1.07)	0.14 (1.36)	0.06 (0.94)	0.12 (1.24)
Charismatic gender-congruent	0.06 (0.89)	0.04 (0.39)	0.05 (0.75)	0.03 (0.31)
WE*charismatic gender-neutral		0.01 (0.06)		-0.00 (0.01)
WE*ch. gender-incongruent		-0.12 (0.82)		-0.11 (0.78)
WE*ch. gender-congruent		0.05 (0.34)		0.04 (0.30)
Participant gender			0.09 (1.68)	0.09 (1.62)
Participant age			0.00 (1.92)	0.00 (1.94)
Participant education			-0.03 (1.75)	-0.03 (1.63)
Participant employment			-0.02 (0.75)	-0.02 (0.83)
Experience 1			0.06 (1.24)	0.06 (1.29)
Experience 2			-0.02 (0.54)	-0.02 (0.52)
Experience 3			-0.11 (2.34)	-0.11 (2.37)
Experience 4			0.01 (0.29)	0.01 (0.33)
Constant	3.51* (60.49)	3.50* (47.48)	3.82* (22.43)	3.82* (22.43)
R-squared	0.01	0.01	0.06	0.07

Note. Robust *t*-statistics in parentheses. *N* = 560. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table C5*Study 2: Perceived Company Growth*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.02 (0.36)	0.02 (0.12)	0.01 (0.11)	-0.00 (0.04)
Charismatic gender-neutral	0.04 (0.41)	0.07 (0.50)	0.04 (0.50)	0.08 (0.59)
Charismatic gender-incongruent	0.01 (0.13)	0.02 (0.14)	0.01 (0.07)	-0.01 (0.09)
Charismatic gender-congruent	0.07 (0.74)	0.02 (0.16)	0.04 (0.43)	0.00 (0.01)
WE*charismatic gender-neutral		-0.06 (0.31)		-0.07 (0.37)
WE*ch. gender-incongruent		-0.01 (0.07)		0.04 (0.19)
WE*ch. gender-congruent		0.10 (0.52)		0.08 (0.42)
Participant gender			0.38* (5.24)	0.38* (5.22)
Participant age			-0.01 (2.20)	-0.01 (2.18)
Participant education			-0.06 (2.32)	-0.06 (2.32)
Participant employment			-0.01 (0.27)	-0.01 (0.26)
Experience 1			0.08 (1.39)	0.09 (1.43)
Experience 2			-0.01 (0.21)	-0.01 (0.27)
Experience 3			-0.10 (1.59)	-0.10 (1.58)
Experience 4			0.02 (0.38)	0.02 (0.36)
Constant	3.36* (42.30)	3.36* (32.98)	3.29* (14.10)	3.30* (13.94)
R-squared	0.00	0.00	0.11	0.11

Note. Robust *t*-statistics in parentheses. *N* = 560. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table C6*Study 2: Perceived Competence*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.16*	0.09	0.15*	0.08
	(3.36)	(0.86)	(3.08)	(0.76)
Charismatic gender-neutral	0.10	0.06	0.10	0.06
	(1.36)	(0.54)	(1.43)	(0.61)
Charismatic gender-incongruent	0.05	0.02	0.04	0.01
	(0.71)	(0.19)	(0.58)	(0.06)
Charismatic gender-congruent	0.14	0.07	0.13	0.05
	(1.98)	(0.71)	(1.86)	(0.58)
WE*charismatic gender-neutral		0.08		0.07
		(0.56)		(0.54)
WE*ch. gender-incongruent		0.06		0.07
		(0.45)		(0.50)
WE*ch. gender-congruent		0.15		0.15
		(1.03)		(1.07)
Participant gender			0.08	0.08
			(1.53)	(1.51)
Participant age			-0.00	-0.00
			(2.17)	(2.17)
Participant education			-0.02	-0.02
			(1.21)	(1.11)
Participant employment			-0.01	-0.01
			(0.68)	(0.68)
Experience 1			0.08	0.08
			(1.69)	(1.75)
Experience 2			-0.02	-0.02
			(0.70)	(0.74)
Experience 3			-0.08	-0.08
			(1.92)	(1.92)
Experience 4			-0.00	-0.00
			(0.09)	(0.10)
Constant	3.43*	3.47*	3.69*	3.72*
	(59.99)	(48.60)	(22.84)	(22.92)
R-squared	0.03	0.03	0.07	0.07

Note. Robust *t*-statistics in parentheses. *N* = 560. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table C7*Study 2: Perceived Warmth*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.04 (0.74)	-0.13 (1.22)	0.04 (0.75)	-0.14 (1.28)
Charismatic gender-neutral	0.01 (0.10)	-0.11 (1.04)	-0.00 (0.04)	-0.12 (1.12)
Charismatic gender-incongruent	0.07 (0.90)	-0.02 (0.21)	0.06 (0.80)	-0.04 (0.41)
Charismatic gender-congruent	0.08 (1.07)	-0.06 (0.63)	0.08 (1.09)	-0.06 (0.65)
WE*charismatic gender-neutral		0.23 (1.50)		0.23 (1.46)
WE*ch. gender-incongruent		0.18 (1.17)		0.20 (1.30)
WE*ch. gender-congruent		0.28 (1.87)		0.28 (1.91)
Participant gender			0.05 (0.78)	0.05 (0.78)
Participant age			0.00 (0.20)	0.00 (0.19)
Participant education			-0.01 (0.48)	-0.01 (0.32)
Participant employment			0.00 (0.02)	0.00 (0.05)
Experience 1			0.05 (1.04)	0.05 (1.12)
Experience 2			-0.03 (0.81)	-0.03 (0.85)
Experience 3			-0.02 (0.38)	-0.02 (0.39)
Experience 4			-0.03 (0.75)	-0.03 (0.77)
Constant	3.76* (64.13)	3.85* (56.32)	3.78* (19.53)	3.86* (19.85)
R-squared	0.00	0.01	0.01	0.02

Note. Robust *t*-statistics in parentheses. *N* = 560. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table C8*Study 2: Perceived Dominance*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.13 (2.52)	0.22 (2.09)	0.13 (2.44)	0.21 (1.97)
Charismatic gender-neutral	-0.07 (0.94)	-0.03 (0.28)	-0.08 (1.07)	-0.04 (0.41)
Charismatic gender-incongruent	-0.00 (0.05)	0.02 (0.24)	-0.01 (0.08)	0.02 (0.23)
Charismatic gender-congruent	0.02 (0.23)	0.11 (1.17)	0.03 (0.39)	0.11 (1.15)
WE*charismatic gender-neutral		-0.08 (0.56)		-0.08 (0.53)
WE*ch. gender-incongruent		-0.06 (0.37)		-0.06 (0.38)
WE*ch. gender-congruent		-0.20 (1.38)		-0.17 (1.21)
Participant gender			0.03 (0.43)	0.03 (0.44)
Participant age			0.00 (0.88)	0.00 (0.88)
Participant education			0.02 (1.15)	0.02 (1.05)
Participant employment			-0.02 (0.80)	-0.02 (0.78)
Experience 1			0.07 (1.73)	0.07 (1.62)
Experience 2			-0.04 (1.28)	-0.04 (1.22)
Experience 3			-0.10 (2.17)	-0.10 (2.15)
Experience 4			0.06 (1.40)	0.06 (1.40)
Constant	2.37* (41.65)	2.32* (33.28)	2.28* (11.47)	2.24* (10.91)
R-squared	0.01	0.02	0.03	0.03

Note. Robust *t*-statistics in parentheses. *N* = 560. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Table C9*Study 2: Perceived Honesty*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.10 (2.19)	0.03 (0.30)	0.10 (2.13)	0.02 (0.21)
Charismatic gender-neutral	-0.05 (0.72)	-0.08 (0.83)	-0.07 (0.97)	-0.09 (1.02)
Charismatic gender-incongruent	0.04 (0.65)	-0.02 (0.26)	0.03 (0.37)	-0.05 (0.57)
Charismatic gender-congruent	-0.01 (0.17)	-0.06 (0.62)	-0.01 (0.22)	-0.07 (0.73)
WE*charismatic gender-neutral		0.06 (0.42)		0.05 (0.38)
WE*ch. gender-incongruent		0.13 (0.99)		0.15 (1.11)
WE*ch. gender-congruent		0.09 (0.70)		0.11 (0.79)
Participant gender			0.03 (0.63)	0.03 (0.67)
Participant age			0.00 (0.22)	0.00 (0.24)
Participant education			-0.01 (0.36)	-0.01 (0.36)
Participant employment			-0.02 (0.98)	-0.02 (0.89)
Experience 1			0.06 (1.34)	0.06 (1.37)
Experience 2			-0.02 (0.53)	-0.02 (0.59)
Experience 3			-0.06 (1.22)	-0.06 (1.20)
Experience 4			-0.04 (1.17)	-0.05 (1.21)
Constant	3.79* (68.78)	3.83* (55.08)	3.94* (25.03)	3.98* (24.95)
R-squared	0.01	0.01	0.04	0.04

Note. Robust *t*-statistics in parentheses. *N* = 560. Experience 1 = work experience in the food delivery business; experience 2 = work experience in the food industry in general; experience 3 = experience in investing in businesses; experience 4 = experience in financial investing.

* $p < .006$.

Figure C1

Study 2: Perceived Entrepreneurial Success (Model 1)

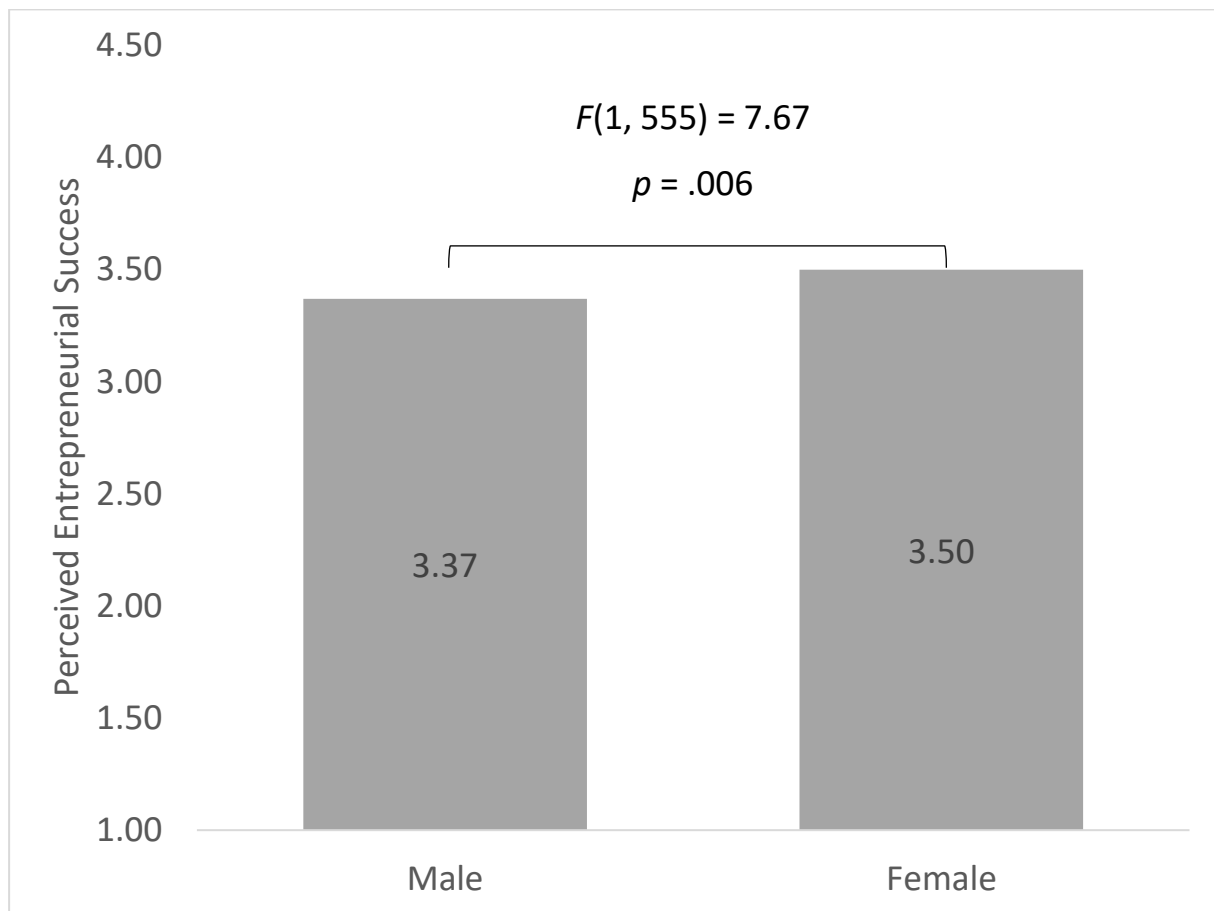
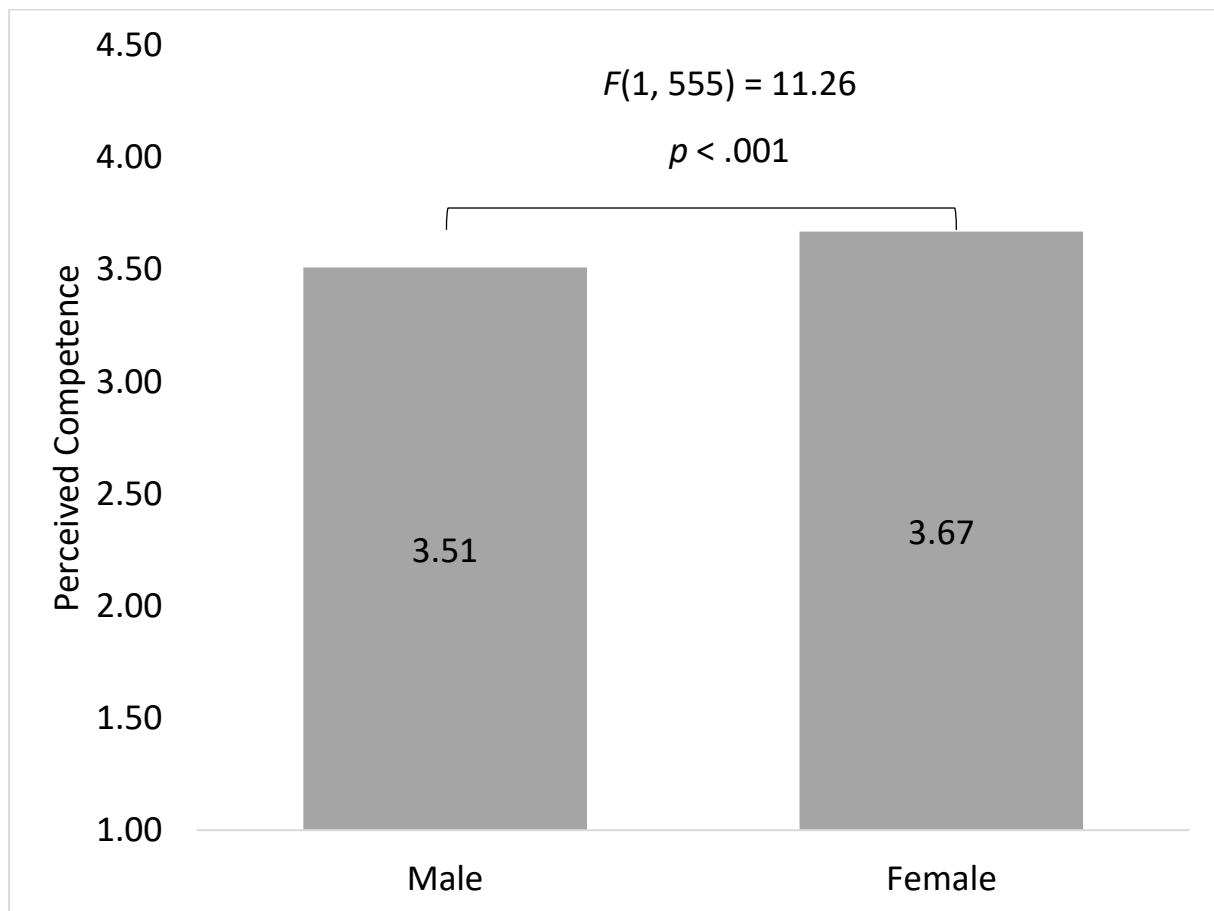


Figure C2*Study 2: Perceived Competence (Model 1)*

Appendix D

Study 2: Descriptive Statistics for the Entrepreneur Faces

Condition	Women		Men	
	Real	Transformed	Real	Transformed
Perceived age	27.71	28.73	27.08	29.10
Perceived realism	3.39	3.18	3.54	3.20
Perceived attractiveness	2.71	2.87	2.50	2.26
Perceived competence	3.43	3.42	3.49	3.15

Note. $N = 60$.

Charisma in Entrepreneurial Pitching: Investigating with Virtual Humans

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Abstract

We investigated whether charisma is perceived similarly and has the same effect in a public goods game when delivered by a real or virtual human in a preliminary study and whether charismatic entrepreneurial pitches result in a higher perceived market potential for firms in a main study. Further, in the main study we investigate whether verbal or nonverbal charisma results in a higher perceived market potential of ventures and whether this effect is similar for women and men entrepreneurs.

In the preliminary study, 275 online participants were randomly assigned to watch a three-minute video of a male speaker who was either charismatic or not and who was either a real or a virtual human, persuading participants to allocate funds to a common goal in the context of a public goods game. In the main study, 558 online participants were randomly assigned to watch a three-minute video of either a woman or man entrepreneur, enacted by a virtual human, pitching a company called “Foodfix”.

In the preliminary study, there was a main effect of charisma of the speaker on the perceived charisma, but not on the persuasiveness of the speaker. In the main study, there was no effect of charisma (combined, verbal, or nonverbal) or gender on the perceived market potential. The findings of the main study suggest charisma is perceived similarly and has similar effects for virtual humans compared to real humans. The findings of the main study suggest that the charisma (verbal and nonverbal) and the gender of the entrepreneur do not affect the perceived market potential of the venture, which contradicts existing research and raises the question of whether it is possible to use virtual humans as stimulus material when studying real human phenomena.

Keywords: charisma, virtual humans, incentivized measures, entrepreneurship, entrepreneurial pitch, pitching

Charisma in Entrepreneurial Pitching: Investigating with Virtual Humans

Early-stage entrepreneurship is a performance environment riddled with uncertainty (Brooks et al., 2014). Potential investors look not only at the quality of the venture idea, but also how the ideas are communicated (Clark, 2008). Specific types of nonverbal (Clarke et al., 2018) and verbal behavior (Balachandra et al., 2021) are linked to better investment outcomes for entrepreneurs. In the present research we set out to investigate, whether using charisma, a well-published management construct (Antonakis et al., 2016) linked to specific types of verbal (e.g., metaphors or rhetorical questions) and nonverbal communication tactics (e.g., animated facial expressions, hand, or body gestures), impacts the success of the outcomes of entrepreneurial pitching. Charisma has been shown to be effective in other fields, such as worker motivation (Meslec et al., 2020), politics (Jacquart & Antonakis, 2015), and social media influence (Tur et al., 2021) and could potentially be useful in a variety of performance domains.

Does using verbal and nonverbal charisma in entrepreneurial pitches lead to higher perceived market potential of ventures, and if so, would the result be similar for entrepreneurs of all genders? We investigate the effect of charisma for self-reported women and men entrepreneurs. There is a significant gender venture funding gap in entrepreneurship (Greene et al., 2001; Kanze et al., 2018), which is partially due to the decisions of the entrepreneurs (i.e., choice of industry, amount of investment asked; Elam et al., 2019; Orser et al., 2006), but also partially due to the incongruity of the stereotypical female social role with the agentic entrepreneurial role (Lee & Huang, 2018). It is possible that the same use of charisma is perceived differently depending on speaker gender (Banks et al., 2017), thus, we investigate whether the same charismatic tactics have the same effects for both women and men entrepreneurs.

We investigate the effect of charisma in entrepreneurial pitching, avoiding gendered verbal (Balachandra et al., 2021) or nonverbal behavior (Balachandra et al., 2019). A way to have women and men entrepreneurs deliver the same pitches with identical nonverbal behavior (i.e., the same voice intonations and gestures in the same moments) is to create the entrepreneurs using virtual humans, 3D representations of real humans with preprogrammed verbal and nonverbal behavior (Fox et al., 2015). Using virtual humans enables us to replicate the same verbal and nonverbal behavior onto multiple women and men virtual-human entrepreneurs, thus avoiding differences in verbal and nonverbal behavior across entrepreneurs. Furthermore, using virtual humans enables researchers to create pitches with entrepreneurs matched in terms of appearance, perceived attractiveness, and age, thus avoiding idiosyncratic differences between entrepreneurs that potentially leads to endogeneity (Antonakis et al., 2014).

Human-like avatars are perceived as likeable and similar to real humans, in comparison to virtual humans having a less human-like appearance (de Borst & Gelder 2015). Furthermore, individuals react similarly to virtual and real humans in certain situations, such as when the human accepts or rejects the gift (Zucker et al., 2011), or when the human asks questions in the clinical setting (Dimeff et al., 2020). Like real humans, virtual humans can be effective in fostering behavioral change when delivering persuasive messages (Guadagno et al., 2007) and when using Cialdini's persuasive strategies (Zalake et al., 2021). Individuals can experience emotional contagion from virtual humans (Volonte et al., 2020), nevertheless it is unclear whether individuals can develop affect toward virtual humans and whether types of leadership, such as charisma. We therefore investigate whether charisma leads to the same effects when delivered by a real compared to a virtual human in the preliminary study, following which we test the effects of verbal and nonverbal charisma for women and men entrepreneurs, represented by virtual humans in the main study.

Charisma and Entrepreneurship

Charisma is a well-established leadership style (House, 1977; Shamir et al., 1993), that was initially described as a “specific gifts of the body and spirit not accessible to everybody” (Weber, 1968, p. 19), that enables leaders to guide their followers through times of uncertainty. Conger and Kanungo (1987) suggests that it is important to consider charismatic leadership as an observable behavioral process and specified that charismatic leaders craft an idealized vision of the future, which in term positively impacts followers’ affection towards the leader and identification with the leader. Shamir (1993) suggests that the mechanism underlying the follower effects stems from the communication of important values that manage to increase the self-worth of the followers.

The neo-charismatic school introduced a more objective definition of charisma through the lens of signaling (Connelly et al., 2011) as “values-based, symbolic, emotion-laden leader signaling” (Antonakis et al., 2016, p. 304) that can be objectively operationalized by verbal and non-verbal charismatic leadership tactics (CLTs; Antonakis et al., 2011). The verbal tactics on one hand serve to communicate a vision through the use of (a) metaphors, (b) rhetorical questions, (c) stories or anecdotes, (d) contrasting statements, (e) three part-lists, and on the other hand add substance to the message by (f) expressing moral conviction, (g) sentiment of the collective, (h) setting ambitious goals, and (i) expressing confidence that these goals will be achieved (Jacquart & Antonakis, 2015). Furthermore, the nonverbal tactics enable the leader to be more memorable and communicate passion through (a) body gestures, (b) animated facial expressions, and (c) an animated voice tone (Awamleh & Gardner, 1999; Ernst et al., 2021; Holladay & Coombs, 1993). These tactics serve to distil and visualize the message, communicate moral values, enable the followers to identify with the leader, as the leader demonstrates similarity with the followers, and motivate the followers to work harder, through increase their self-efficacy (Ernst et al., 2021).

Charisma is effective in situations of both formal and informal leadership (Awamleh & Gardner, 1999; Meslec et al., 2020; Tosi et al., 2004; Tur et al., 2021). The charisma of a leader can increase follower effort in repetitive tasks (Antonakis et al., 2021; Howell & Frost, 1989; Meslec et al., 2020), is linked to an increased likelihood of political candidates being elected when economic performance signals are ambiguous (Jacquart & Antonakis, 2015), the likelihood of CEO retention (Jacquart & Antonakis, 2015), and linked to an increased the company share price and CEO compensation in case of ambiguous results (Tosi et al., 2004); it also works well in social media settings (Tur et al., 2021). From an evolutionary perspective, charismatic leaders signal the ability to coordinate complex group actions and mobilize resources (Grabo et al., 2017). Despite the evidence in many different fields, the effect of charisma on investment outcomes in entrepreneurship has not yet been studied.

One of the most prominent corporate leaders and entrepreneurs in recent history, the founder of Apple, Steve Jobs has been described as charismatic (Sharma & Grant, 2011); he was able to masterfully craft his public speaking, weaving in innovation, storytelling, and rhetorical tactics, thus conveying a powerful vision for his company. Indeed, oftentimes, the roles of leaders and entrepreneurs coincide (Harrison & Leitch, 1994). Managers must persuade their employees to accomplish tasks, whereas entrepreneurs must persuade both potential investors and potential clients. A difference between the use of charisma for managers and entrepreneurs is the power relationship with the counter party (managers hold formal power over their employees, whereas entrepreneurs do not; Pollack & Bosse, 2014). Nevertheless, both managers and entrepreneurs must persuade third parties, which constitutes a clear similarity in terms of the persuasion task.

Thus, we investigate whether charisma of an entrepreneur can influence the perceived market potential of the venture by which we understand the extent to which investors coordinate their actions (i.e., the investment) with the other stakeholders (e.g., other investors,

consumers, the entrepreneur; Mehta et al., 1994). Research has shown that the charisma of CEOs is linked to positive effects on the market value of companies in case of ambiguous performance measures (Tosi et al., 2004), which is similar to early-stage entrepreneurship when future performance is uncertain.

In the present research, we investigate whether charisma is effective in the context of an entrepreneurial “elevator” pitch. An “elevator” entrepreneurial pitch typically consists of a brief presentation lasting several minutes when the venture founders first introduce themselves and their idea to potential investors (e.g., venture capitalists, business angels; Clark, 2008). Based on this pitch, investors assess both the viability and interest of the venture and the entrepreneur (Fried & Hisrich, 1994). Therefore, during the pitch, entrepreneurs must clearly communicate their venture idea, persuade the investors in its viability, and showcase strong persuasiveness and communication skills (Clark, 2008), passion, preparedness (Chen et al., 2009), and ability to provide a sustained effort (MacMillan et al., 1985), enabling their venture to appear legitimate (Aldrich & Fiol, 1994).

Research has shown that both verbal and nonverbal communication plays an important role in the successful funding of the venture (Balachandra et al., 2013, 2021; Clarke et al., 2018). When studying the transcripts of a pitch competition, Balachandra et al. (2021) found that when a pitch included a message linked to inspiration, this impacted the selection of the finalist in a significantly positive way. One can argue that inspiration helps to form a compelling vision, through expressing confidence that the goal will be achieved, a charismatic leadership tactic (Ernst et al., 2021). Furthermore, Clarke et al. (2018) found that when entrepreneurs used more gestures to accompany the content of their pitches, the investors were more likely to invest in their ventures (Awamleh & Gardner, 1999). However, some verbal tactics, such as metaphors were not linked to increased investment (Clarke et al., 2018). Furthermore, research shows that the perceived market potential of a venture was not

influenced by whether the pitch contained charismatic tactics or not: The venture had an equal perceived market potential in both conditions (Bekbergenova et al., 2023). It is thus not clear whether charisma can influence funding outcomes in entrepreneurial pitches, which leads us to pose a research question rather than a hypothesis.

RQ1: Do charismatic entrepreneurial pitches result in a higher perceived market potential of the venture compared to non-charismatic pitches?

Further, we investigate how entrepreneur verbal and nonverbal charisma (separately and jointly) influences the perceived market potential of the firm. In naturalist settings, verbal and nonverbal charisma are correlated with each other and are typically expressed jointly (Antonakis et al., 2011; Jacquart & Antonakis, 2015; Tur et al., 2021). However, there is conflicting evidence to whether verbal or nonverbal charisma contributes more to the impact: Kirkpatrick and Locke (1996) investigated the direct and indirect effects of charismatic vision and charismatic communications style, discovering that vision positively affected the congruence between the beliefs of the leaders and followers, positive follower attributions, and trust in the leader, whereas communication style only positively affected perceived charisma. Contrarily, Awamleh and Gardner (1999) revealed that strong nonverbal delivery was particularly important for perceptions of charisma and for perceived leader effectiveness, unlike the communication of the vision. Tur et al. (2021) found that verbal charisma predicted more views of TED talks; however, gesturing did not have a significant impact on the views. Concerning entrepreneurial pitches, a study has found that nonverbal gesturing, rather than using metaphors, had a stronger impact on individuals' propensity to invest (Clarke et al., 2018). Given the contradicting results, we try to distinguish whether verbal or nonverbal charisma is more important for the perceived market potential of the venture being pitched.

RQ2: How does verbal and nonverbal charisma of the entrepreneur affect perceived market potential of the venture?

Gender and Entrepreneurship

Does verbal and nonverbal charisma have the same effects for women and men entrepreneurs? There is uncertainty surrounding the future success of nascent ventures (Huang & Pearce, 2015) and the livelihood of the ventures highly depends on the success of the pitch to attract the interest of investors (Davila et al., 2003; Gompers & Lerner, 2004), and not all entrepreneurs are treated equally (Kanze et al., 2018). Typically, women entrepreneurs encounter more difficulties in the entrepreneurial process (Balachandra et al., 2013), such as having more difficulty when accessing private equity, institutional capital, and banking loans (Becker-Blease & Sohl, 2007; Bigelow et al., 2014; Eddleston et al., 2016). Furthermore, identical business pitches were perceived as more logical, fact-based, and persuasive, receiving twice as much funding when presented by a male entrepreneur compared to when presented by a woman entrepreneur (Brooks et al., 2014). Thus, there is a need to do controlled experiments in this context, and virtual settings may be able to add new knowledge in this regard.

Investors have reported perceiving ventures run by men as safer and less risky than ventures run by women (Greene et al., 2001). Furthermore, when interrogating women entrepreneurs about the future of their companies during pitch competitions, investors tended to ask them questions related to a negative company outlook (prevention-focused - focusing on caution and reducing losses), whereas they ask men entrepreneurs questions with a positive outlook (promotion-focused - focusing on generating profit; Kanze et al., 2018). On average, entrepreneurs who were asked promotion-focused questions raised \$16.8 million, while entrepreneurs who received prevention-focused questions raised \$2.3 million (Kanze et al., 2018).

The different treatment of women and men entrepreneurs can be analyzed through the lens of social role theory (Eagly, 1987): The differences in expectations towards women and

men stem from the differences in their historically diverging social roles (Eagly, 1987). Entrepreneurship is considered a stereotypically male profession (Bird & Brush, 2002; Bruni et al., 2004). Words describing men (e.g., independent, ambitious, or analytical; Bem, 1974) coincide with words describing entrepreneurship (e.g., independent, achievement oriented, or intelligent); however, different sets of descriptions are used for women (e.g., gentle, shy, or gullible; Ahl, 2006). Furthermore, responses to the Schein descriptive index (SDI) showed that characteristics attributed to men highly correlated with characteristics attributed to entrepreneurs (Gupta et al., 2009).

Women are perceived to have a “lack of fit” for male-typed professions such as management positions (Heilman, 1983) and it seems, entrepreneurship too. Furthermore, women who succeed in male-typed professions may face backlash, being perceived as less warm, less likeable, and more interpersonally hostile (Heilman et al., 2004; Heilman & Okimoto, 2007). Given that the funding of a venture, especially in the early stages, depends on positive assessments of the entrepreneur by investors, women entrepreneurs may be at a disadvantage. Typically, the assessment related to venture investments is carried out on (a) the founder, (b) the venture, and (c) the perception of the ability of the founder to execute (Huang & Pearce, 2015). The combination of the male social role stereotype of an entrepreneur and the perceived lack of fit of women in the entrepreneurship field can lead to negative assessments of women entrepreneurs which then can negatively impact funding (Lee & Huang, 2018).

Furthermore, even if women entrepreneurs exhibit behaviors linked to more positive funding outcomes, such as using more gestures during a pitch (Clarke et al., 2018), using language linked to inspiration (Balachandra et al., 2021), and showcasing strong communication skills (Steigenberger & Wilhelm, 2018), it is not clear whether these actions have the same effect for women entrepreneurs compared to men. For example, in leadership,

women on average are rated higher on the use of transformational leadership (Eagly et al., 2003)—perhaps because of a selection effect (women have to meet a higher threshold to achieve leadership roles; Antonakis et al., 2010, p. 1109). They are also more nonverbally expressive than men (Briton & Hall, 1995). However, they are not considered as more charismatic leaders than men (Banks et al., 2017; Groves, 2005).

When studying the effects of verbal and nonverbal charisma for women and men entrepreneurs, we consider that investors might be under the influence of the gender stereotype and provide biased assessment (Kanze et al., 2018; Lee & Huang, 2018; Malmström et al., 2017). Indeed, women entrepreneurs might be victim to the backlash effect and perceived having communality deficit (Heilman & Okimoto, 2007), given they adopt an agentic role (Heilman et al., 2004) which might partially explain the venture funding gap (Lee & Huang, 2018). Charismatic leaders on the other hand are perceived as warm (Michel et al., 2013) and generally enjoy positive ratings on a variety of trait dimensions (Antonakis et al., 2011). Thus, the use of charisma might address the backlash effect that women entrepreneurs are subject to. Nevertheless, research showed that transcripts of entrepreneurial pitches containing differing levels of verbal charisma had a similar effect for both women and men entrepreneurs in that the transcripts did not elicit a different effect in perceived market potential of the venture and that pitches of a different style (i.e., gender-congruent style) elicited similar effects for entrepreneurs of female and male genders (Bekbergenova et al., 2023). Thus, whereas individuals might have different reactions to levels of nonverbal charisma exhibited by women and men entrepreneurs linked to gender stereotypes in nonverbal behavior (Fischer & LaFrance, 2015), it remains unclear whether differing levels of verbal charisma will elicit a different reaction when enacted by women and men entrepreneurs.

RQ3: Does verbal and nonverbal charisma affect the perceived market potential differently for women compared to men entrepreneurs?

In the present research, we will exploit a virtual setting to rigorously examine this question. We will standardize the verbal and nonverbal behavior of the women and men entrepreneurs using virtual humans, to be able to observe the effects of entrepreneur gender without the verbal, and nonverbal behavior being a potential confound; we thus disentangle the gender from the behavior by holding the behavior constant across gender.

Virtual Humans and Charisma

Virtual humans can either be agents (controlled by a script) or avatars (representations of a real human; Fox et al., 2015). Virtual humans have already been successfully used in educational purposes (Johnson et al., 2000; Rickel & Johnson, 1999), and in influencing human attitude change (Guadagno et al., 2007). Guadagno et al. (2007) measured the effects of virtual human behavioral realism, virtual human gender, and participant gender on the attitude change after listening to a persuasive message delivered by the virtual human. Indeed, the persuasive message delivered by the virtual humans did cause an attitude change in participants, with the greatest attitude change occurring when the virtual human was the same gender as the participant, meaning that persuasive messages are also effective when delivered by virtual humans. Nevertheless, the study did not report whether the attitude change was comparable when the message was delivered by a real human compared to a virtual human. In the present research, we first test whether there is a difference in how charismatic a real compared to a virtual human is perceived when delivering a charismatic message.

How can a virtual human be charismatic? Virtual humans can communicate verbally (Dimeff et al., 2020), use gestures (Wang & Ruiz, 2021), and exhibit emotions (Volonte et al., 2020). Thus, virtual humans can replicate objective measures of charisma such as verbal and nonverbal charismatic leadership tactics (Antonakis et al., 2011). Furthermore, individuals

reported feeling fewer negative emotions after interacting with virtual humans exhibiting positive emotions (Volonte et al., 2020). Virtual humans were as effective as real humans in changing participant attitudes toward a variety of subjects (Zanbaka et al., 2006).

Nevertheless, given that virtual humans similar in appearance to real humans can be subject to the uncanny valley effect (Ho & MacDorman, 2017), and thus suffer from a decrease in likability, it is unclear whether charisma will lead to the same effects in real and virtual humans. Thus, we will test whether charisma is perceived the same and whether it has an effect the contributions to the public goods game (i.e., operationalized persuasion) when a charismatic message is delivered by a virtual as compared to a real human (preliminary study).

RQ4: Is there a difference in the effect of a charismatic message when delivered by a real as compared to a virtual human?

If the virtual human is perceived as charismatic and attains similar results in terms of operationalized persuasion compared to the real human, this will enable us to use virtual humans as entrepreneurs in the main study. It is primordial to ensure that charisma is perceived when enacted by virtual compared to real humans prior to investigating a real human situation (i.e., entrepreneurial pitching).

Overview of Current Studies

We set out to test whether charisma has an effect in public speaking (i.e., a speech, an entrepreneurial pitch) using virtual humans. In the preliminary study, we set out to test whether combined verbal and nonverbal charisma has the same effect when delivered by virtual humans compared to a real human. We examine the effects on operationalized persuasion using incentivized measures. In the main study we test whether the perceived market potential of a venture (an incentivized measure different from the preliminary study) is affected by the level of verbal and nonverbal charisma of the pitch as well as the self-reported

gender of the entrepreneur; the latter study thus also addresses the current call for research on the relationship of gender and charisma (Banks et al., 2017) and on gender and entrepreneurial communication style (Clarke et al., 2018).

Preliminary Study: Charisma in Real and Virtual Humans

Method

In the current study, we test whether there is a difference in persuasion when a real or a virtual human delivers a motivating speech. We exposed participants to a male speaker who was either charismatic or not and who was either a real or a virtual human. The speaker was recorded to persuade participants to allocate their funds to a common pot in the context of a public goods game, one of the most widespread experimental mechanisms to investigate collective action (Antonakis et al., 2021; Fischbacher et al., 2001; Kurzban, 2001). We chose this context because it enabled us to operationalize persuasion, which is a key variable influencing investor decisions in entrepreneurial pitching (Chen et al., 2009; Tsai & Lai, 2011), and to measure consequential participant reactions to charisma (Lonati et al., 2018; Meslec et al., 2020). Given too, that entrepreneurial investment depends on coordination between stakeholders (Chou et al., 2017), one can argue that investment in a new venture is somewhat related to the contribution to the stakeholder common good (public good) because both coordination to contribute and anticipating whether others will react well to an entrepreneur depend on individual beliefs of what others will do. Thus, beyond using virtual versus real humans the two studies do have a commonality with respect to observer beliefs about what others may think about the target.

Participants

We recruited 309 participants (143 women) via the Prolific online platform. We selected participants who were native French speakers and citizens of France, Belgium, or Switzerland. The participants received a fixed payment of £1.50 and a variable payment

ranging from £0 to £1.00. Thirty-four participants were excluded for failing the audio check (explained below), leaving us with a final sample of 275 participants (136 women). Their average age was 30.16 years ($SD = 9.87$, range = 19 - 64). Concerning their employment status, 42.55% were employed full time, 6.55% employed part-time, 9.45% were self-employed, 4.73% were unemployed, 31.99% were students, and 4.73% did not report their employment status.

Procedure

Participants accessed an online questionnaire and after providing informed consent, were informed that they were going to watch a video of an individual giving a motivating speech in French. The researchers asked the participants to think about the person giving the speech as their leader. We used two existing videos of a man providing a motivational speech about the instruction of a public goods game either high or low in charisma (explained in more detail below). We then created two new videos of a virtual human mimicking the person and the speech shown in the existing videos. This transformation resulted in four videos with either high or low levels of combined verbal and nonverbal charisma and either delivered by a real or a virtual human: that is, a 2 (human: real vs. virtual) by 2 (charisma: high vs. low) design. Participants were randomly assigned to one of the four experimental conditions.

After watching the video, participants reported how persuaded they were by the speaker and how charismatic they perceived him. The order of presentation of the two variables was randomized¹. After, participants then filled in the general leadership impression scale (GLI; Cronshaw & Lord, 1987) and the vision articulation scale (Podsakoff et al., 1996) in random order. Participants assigned to the virtual human conditions also filled in the perceived uncanny valley effect questionnaire (i.e., humanness, attractiveness, eeriness; Ho & MacDorman, 2017). Finally, participants reported information about their age, gender,

profession, and education. Throughout the study, there were attention checks (explained in more detail below).

Materials

Manipulation of Charisma and the Virtual and Real Human

We utilized the two videos of a human actor delivering a speech in a high or low charisma way previously created and used by Antonakis, d'Adda, Zehnder (2021) in a study involving a public goods game. The researchers hired a professional actor to motivate the viewer to contribute to a public goods game in form of a speech in a (a) charismatic or (b) non-charismatic manner. In the charismatic video, the actor delivered a speech that was written using 20 CLTs over 41 sentences, while using expressive non-verbal language, animated facial expressions, and modulating his tone of voice. In the non-charismatic video, the actor delivered a speech which contained no CLTs over 32 sentences, while keeping a blank facial expression, a monotonous tone of voice, and not using any hand gestures. As a result of a pretest, conducted by Antonakis et al. (2021), the leader portrayed in the video with high levels of charisma was perceived as significantly more charismatic than the leader portrayed in the video with low levels of charisma.

Based on these two videos, we created two new videos with a virtual human replicating the speech (using the original human voice), verbal, and nonverbal behavior of the human actor. The virtual human (a) had a similar physical appearance as the actor (i.e., skin tone, hair color, attire; see Figure 1), (b) replicated the hand and body gestures of the actor, and (c) had the identical audio file as the human actor. Using the program Headshot (Headshot, 2022) we created a digital version of the actor's face, ensuring a similar physical appearance between the real and virtual human (Figure 3). Using an artificial intelligence technology (DEEPMOTION Animate 3D, 2022), we transposed the hand and body gestures of the actor in the video onto the body of the virtual human (Figure 2). Finally, we extracted the

audio files of the speeches by the actor in the videos and transposed it onto the virtual humans in the videos, enabling us to create the two videos with the virtual humans (Figure 3).

Subjective Manipulation Check of Perceived Charisma. To test whether the manipulation of charisma was perceived in the intended way, we asked participants within the main study to report their answers to subjective manipulation check in the study using an incentivized measure of charisma (Jensen et al., 2021), the GLI (Cronshaw & Lord, 1987), and the vision articulation scale (Podsakoff et al., 1996). In the incentivized measure of charisma, participants were first asked: “Please indicate to what extent you found Jean, the individual in the video you have just watched, charismatic.”, rated on a five-point slider ranging from 1 (*very non-charismatic*) to 5 (*very charismatic*) rounded to one decimal point. With a higher score meaning the speaker was perceived as more charismatic (across conditions $M = 2.71$, $SD = 1.14$). This measure was only used to create the average perceived charisma rating of the entire sample to determine the bonus payment. We also used a one-item incentivized measure based on the coordination game (Mehta et al., 1994) and on the incentivized measure developed by Jensen and colleagues (2021). Chronologically this question always followed the self-report measure. Participants were told that they had the opportunity to earn extra money and were asked: “...On average, how charismatic do you think other people who have watched this video find Jean, the speaker in the video, rated on a five-point slider ranging from 1 (*very non-charismatic*) to 5 (*very charismatic*) rounded up to one decimal point. At the same time, we informed them that they could earn £0.50 if their answer is within half a point of the average of all participants, and £0.20 if their answer is within one point of that average (across conditions $M = 2.88$, $SD = 0.98$), creating a more consequential measure (Lonati et al., 2018).

For the results of the manipulation checks, whether or not we included covariates, results for the manipulations remained virtually identical (see tables for full reporting). For

self-reported perceived charisma, there was a significant main effect of charisma ($B = 1.39, p < .001$), indicating higher levels of self-reported perceived charisma (Table 1) when the speech was delivered in a highly charismatic way ($M = 3.40, SD = 0.93$) as compared to a non-charismatic way ($M = 2.02, SD = 0.89$; Figure 4). For the incentivized perceived charisma measure, results matched the ones for the self-report measures in that there was a significant main effect of charisma ($B = 1.26, p < .001$), indicating higher levels of incentivized perceived charisma (Table 2) when the speech was delivered in a highly charismatic way ($M = 3.51, SD = 0.69$) as compared to a non-charismatic way ($M = 2.25, SD = 0.81$).

In the regression results (Table 3) we observe there was a main effect of charisma in the GLI ($B = 1.49, p < .001$), indicating higher levels of perceived leader prototypicality when the speech was delivered in a highly charismatic way ($M = 3.52, SD = 0.97$) as compared to a non-charismatic way ($M = 2.03, SD = 0.85$).

The perceived articulation of vision results had a main effect of charisma ($B = 1.06, p < .001$), robust to covariates ($B = 1.07, p < .001$), indicating higher levels of perceived articulation of vision when the speech was delivered in a highly charismatic way ($M = 3.76, SD = 0.89$) as compared to a non-charismatic way ($M = 2.69, SD = 0.94$). Results for both measures of perceived charisma, GLI, and leader prototypicality show that both real and virtual humans were perceived as more charismatic when delivering the high charisma speech compared to when delivering the low charisma speech.

Measures

Persuasion

We used a one-item self-report measure created by us to measure how many points the participant wants to contribute to the public goods game the rules of which were explained in the video, using a 20-point slider from 0 to 20 points. This measure constitutes an

operationalized measure of the persuasive message of the speaker. The speaker was persuading participants to contribute their points to the common good, thus a higher score meant that the individual contributed more points toward the public good (across conditions $M = 16.16$, $SD = 5.43$) indirectly measuring the persuasion of the speaker. This measure was only used to calculate the bonus for the incentivized measure of the public goods game measure and the points were not deducted from the participants' pay.

We also used a one-item incentivized measure based on the coordination game (Mehta et al., 1994). Chronologically this question always followed the self-report measure. Participants were told that they had the opportunity to earn extra money and were told: "Other people have also watched the same video as you and answered the previous question. Your job is to estimate how many points these other people wanted to contribute on average to the public goods game." Participants indicated their choice using a 20-point slider from 0 to 20 points. At the same time, we informed them that they could earn £0.50 if their answer is within two points of the average of the entire sample, and £0.20 if their answer is within four points of that average (across conditions $M = 14.47$, $SD = 4.07$). Although this measure captures how much the participant thinks others are persuaded by the message and not directly how much the participant is persuaded by the message, it incentivizes the response that otherwise bears the risk of being relatively random because of zero consequences of simply reporting how much one would contribute to a common good.

Audio Check and Attention Checks

To identify whether participants had the audio on their devices enabled and whether they were paying attention to the instructions, we included an audio check in the beginning of the study. Participants were informed that they will hear a code consisting of numbers and letters and will have to pay attention to this code. After hearing the recording of the code (A54TSI3Y), participants were asked "Which code have you just heard?" and had to select one

answer out of five. Failing to answer the audio check correctly led to the exclusion of 34 participants.

To test whether the participants were paying attention to instructions when completing the questionnaire, two attention check items were included. A sample item is, “Please select completely disagree” on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). The responses to the items served as an exclusion criterion for the participants. All participants answered the attention checks correctly.

Results

We only present results pertaining to perceived charisma and to persuasion as described in the Method section. Means, standard deviations, and correlations are reported in Table 4. To answer the research question of whether there is a difference in perceived charisma and persuasion when a motivating speech is delivered by a real or a virtual human, we regressed the level of charisma in the speech (high or low) and the type of human (real or virtual) on perceived charisma (self-report and incentivized measures) and persuasion (self-report and incentivized measures). We apply the family-wise Bonferroni correction (Armstrong, 2014), given we gathered seven dependent variables, which yields a significance level of $\alpha = .007$.

For all results, whether we included covariates, results for the manipulations remained virtually identical (see tables for full reporting). For self-reported persuasion, results (Table 5) show that there was no significant main effect of charisma ($B = 1.20, p = .067$) and no significant main effect of type of human ($B = -0.55, p = .398$), as well as no significant interaction effect between charisma and the type of human ($B = -1.44, p = .273$).

For incentivized persuasion (Table 6), results show that there was no significant main effect of charisma ($B = 0.62, p = .209$) and no significant main effect of type of human ($B = 0.34, p = .493$). Moreover, there was no significant interaction effect between charisma and

the type of human ($B = -1.01, p = .305$). Whereas different levels of charisma were perceived as such in humans and virtual humans, different levels of charisma did not result in differences in persuasion.

Discussion

In the preliminary study, we investigated whether the effect of a real or a virtual human delivering a charismatic motivating speech would be different with respect to perceived charisma and persuasion. Results showed that the charisma manipulation was perceived as such, whether it was demonstrated by a real human or virtual human, both for a self-reported and an incentivized measure, leadership prototypicality, and vision articulation.

Charisma did not make a difference in persuasion, neither in real nor in virtual humans. This result may be explained by the one-off interaction of participants, compared to a repeated interaction game (Fischbacher et al., 2001). Typically, in public goods game setups in leadership, experimenters use games with multiple rounds of interaction between the participants which determine whether the participants contribute to the public good and the effect on the final participant pay (Dal Bó & Dal Bó, 2014). In the present study, we developed a simplified version of the task related to the public goods game described in the speech and it is possible that, given the present task was simplified (did not have multiple rounds or interaction with other group members) this interfered with the effect of charisma on the participants. A possibility to improve this in the future would be to replicate the public goods game in an online format but keeping the group interaction format and several rounds of interactions.

Moreover, previous research on charisma showed that the effect of charisma was enhanced when either the performance of the participants or the contribution to a public goods game by the participants was matched by a contribution to a charitable organization by the researchers and also was most effective when the speech was watched by participants in a

group setting (Antonakis et al., 2021; Meslec et al., 2020); presumably because it primed a collective identity, that the charisma effect occurred (see laboratory experiment 3). It would thus be possible to address whether watching the videos of the preliminary study would yield different results if participants watched the videos of the virtual and real human in a group and if the contributions would be matched by real contributions to charity.

It is possible that in the preliminary study, participants were not influenced by the persuasive elements of charisma in the speech and decided to base their contributions purely on the information about the payout and the bonus payment. Given that the payout structure was identical in the charismatic and non-charismatic conditions, this logic led participants to contribute in similar ways to the high and low charisma speeches, processing both speeches in a systematic way (Kim & Sundar, 2016).

On another note, the virtual human was designed using a software and replicated the nonverbal behavior of the real human. Nevertheless, the voice of the real human was transferred to the virtual human, thus the manipulation of the type of type of human only affected the visual component (e.g., appearance and gesturing). The voice and vocal modulations of the real and virtual humans remained constant, which could have biased the manipulation of the type of human in charisma. A more ecologically valid manipulation of the type of human would have been to add a synthetic voice or to treat the voice. This would have affected the manipulation of the type of human to a greater extent and eventually influenced the impact of charisma on persuasion.

Real and virtual humans were both perceived as more charismatic when delivering a speech high in charisma, compared to a speech low in charisma. Having assured that real and virtual humans alike are able to convey charisma, in Study 2 we investigate how using verbal and nonverbal charisma of virtual humans influences the perceived market potential of a venture in the context of raising funds through an entrepreneurial pitch.

Main Study: Pitching, Charisma, and Virtual Humans

Method

We created videos of either women or men entrepreneurs pitching a business idea to potential investors. The text of the pitch was either high or low in verbal charismatic signaling, and the nonverbal delivery was either high or low in nonverbal charismatic signaling. The experiment had a 2 (entrepreneur gender: female vs. male) by 2 (verbal charisma: high vs. low) by 2 (nonverbal charisma: high vs. low) between-subjects design.

Participants

We recruited 560 participants (277 women, 279 men, 4 other) via the Prolific online platform. Their average age was 40.15 years ($SD = 14.13$, $range = 18 - 81$). During the recruitment process, we selected participants who were native English speakers and citizens of the United Kingdom, the United States, or Ireland. Participants were randomly assigned to one of the eight experimental conditions. The participants received a fixed payment of £1.50 and a variable payment ranging from £0 to £0.50. We excluded two participants for failing at least one attention check. The final analyses were conducted on a sample of 558 participants (276 women, 278 men, 4 other). Their average age was 40.12 years ($SD = 14.13$, $range = 18 - 81$). Concerning their employment status, 52.33% were employed full time, 13.26% employed part-time, 7.17% were self-employed, 10.57% were unemployed, 7.71% were students, and 8.96% did not report their employment status.

Procedure

Participants accessed an online questionnaire and after providing informed consent, watched a video of a virtual human pitching a business idea. We asked the participants to imagine that the video showed an entrepreneur pitching a business idea to convince investors to fund a start-up. After watching the video, participants assessed the perceived market potential of the pitch (our main dependent variable). Moreover, we measured the participants'

(a) investor impressions (propensity to invest and perceived company growth), (b) professional impressions about the entrepreneurs (perceived entrepreneurial success and ability of the entrepreneur to execute), and (c) the personality perceptions of the entrepreneur (perceived masculinity, femininity, warmth, competence, dominance, and honesty). These measures were shown in random order after the perceived market potential measure. The results concerning the dependent variables other than the perceived market potential are reported in Appendix C. At the end of the study, participants answered several socio-demographic questions and questions about their experience in the food delivery and food industries. Four attention check questions were distributed throughout the study.

Materials

Entrepreneurial Pitch Text

The pitch was structured like a business pitch first stating the (a) benefits of using the service, (b) information about competitors, (c) information about the current clients, and (d) expansion plans (Appendix D). To ensure external validity (Colquitt, 2008; Lonati et al., 2018), we based the pitch on an existing pitch from successful participants of televised entrepreneurial pitch show. The informational content of the pitches was held constant throughout the eight experimental conditions. We ensured that the venture was perceived as gender neutral, and that the manipulation of charisma in the text was perceived successfully.

Gender Neutrality Manipulation Check. The pitch concerned a fictional company “Foodfix” operating in the food delivery industry and seeking to raise funds. This industry was relatively gender-neutral in that according to the United States bureau of labour statistics the restaurant industry had 52% of women workers (Ko et al., 2015). We pretested whether the food delivery industry was perceived as gender neutral. We recruited 100 participants (48 women, 3 other) from the Prolific online platform to complete an online questionnaire. The participants were between 18 and 65 years old, with their modal range being between 35 and

44 years². One participant was excluded for failing an attention check question, leaving us with a final sample of 99 participants with the same age range and modal range. The participants read the non-charismatic pitch about Foodfix and reported their perceptions about the genderedness of “Foodfix” (the company mentioned in the pitch) on a five-point Likert scale from 1 (*completely masculine*) to 5 (*completely feminine*), and whether they spontaneously associated the company with a man, woman, or neither. The results showed that “Foodfix” was considered a gender-neutral company, $t(98) = 1.52, p = .131$ (t -test of the perceived genderedness of “Foodfix” as a company against 3, the midpoint of the scale) and that it was associated with neither women nor men, $\chi^2(2, N = 99) = 44.06, p < .001$ (Chi-2 test comparing whether “Foodfix” was equally associated with women, men, or neither).

Verbal Charisma Manipulation Check. To manipulate the level of charisma in the pitch, we had written two texts of 376 words, identical in information, but different in the number of charismatic tactics. One pitch (high charisma) was enhanced with charismatic tactics (e.g., sentiment of collective, contrasts, ambitious goals, confidence in goals, metaphors, moral convictions, rhetorical questions, three-part lists, and repetitions), whereas the other (low charisma) did not contain any charismatic tactics. The high charisma pitch has 22 CLTs over 29 sentences, while the low charisma pitch had zero over 25 sentences.

We pretested the perceived charisma in six pitches to select one charismatic and one non-charismatic pitch. We recruited 561 participants from the Prolific platform and six participants were excluded based on failed attention checks. The final sample consisted of 555 participants (275 men, 276 women, and 4 other). Their average age was 36.88 years ($SD = 13.55, range = 18 - 77$). The participants accessed an online questionnaire and after reading the informed consent they were randomly assigned to read one of the six pitches. The name or gender of the entrepreneur was not revealed in the pitch. Participants then answered an incentivized measure of charisma (Jensen et al., 2021), where the participants had to guess

how others would perceive the pitch with respect to charisma, measured on a five-point scale from 1 (*very non-charismatic*) to 5 (*charismatic*). As a result of the pretest, we chose the non-charismatic pitch that was perceived as less charismatic ($M = 3.43$, $SD = 0.85$) and one that was the most charismatic pitch ($M = 3.78$, $SD = 0.65$), $t(139) = -2.69$, $p = .008$.

Entrepreneurial Pitch Video

To create the videos of the entrepreneurial pitch, (a) we filmed an actress performing the pitch using a motion capture system and then (b) transposed her body language and voice to a virtual human. To manipulate nonverbal charisma, we instructed an actress playing the role of the entrepreneur to act in two different ways: In the high nonverbal charisma condition, the actress used lively gestures, animated facial expressions, and vocal modulations that underlined the meaning of the text, whereas in the low nonverbal charisma conditions, the actress did not use gestures, had a neutral facial expression, and a monotonous voice. Moreover, because the movements were transposed onto women and men virtual humans, we ensured that the gestures are neither “feminine” nor “masculine” but rather gender neutral. After, we transposed the gesturing onto women and men virtual humans and added a woman’s voice and transformed the woman’s voice into a man’s voice.

We filmed the human actress in four different conditions (see Figure 4). Using the OptiTrack motion capture system during the filming process, we captured the movements of the actress and transposed them onto the virtual humans via the optical motion capture software (Bregler, 2007; Nagymáté & Kiss, 2018). We then transposed the nonverbal and the verbal behavior onto women and men virtual humans. To avoid idiosyncratic differences among the virtual women and men (e.g., appearances that may drive stereotypical decision making), we used two different virtual women and two different virtual men humans; they had varying hair color, complexion, and attire (Figure 5). We ran a series of manipulation checks on the nonverbal gesturing and on the videos of the virtual humans and the voice to

ensure that our manipulation of nonverbal charisma was successful and that our final stimulus material did not contain confounding factors (Appendix E). As a result, our final stimulus material consisted of 16 videos: 2 (entrepreneur gender: female vs. male) by 2 (virtual human: type 1 vs. type 2) by 2 (verbal charisma: high vs. low) by 2 (nonverbal charisma: high vs. low).

Measures

Perceived Market Potential of the Venture

We used a one-item incentivized decision task based on the coordination game (Mehta et al., 1994) and on the incentivized measure developed by Jensen and colleagues (2021). We asked the participants to imagine that they are investors and then assess Foodfix as an investment opportunity from 1 (*very bad investment*) to 5 (*very good investment*). We also informed them that they had the opportunity to earn £0.50 if their answer was within 0.50 point of the condition average, and £0.10 if their answer was within 1 point of the condition average. A higher score meant that Foodfix was perceived as having a higher perceived market potential (across conditions $M = 3.37$, $SD = 0.87$). This task did not directly assess the willingness to invest of the participants, but the overall assessment of whether others would find the company having a good market potential or not. We used this task because it has less demand characteristics (not being simply a self-report measure) and given it is an incentivized measure and it mirrors quite well the thought process involved when assessing a individual's beliefs about what they think others think (Jensen et al., 2021; Khademi et al., 2021; Lonati et al., 2018). That is, this coordination game mirrors somewhat thought process of investors, when they must consider the opinions of other stakeholders involved in the process, such as other investors, potential consumers, and the entrepreneurs themselves, who would also assess the perceived market potential of their business.

Attention Checks

To identify whether participants paid attention to instructions within the questionnaire, four attention check items were included. A sample item is, “Please select disagree” on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). The responses to the items served as an exclusion criterion for the participants, meaning that if the participants answered at least one attention check question incorrectly, their data was excluded from the sample. We excluded two participants for failing at least one attention check.

Demographic Variables

To control for individual differences, we measured the participant’s previous professional experience in the food delivery business and in the food industry in general. Participants were asked: “Do you have previous work experience in...” either “...the food delivery business” ($M = 1.29$, $SD = 0.72$) or the “...food industry in general” ($M = 1.80$, $SD = 1.08$) rated on a five-point Likert scale from 1 (*no experience at all*) to 5 (*very strong experience*), with a higher score indicating more experience. We also collected data on the socio-demographic characteristics (i.e., gender, age, education, and employment status). Including or not the control variables did not alter any of the substantive results we report below.

Results

We only present the results pertaining to our main dependent variable, the perceived market potential of the venture. The results concerning the other dependent variables (propensity to invest, perceived company growth, entrepreneurial success, ability of the entrepreneur to execute, perceived masculinity and femininity, and perceived entrepreneur characteristics) are reported in Appendix C.

To answer the research question of whether charismatic entrepreneurial pitches resulted in a higher perceived market potential of the venture compared to non-charismatic pitches, we regressed charisma (either combined high verbal and nonverbal or combined low verbal and nonverbal) on the perceived market potential (Table 7). We apply the family-wise Bonferroni correction (Armstrong, 2014), given we gathered 11 dependent variables, which yields a significance level is $\alpha = .005$.

The regression results (Table 7) show that there was no effect of charisma on the perceived market potential ($B = -0.13, p = .217$); this result replicates the preliminary study, which showed the incentivized measure of persuasion was not influenced by charisma.

To answer research question 2 of whether verbal or nonverbal charisma of the entrepreneur leads to a greater perceived market potential, we regressed verbal and nonverbal charisma on the perceived market potential. The regression results (Table 8) show that there was no effect of verbal ($B = -0.05, p = .460$) or nonverbal ($B = -0.08, p = .280$) charisma on the incentivized measure of the public goods game contribution. Contrary to findings (Clarke et al., 2018), nonverbal charismatic signaling which contains active gesturing, did not have an impact on the perceived market potential.

To answer the research question of whether verbal and nonverbal charisma have the same effect on perceived market potential for women and men entrepreneurs, we regressed the entrepreneur gender, verbal, and nonverbal charisma on the perceived market potential. The regression results (Table 9) show that there was no interaction between entrepreneur gender and verbal charisma ($B = 0.09, p = .689$; $B = 0.13, p = .525$; without and with covariates respectively) or entrepreneur gender and nonverbal charisma. Verbal and nonverbal charisma had the same effect for women and men participants. Furthermore, there was no main effect of entrepreneur gender ($B = 0.04, p = .625$).

In all regressions, participant gender was a significant covariate ($B = 0.30, p < .001$). With women participants ($M = 3.55, SD = 0.78$) attributed a significantly higher perceived market potential to the venture than were male participants ($M = 3.19, SD = 0.92$). An exploratory analysis showed that there was no interaction between the participant gender with entrepreneur gender and charisma ($B = -0.03, p = .947$).

Discussion

We aimed at investigating whether charismatic entrepreneurial pitches would result in a higher perceived market potential of the venture compared to non-charismatic entrepreneurial pitches, whether verbal or nonverbal charisma of the entrepreneur lead to a greater perceived market potential of the venture, and whether verbal and nonverbal charisma has the same effect on perceived market potential for women and men entrepreneurs. Results showed that verbal and nonverbal charisma (jointly or separately) did not have a significant impact on the perceived market potential for women or men entrepreneurs.

Charisma has previously been linked to success in attracting followership in digital formats, such as amassing views on video platforms (Tur et al., 2021), while nonverbal gesturing has been linked to an increase in the propensity to invest (Clarke et al., 2018), however in the current study, neither verbal or nonverbal charisma influenced the perceived market potential of the firm, our main dependent variable. Possibly, combined verbal and nonverbal charisma is not effective in increasing the perceived market potential of a venture in the context of an entrepreneurial pitch. Indeed, metaphors and stories used in entrepreneurial pitching do not contribute to higher amounts of investment attitudes (Clarke et al., 2018). Nevertheless, research suggesting that the nonverbal communication skills of entrepreneurs are important in the investment process is robust (Balachandra et al., 2013; Clark, 2008; Clarke et al., 2018; MacMillan et al., 1985). It could be that in the current research, the fact that nonverbal charisma did not contribute to a higher perceived market

potential of the venture, suggests that using virtual humans to display charisma might not yield the same results as when human actors utilise charisma. Precisely, in the main study, we decoupled nonverbal charisma from gendered nonverbal behavior, which could have also influenced how the entrepreneurs portrayed by virtual humans were perceived. Research suggests that entrepreneurs displaying agentic nonverbal behaviors are typically favoured by investors compared to entrepreneurs displaying communal nonverbal behavior (Balachandra et al., 2013). Possibly, the fact that the nonverbal behavior was perceived as gender neutral could have influenced the perceptions about the venture on an implicit level or have seemed unnatural to the participants watching the entrepreneurial pitches. This could also explain why there was no gender funding gap present in the results of main study, despite evidence of the gender funding gap in entrepreneurial funding (Lins & Lutz, 2016).

General Discussion

The aim of this research was to investigate whether charisma influences the perceived market potential of the venture. Given that we used virtual humans as pitching entrepreneurs, it was important to first investigate whether charisma led to the same effects when delivered by real or virtual humans (preliminary study) and once results revealed that indeed charisma had the same effects for real and virtual humans, test charismatic entrepreneurial pitches delivered by virtual humans allowed us to test the effect of verbal and nonverbal charisma as well as gender of the entrepreneur on perceived market potential without those variables being interdependent (main study). As a matter of fact, transposing gender-neutral charismatic and non-charismatic behavior onto female and male virtual humans guaranteed that we manipulated these variables independently of each other.

In both studies, the main dependent variable was an incentivized variable based on the coordination game (Mehta et al., 1994). In the preliminary study the incentivized variable was persuasion, the estimation of how many points other participants would contribute to the

public goods game after watching the speech (a proxy of the persuasion of the speech), while in the main study the incentivized variable served to estimate the perceived market potential of Foodfix by other participants who also watched the video. In both cases charisma did not influence the incentivized variables. Unlike evaluating the perceived charisma (an incentivized variable influenced by charisma), both tasks involved inferring a certain vision of the future in an abstract way (the contribution to the public good via the public goods game in the preliminary study and the future success of the company Foodfix in the main study).

It is possible that charisma is not effective in the context of a public goods game with no real contribution to charity, or in the context of an entrepreneurial pitch with no real consequential outcome for the participant. In the preliminary study, the public goods game described, and the measure of persuasion was a single shot item with no contributions being matched with charity contributions, which is crucially effective (Antonakis et al., 2021; Meslec et al., 2020). Typically, public goods games are repeated interactions with a consequential effect of the participant pay linked to these interactions (Dal Bó & Dal Bó, 2014; Güth et al., 2007; Van Vugt & De Cremer, 1999), thus the current when the public goods game is modeled through a coordination game (Mehta et al., 1994) could have been ineffective. Concerning the main study, possibly investors are more interested in the information pertaining to the financial facts linked to the business, and possible financial risk or gain, rather than the verbal charisma of the entrepreneur.

It is also possible that participants evaluated the entrepreneurial pitches in a systematic way: Considering purely the monetary and business-related information about the venture. Given that the venture described was identical in every condition, this information can explain why there was no difference in perceived market potential across the different conditions, despite the differences in nonverbal charisma and the gender of the entrepreneur. Charisma is effective in increasing follower effort (Howell & Frost, 1989) as well as increasing informal

leadership (Tur et al., 2021), on one side my motivating followers to increase their effort and through sending a costly signal of their ability (Antonakis et al., 2016), whereas in the present research, participants had to base a costly financial decision after listening to the entrepreneurial pitch. Perhaps, the factual information about the payout structure had overpowered the persuasive effects of charisma, leading participants to base their decisions on the payout structure that was uniform across all conditions, rather than on the charisma of the pitch.

On another note, the effects of charisma might have been absent precisely because we used a novel methodology – virtual humans, to portray the speaker in the preliminary study or the entrepreneurs in the main study and the nonverbal behavior of the targets was manipulated separately from the verbal behavior. In the preliminary study the nonverbal behavior was computer generated from the original video with the human actor, whereas in the main study we disentangled the nonverbal behavior from the gender by creating a gender-neutral nonverbal behavior for the entrepreneurs. On one hand, these methods ensured that we had absolute control of the nonverbal behavior that was used, but on the other hand this could have led to an incongruity between the nonverbal and verbal behavior, diminishing the effects of charisma. Indeed, verbal and nonverbal charisma are typically highly correlated (Tur et al., 2021).

Furthermore, in the main study, we disentangled nonverbal behavior from gender, which led to observing the pure effects of the nonverbal behavior, alleviating the effects of gendered nonverbal behavior. Even though, in the main study, we did not observe effects of charisma on the perceived market potential, we did not observe a venture funding gender gap, present in entrepreneurial funding either (Lins & Lutz, 2016). Thus, it would be relevant to use this methodology in the future to observe whether nonverbal charisma has the same effects for women and men leaders in the context of a motivational speech. This would

answer the current call for rigorous research on charisma and demographic factors, such as gender (Banks et al., 2017). Nevertheless, considering that entrepreneur gender did not impact the perceived market potential of the venture when the entrepreneurial pitch was present in text format (Bekbergenova et al., 2023), it is reassuring that this effect persists when the entrepreneurial pitch is presented in video format. Perhaps, with careful design the gender funding gap dissipates.

Despite charisma being perceived both in real and in virtual humans in the preliminary study, it is possible that disentangling the nonverbal behavior from gender, could have led to the elimination of the funding gender gap in the main study, given the increased level of control across conditions. A possibility to investigate the effectiveness of charisma in entrepreneurial pitching in the future, could be to conduct a study with an actress portraying and entrepreneur, following the suggestion of Clarke et al. (2018). Furthermore, despite virtual humans being successful training partners when mastering soft and hard skills (Campbell et al., 2011; Cate & Albright, 2015; Cordar et al., 2015; Johnson et al., 2000; Rickel & Johnson, 1999; Schmid Mast et al., 2018), future research needs to be done to clarify whether virtual humans can be used successfully when studying real human phenomena.

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Footnotes

¹ One can argue that asking participants to report their answers on perceived charisma (self-report and incentivized) before persuasion can bias the answers of participants to the persuasion scale. Nevertheless, the analysis of the impact of the order of the main dependent variables showed no significant robust impact of order on persuasion.

²In this manipulation check we collected age ranges of participants: 25.00% of participants were in the 18 – 24 year range, 14.00% were in the 25 – 29 year range, 14.00% were in 30 – 34 year range, 27.00% were in the 35 – 44 year range, 14.00% were in the 45 – 54 year range, 5.00% were in the 55 – 64 year range, 1.00% was in the 65 and older age range.

³In this manipulation check we collected age ranges of participants: 26.04% of participants were in the 18 – 24 year range, 19.03% were in the 25 – 29 year range, 18.86% were in 30 – 34 year range, 20.03% were in the 35 – 44 year range, 9.18% were in the 45 – 54 year range, 4.84% were in the 55 – 64 year range, 2.00% was in the 65 and older age range.

Tables and Figures

Table 1

Preliminary Study: Regression Coefficients – Perceived Charisma – Self-report Measure

Variables	(1)	(2)	(3)	(4)
Charisma	1.39*	1.29*	1.38*	1.27*
	(12.61)	(8.15)	(12.71)	(8.19)
Human	-0.03	-0.13	-0.00	-0.11
	(-0.27)	(-0.85)	(-0.01)	(-0.73)
Charisma*human		0.20		0.22
		(0.90)		(1.02)
Participant gender			-0.03	-0.03
			(-0.26)	(-0.26)
Participant age			-0.02	-0.02
			(-2.46)	(-2.51)
Participant education			-0.07	-0.07
			(-1.70)	(-1.69)
Participant employment			0.01	0.01
			(0.31)	(0.37)
Constant	2.03*	2.08*	2.89*	2.95*
	(21.51)	(19.18)	(8.75)	(8.67)
R-squared	0.37	0.37	0.40	0.40

Note. $N = 275$. Robust t-statistics in parentheses; Bonferroni correction for family-wise error

with seven dependent variables.

* $p < .007$.

Table 2*Preliminary Study: Regression Coefficients – Perceived Charisma – Incentivized Measure*

Variables	(1)	(2)	(3)	(4)
Charisma	1.26*	1.11*	1.26*	1.10*
	(13.85)	(9.40)	(13.71)	(9.27)
Human	0.10	-0.06	0.09	-0.06
	(1.04)	(-0.42)	(1.00)	(-0.45)
Charisma*human		0.31		0.31
		(1.69)		(1.70)
Participant gender			-0.06	-0.06
			(-0.61)	(-0.61)
Participant age			-0.00	-0.00
			(-0.51)	(-0.59)
Participant education			-0.05	-0.05
			(-1.53)	(-1.51)
Participant employment			-0.02	-0.02
			(-0.61)	(-0.52)
Constant	2.20*	2.28*	2.66*	2.75*
	(28.02)	(25.29)	(10.49)	(10.56)
R-squared	0.41	0.42	0.42	0.43

Note. $N = 275$. Robust t-statistics in parentheses. Bonferroni correction for family-wise error with seven dependent variables.

* $p < .007$.

Table 3*Preliminary Study: Regression Coefficients – Self Reported Measures*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GLI		Vision		GLI		Vision	
Charisma	1.49*	1.38*	1.06*	0.74*	1.48*	1.36*	1.07*	0.73*
	(13.56)	(8.37)	(9.72)	(4.76)	(13.63)	(8.36)	(9.72)	(4.72)
Human	-0.19	-0.30	-0.26	-0.59*	-0.16	-0.28	-0.25	-0.58*
	(-1.77)	(-2.11)	(-2.37)	(-3.84)	(-1.43)	(-1.91)	(-2.17)	(-3.69)
Charisma*human		0.22		0.65*		0.25		0.67*
		(0.99)		(3.02)		(1.16)		(3.09)
Participant gender					0.08	0.08	0.01	0.01
					(0.68)	(0.68)	(0.06)	(0.06)
Participant age					-0.02	-0.02	-0.01	-0.01
					(-2.45)	(-2.49)	(-1.15)	(-1.31)
Participant education					-0.08	-0.08	0.00	-0.00
					(-1.86)	(-1.86)	(0.02)	(-0.02)
Participant employment					0.05	0.05	0.04	0.05
					(1.42)	(1.49)	(1.14)	(1.35)
Constant	2.13*	2.18*	2.82*	2.99*	2.71*	2.78*	2.93*	3.11*
	(21.93)	(19.28)	(28.63)	(26.06)	(7.87)	(7.93)	(8.14)	(8.69)
R-squared	0.41	0.41	0.27	0.29	0.44	0.44	0.28	0.30

Note. Robust t-statistics in parentheses; $n = 275$. Bonferroni correction for family-wise error

with seven dependent variables.

* $p < .007$.

Table 4*Preliminary Study: Means, Standard Deviations, and Correlations*

Variables	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.
1. Perceived charisma – self-report	2.71	1.14	-						
2. Perceived charisma – incentivized	2.88	0.98	.83***	-					
3. Persuasion – self-report	16.16	5.43	.19**	.11	-				
4. Persuasion – incentivized	14.47	4.07	.11	.14*	.64***	-			
5. General leadership impression	2.78	1.18	.81***	.72***	.19**	.07	-		
6. Perceived articulation of vision	3.23	1.06	.72***	.62***	.21***	.09	.80***	-	
7. Humanness	2.15	0.92	.36***	.23**	-.04	-.05	.29***	.21*	-
8. Attractiveness	3.81	0.96	.51***	.48***	.06	.10	.51***	.41***	.47***
9. Eeriness	2.23	0.84	.59***	.50***	.15	.12	.62***	.45***	.40***
10. Participant gender	1.49	0.50	.06	.01	-.06	-.14*	.10	.06	-.08
11. Participant age	30.16	9.87	-.15*	-.03	.10	.18**	-.13*	-.06	-.01

Note. N = 275.* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4*Preliminary Study: Means, Standard Deviations, and Correlations*

Variables	<i>M</i>	<i>SD</i>	8.	9.	10.	11.
1. Persuasion – self-report	16.16	5.43				
2. Persuasion – incentivized	14.47	4.07				
3. Perceived charisma – self-report	2.71	1.14				
4. Perceived charisma – incentivized	2.88	0.98				
5. General leadership impression	2.78	1.18				
6. Articulating vision	3.23	1.06				
7. Humanness	2.15	0.92				
8. Attractiveness	3.81	0.96	-			
9. Eeriness	2.23	0.84	.44***	-		
10. Participant gender	1.49	0.50	.09	-.04	-	
11. Participant age	30.16	9.87	.01	-.02	-.27***	-

Note. N = 275.* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5*Preliminary Study: Regression Coefficients – Persuasion – Self-Report Measure*

Variables	(1)	(2)	(3)	(4)
Charisma	1.20 (1.84)	1.92 (2.17)	1.28 (1.94)	2.00 (2.25)
Human	-0.55 (-0.85)	0.17 (0.18)	-0.73 (-1.12)	0.00 (0.00)
Charisma*human		-1.44 (-1.10)		-1.46 (-1.12)
Participant gender			-0.60 (-0.82)	-0.59 (-0.82)
Participant age			0.04 (0.84)	0.04 (0.89)
Participant education			0.22 (0.74)	0.22 (0.75)
Participant employment			0.16 (0.67)	0.14 (0.60)
Constant	15.83* (27.66)	15.47* (23.28)	14.19* (5.98)	13.79* (5.72)
R-squared	0.01	0.02	0.03	0.04

Note. $N = 275$. Robust t-statistics in parentheses. Bonferroni correction for family-wise error with seven dependent variables.

* $p < .007$.

Table 6*Preliminary Study: Regression Coefficients – Persuasion – Incentivized Measure*

Variables	(1)	(2)	(3)	(4)
Charisma	0.62 (1.26)	1.12 (1.54)	0.69 (1.41)	1.22 (1.68)
Human	0.34 (0.69)	0.84 (1.11)	0.10 (0.20)	0.62 (0.85)
Charisma*human		-1.01 (-1.03)		-1.05 (-1.09)
Participant gender			-0.88 (-1.67)	-0.88 (-1.67)
Participant age			0.05 (1.85)	0.05 (1.90)
Part. education			0.16 (0.79)	0.16 (0.80)
Part. employment			0.12 (0.72)	0.11 (0.66)
Constant	13.99* (29.64)	13.74* (24.06)	12.83* (8.16)	12.54* (7.71)
R-squared	0.01	0.01	0.05	0.06

Note. $N = 275$. Robust t-statistics in parentheses. Bonferroni correction for family-wise error with seven dependent variables.

* $p < .007$.

Table 7*Main Study: Regression Coefficients – Perceived Market Potential of the Venture*

Variables	(1)	(2)
Charisma	-0.13 (-1.24)	-0.16 (-1.58)
Participant gender		0.29* (3.35)
Participant age		-0.01* (-3.07)
Participant education		-0.11 (-2.76)
Participant employment		-0.02 (-0.44)
Experience 1		0.01 (0.15)
Experience 2		-0.06 (-1.17)
Constant	3.47* (44.82)	4.08* (13.78)
R-squared	0.01	0.12

Note. $N = 280$. Robust t-statistics in parentheses. The alpha significance is .005, given the Bonferroni correction for 11 dependent variables.

* $p < .005$.

Table 8*Main Study: Regression Coefficients – Perceived Market Potential*

Variables	(1)	(2)	(3)	(4)
Verbal charisma	-0.05 (-0.74)	-0.11 (-1.04)	-0.04 (-0.50)	-0.08 (-0.77)
Nonverbal charisma	-0.08 (-1.08)	-0.14 (-1.31)	-0.11 (-1.53)	-0.15 (-1.52)
Verbal*nonverbal		0.11 (0.77)		0.09 (0.62)
Participant gender			0.30* (4.59)	0.30* (4.59)
Participant age			-0.01* (-3.05)	-0.01* (-3.03)
Participant education			-0.06 (-2.35)	-0.06 (-2.33)
Participant employment			0.00 (0.06)	0.00 (0.02)
Experience 1			0.06 (0.92)	0.06 (0.92)
Experience 2			-0.05 (-1.37)	-0.05 (-1.38)
Constant	3.44* (52.15)	3.47* (44.82)	3.58* (17.66)	3.60* (17.62)
R-squared	0.00	0.00	0.08	0.08

Note. $N = 558$. Robust t-statistics in parentheses. The alpha significance is .005, given the

Bonferroni correction for 11 dependent variables.

* $p < .005$.

Table 9*Main Study: Regression Coefficients – Perceived Market Potential*

Variables	(1)	(2)	(3)	(4)
Woman entrepreneur (WE)	0.04 (0.49)	-0.08 (-0.49)	0.03 (0.36)	-0.08 (-0.56)
Verbal charisma	-0.05 (-0.74)	-0.15 (-0.98)	-0.04 (-0.50)	-0.15 (-0.96)
Nonverbal charisma	-0.08 (-1.08)	-0.20 (-1.28)	-0.11 (-1.53)	-0.21 (-1.41)
WE*verbal charisma		0.09 (0.40)		0.13 (0.64)
WE*nonverbal charisma		0.12 (0.59)		0.11 (0.54)
Verbal *nonverbal		0.10 (0.44)		0.11 (0.52)
WE*verbal*nonverbal		0.04 (0.13)		-0.04 (-0.14)
Participant gender			0.30* (4.57)	0.30* (4.47)
Participant age			-0.01* (-3.05)	-0.01* (-3.03)
Participant education			-0.06 (-2.32)	-0.06 (-2.31)
Participant employment			0.00 (0.06)	-0.00 (-0.04)
Experience 1			0.06 (0.91)	0.06 (0.93)
Experience 2			-0.05 (-1.38)	-0.06 (-1.41)
Constant	3.42* (44.02)	3.51* (30.96)	3.57* (17.35)	3.66* (16.27)
R-squared	0.00	0.01	0.08	0.08

Note. $N = 558$. Robust t-statistics in parentheses. The alpha significance is .005, given the

Bonferroni correction for 11 dependent variables.

* $p < .005$.

Figure 1

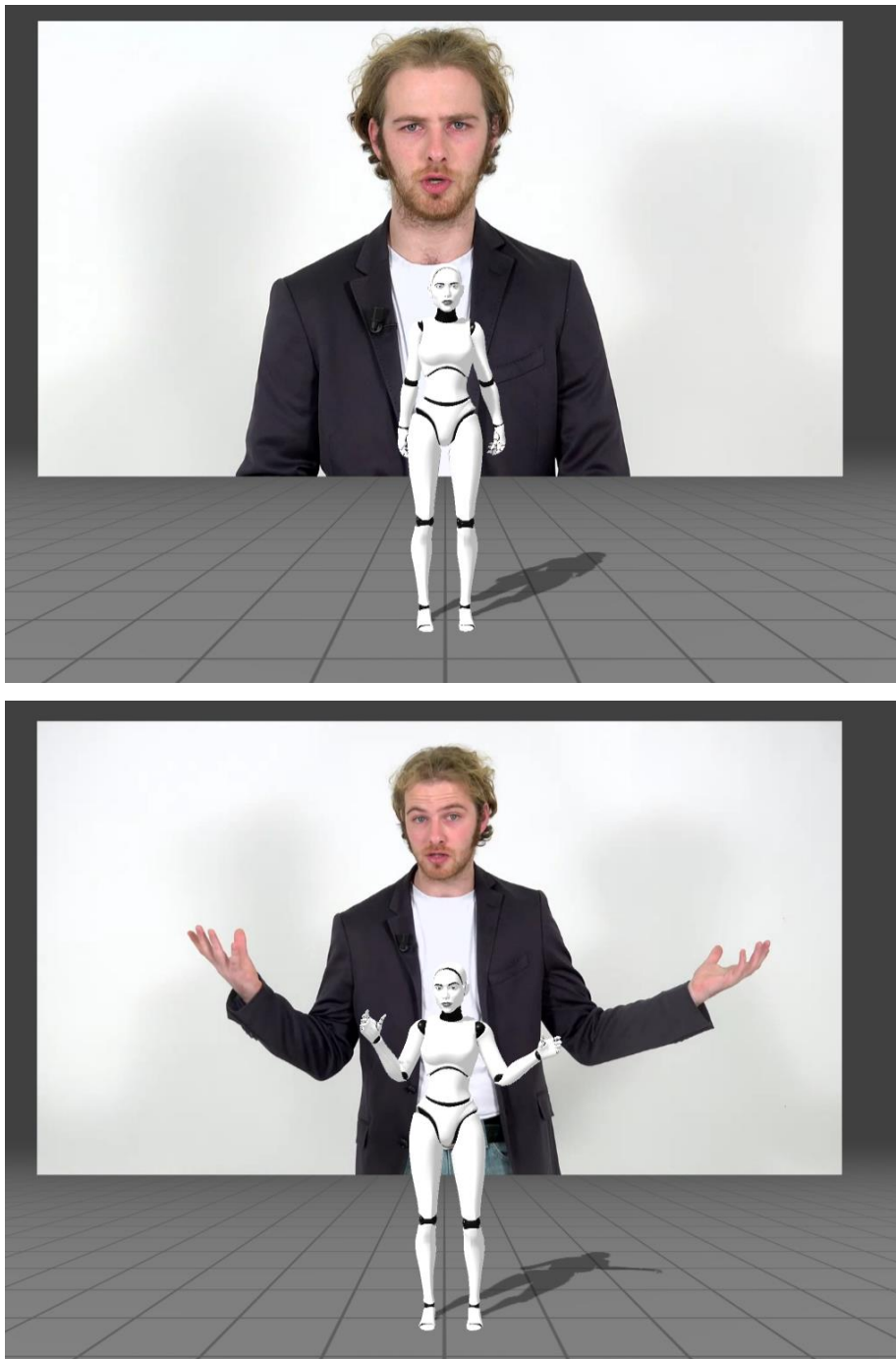
Preliminary Study: Faces of the Virtual and Real Human



Note. The portrait photograph of the actor and the virtual image created using Headshot.

Figure 2

Preliminary Study: Extracting the Nonverbal Behavior of the Actor



Note. The nonverbal behavior of the actor is extracted on the virtual human using the Deepmotion technology.

Figure 3

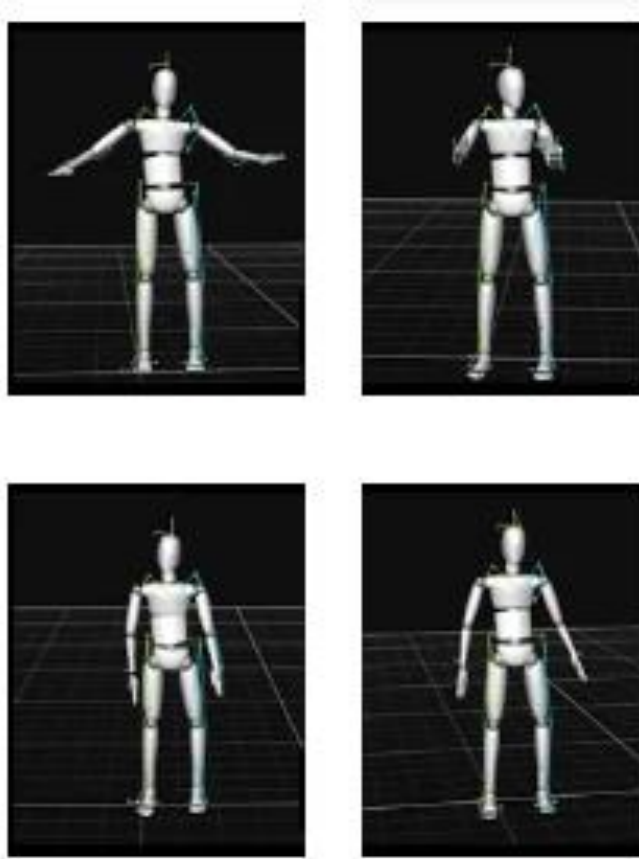
Preliminary Study: Video Snapshots with Real and Virtual Humans



Note. The images above demonstrate the high charisma conditions, while the images below demonstrate the low charisma conditions.

Figure 4

Main Study: Stick Figures Generated Using Optitrack



Note. Nonverbal behavior generated with the Optitrack motion capture system.

Figure 5

Main Study: Virtual Humans Used in the Experiment



Note. Women and men virtual humans developed in Unity and used in Study 2.

Appendix A

Preliminary Study: Speeches

Non-Charismatic Speech

Bonjour, mon nom est Jean et les expérimentateurs m'ont demandé de vous briefer sur les enjeux de ce jeu. Je n'ai rien à gagner ou à perdre de la façon dont vous jouerez. Cependant, vous pourrez prendre un plaisir immense en voyant votre groupe gagner ensemble. Laissez-moi vous dire pourquoi.

J'imagine que beaucoup d'entre vous ont entendu parler de la tragédie des biens communs. Cela consiste en une situation où de multiples joueurs ont une ressource commune à partager. Si tout le monde contribue au bien commun, chacun pourra en profiter. Contribuer signifie que chacun subit des coûts et qu'en faisant ainsi, chacun pourra en bénéficier. En protégeant le bien public, le bien-être général peut augmenter. Dans de telles situations, si les individus choisissent de ne pas coopérer, la richesse publique sera détruite. Par conséquent, les individus doivent considérer à la fois leurs propres intérêts et l'intérêt collectif. L'action rationnelle à long terme est la coopération.

La tragédie des biens communs est un classique en économie car elle souligne les frictions entre les intérêts privés et publics. Le jeu auquel vous allez jouer est similaire et la coopération entre les joueurs se traduit par des gains collectifs plus élevés pour tous. Les individus se trouvent devant un dilemme et l'utilité, c'est-à-dire les bénéfices, que chacun en retire dépend des gains, mais sera aussi être de nature psychologique.

Vous recevrez 20 points à chaque période. Les mettre tous dans le pot commun est l'option coopérative et les mettre tous dans votre compte privé se traduit par la recherche de votre intérêt personnel. Si tout le monde choisit cette seconde option, vous pouvez réaliser un maximum de 200 points. Si tout le monde coopère, vous pouvez réaliser un maximum de 320 points, ce qui représente 60% en plus et signifie plus de revenus pour tous.

Bien évidemment, un joueur peut décider d'invoquer la stratégie dominante, qui potentiellement permet d'obtenir le gain le plus élevé. Cette personne tire parti de la bienveillance des autres contributeurs et ne contribue jamais au bien public. Curieusement, même si un joueur refuse chaque tour de contribuer et ne met rien dans le compte commun, et si les trois autres joueurs continuent à contribuer, ils s'en sortiront toujours mieux et réaliseront 240 points, ce qui est 20% de mieux que dans le cas où tout le monde joue de façon égoïste. Evidemment, la personne qui ne coopère pas gagnera plus d'argent, mais elle devra affronter les coûts psychologiques de son comportement. Cette personne doit trouver un équilibre entre l'avantage financier et les coûts psychologiques encourus de pas avoir coopéré.

Finalement, réfléchissez à deux fois avant d'exercer des représailles suivant les comportements égoïstes de quelqu'un d'autre. Le leader des droits civils Martin Luther King disait que résister passivement n'était pas un acte de faiblesse et qu'il faut être fort pour ne pas riposter. Cette méthode influencera l'utilité de votre adversaire.

Si une personne ne coopère pas dès le début, vous pouvez lui envoyer un signal en jouant de manière coopérative. Cette personne verra que vous croyez en elle et en la valeur de la coopération, et peut-être cette personne changera. Mais si cette personne ne change pas, vous quitterez quand même cette salle en sachant que vous avez servi l'intérêt commun. Dans le cas où vous êtes le seul contributeur restant, vous obtiendrez plus d'utilité en connaissant le défi que vous avez affronté seul.

Pour conclure, il est clair que la coopération est la meilleure option pour tous et cette option doit être mise en avant. Pour éviter une tragédie des biens communs, maximisez votre utilité psychologique et sentez-vous bien.

Charismatic Speech

Bonjour, mon nom est Jean et les expérimentateurs m'ont demandé de vous briefer sur les enjeux de ce jeu. Je n'ai rien à gagner ou à perdre de la façon dont vous jouerez.

Cependant, vous pourrez prendre un plaisir immense en voyant votre groupe gagner ensemble. Laissez-moi vous dire pourquoi.

Connaissez-vous la tragédie des biens communs ? Imaginez qu'il y a un pâturage commun que les paysans doivent se partager. L'intérêt public voudrait que le pâturage soit protégé afin de se régénérer et que de l'herbe puisse à nouveau pousser. Il est dans l'intérêt commun des paysans de coopérer et de partager équitablement la terre, car en coopérant, les paysans peuvent en bénéficier. Cependant, chaque paysan pourrait avoir un intérêt égoïste afin que ses vaches broutent autant que possible. Mais si chaque paysan fait cela, le bien commun sera alors détruit. Le champ, autrefois recouvert d'une herbe luxuriante, sera recouvert de boue

Dans cet exemple, il y a un intérêt moral commun opposé à un intérêt immoral égoïste. Le jeu auquel vous allez jouer est similaire. Soit vous coopérez tous et en profitez tous, soit vous choisissez l'option égoïste et perdrez collectivement. Dans ce dilemme, il y aura trois choses en jeu : votre gain monétaire, mais aussi votre fierté et votre sentiment d'estime de soi. Pourquoi ?

Pour chaque période, vous recevrez 20 points. En les mettant tous dans le pot commun, vous protégerez le bien commun. En les mettant tous dans votre compte personnel, vous protégerez vos propres intérêts. Si tout le monde se comporte égoïstement, vous gagnerez tous 200 points. Cependant, si tout le monde coopère et met tous ses points dans le pot commun, vous pouvez tous remporter 320 points. C'est 60% en plus. Qui ne serait pas intéressé par cela ?

Il y a peut-être une personne rusée qui pense : « Je vais laisser les idiots mettre leur argent dans le pot commun, mais je vais toujours mettre le mien dans mon compte privé et profiter de leur coopération ». Voulez-vous être cette personne ? Vous sentiriez-vous bien d'agir ainsi ? Est-ce juste ? Même si un des membres de votre groupe ne met rien dans le pot

commun, tant que vous continuez à contribuer, les personnes qui coopèrent peuvent toujours remporter 240 points. C'est 20% de plus que si tout le monde joue de façon égoïste. La personne qui ne coopère pas peut gagner plus d'argent, mais elle quittera cette salle en sachant qu'elle vous a tous laissé tomber, qu'elle a profité du groupe et qu'elle s'est comporté égoïstement.

Finalement, réfléchissez à deux fois avant d'exercer des représailles suivant les comportements égoïstes de quelqu'un d'autre. Le leader des droits civils Martin Luther King disait que résister passivement n'était pas un acte de faiblesse, car c'est la personne forte qui ne riposte pas. Cette méthode affectera la conscience de votre adversaire.

Même si une personne ne coopère pas dès le début, vous pouvez lui envoyer un signal en contribuant à nouveau au compte commun. Cette personne verra que coopérer vaut mieux que d'être égoïste, mais aussi que vous croyez en elle et en le bien commun, et peut-être cette personne changera. Mais si cette personne ne change pas, vous quitterez quand même cette salle la tête haute. Et si vous êtes le seul contributeur ? Moins il y a de contributeurs, plus cela rendra votre comportement honorable.

Donc, faites ce qui est juste, faites ce qui requiert du courage, et pensez au bien commun. Transformez la tragédie des biens communs en un triomphe de la coopération, et sortez fièrement de cette salle. Alors, qu'allez-vous faire

Appendix B

Preliminary Study: Uncanny Valley Results

Uncanny Valley Effect

This is a 19-item scale adapted from the uncanny valley effect measures developed by Ho and MacDorman (2017) and which was shown only to the participants in the conditions with an virtual human speaker. It consisted of three subscales – humanness, attractiveness, and eeriness. Participants were asked: “To what extent do you agree that the speaker is...” accompanied with a seven-point bipolar scale ranging from 1 (*inanimate*) to 7 (*living*). Other pairs of adjectives such as “synthetic – real” or “unattractive – attractive” replaced the extremities. Scores were averaged, with a higher score in the humanness category indicating more humanness ($M = 2.14$, $SD = 0.92$), a higher score in the attractiveness subscale indicating more attractiveness ($M = 3.81$, $SD = 0.93$), and a higher score in eeriness indicating more perceived eeriness ($M = 2.23$, $SD = 0.84$).

Results

We conducted an exploratory analysis to investigate humanness, attractiveness, and eeriness in the virtual humans who were using high and low charisma (Table B1). There was no main effect of charisma on perceived humanness ($B = 0.37$, $p = .016$), robust to covariates ($B = 0.38$, $p = .017$), but a main effect of charisma on perceived attractiveness ($B = 0.48$, $p = .002$), and on perceived eeriness ($B = 0.86$, $p < .001$), robust to covariates ($B = 0.46$, $p = .004$; $B = 0.85$, $p < .001$; perceived attractiveness and eeriness respectively).

The virtual human is perceived as more attractive (Figure B1) when the speech was delivered in a highly charismatic way ($M = 4.05$, $SD = 0.84$) as compared to a non-charismatic way ($M = 3.57$, $SD = 0.95$). The virtual human is perceived as more eerie (Figure B2) when the speech is delivered in a highly charismatic way ($M = 2.65$, $SD = 0.68$) as compared to a non-charismatic way ($M = 1.79$, $SD = 0.76$).

Discussion

The virtual human was perceived as more attractive and more eerie when delivering a speech high in charisma compared to a speech low in charisma. Individuals develop an affinity with an entity the more it is similar to a human, up to a certain point when it becomes perceived as uncanny (Mori et al., 2012). Research shows conflicting results to whether dimensions of the uncanny valley (i.e., humanness, attractiveness, eeriness) are negatively or positively correlated to one another (Diel et al., 2021). The virtual human was perceived as more eerie when the speech was delivered in a highly charismatic way as compared to a non-charismatic way. This could indicate that charismatic virtual humans are closer to real humans but might fall into the uncanny valley. However, in the light of the results concerning perceived charisma and persuasion, there were no negative effects caused by the potential uncanny valley.

Tables and Figures

Table B1

Preliminary Study: Regression Coefficients - Humanness, Attractiveness, and Eeriness

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Humanness		Attractiveness		Eeriness	
Charisma	0.37 (-2.44)	0.38 (-2.43)	0.48* (-3.16)	0.46* (-2.97)	0.86* (-6.98)	0.85* (-6.94)
Participant gender		-0.18 (-1.02)		0.16 (-1.01)		-0.13 (-1.00)
Participant age		-0.01 (-0.68)		0.01 (-0.66)		0.00 (-0.49)
Participant education		0.01 (-0.08)		-0.10 (-1.56)		-0.09 (-2.12)
Participant employment		0.04 (-0.8)		0.01 (-0.13)		-0.05 (-1.25)
Constant	1.96*	2.29*	3.57*	3.61*	1.79*	2.44*
R-squared	-20.64	-4.23	-30.94	-7.35	-19.32	-7.19

Note. Robust t-statistics in parentheses. $N = 138$. Bonferroni correction for family-wise error

with seven dependent variables.

* $p < .007$.

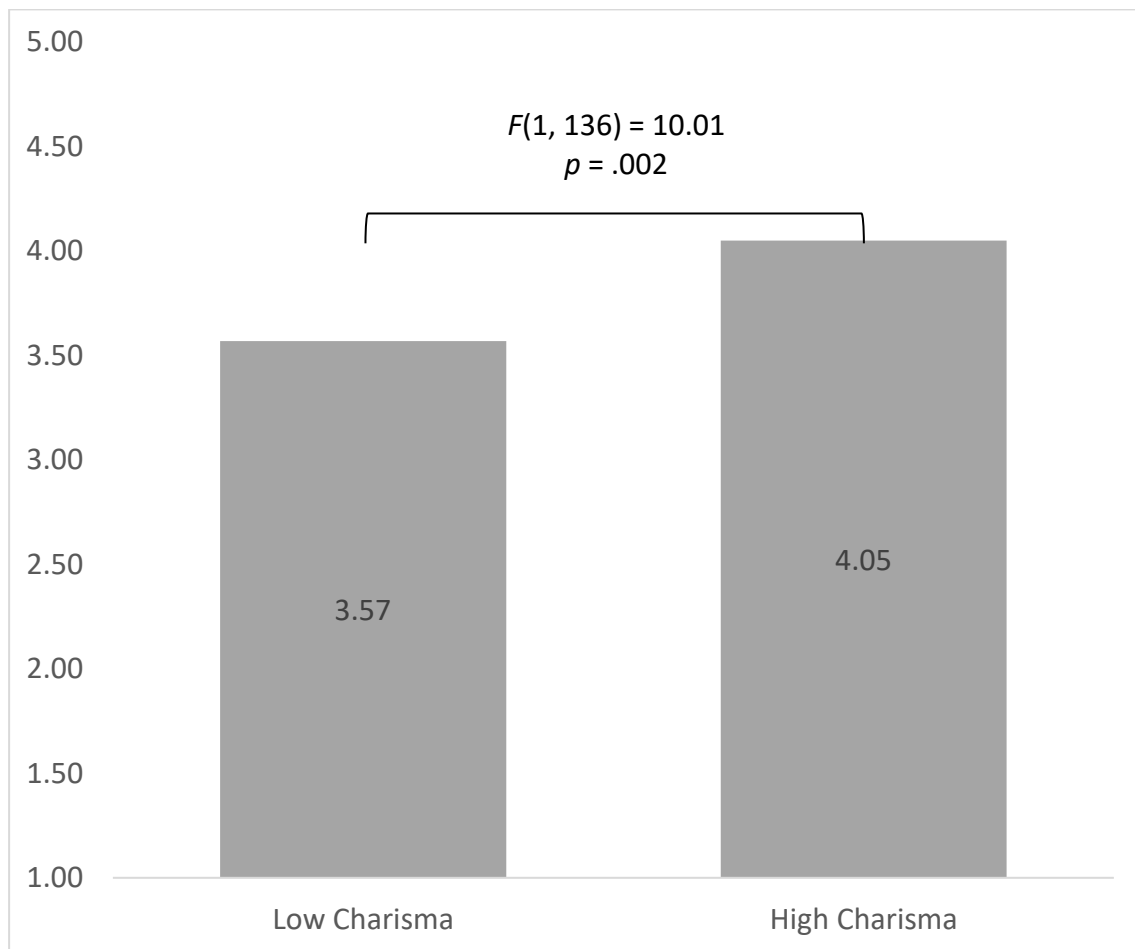
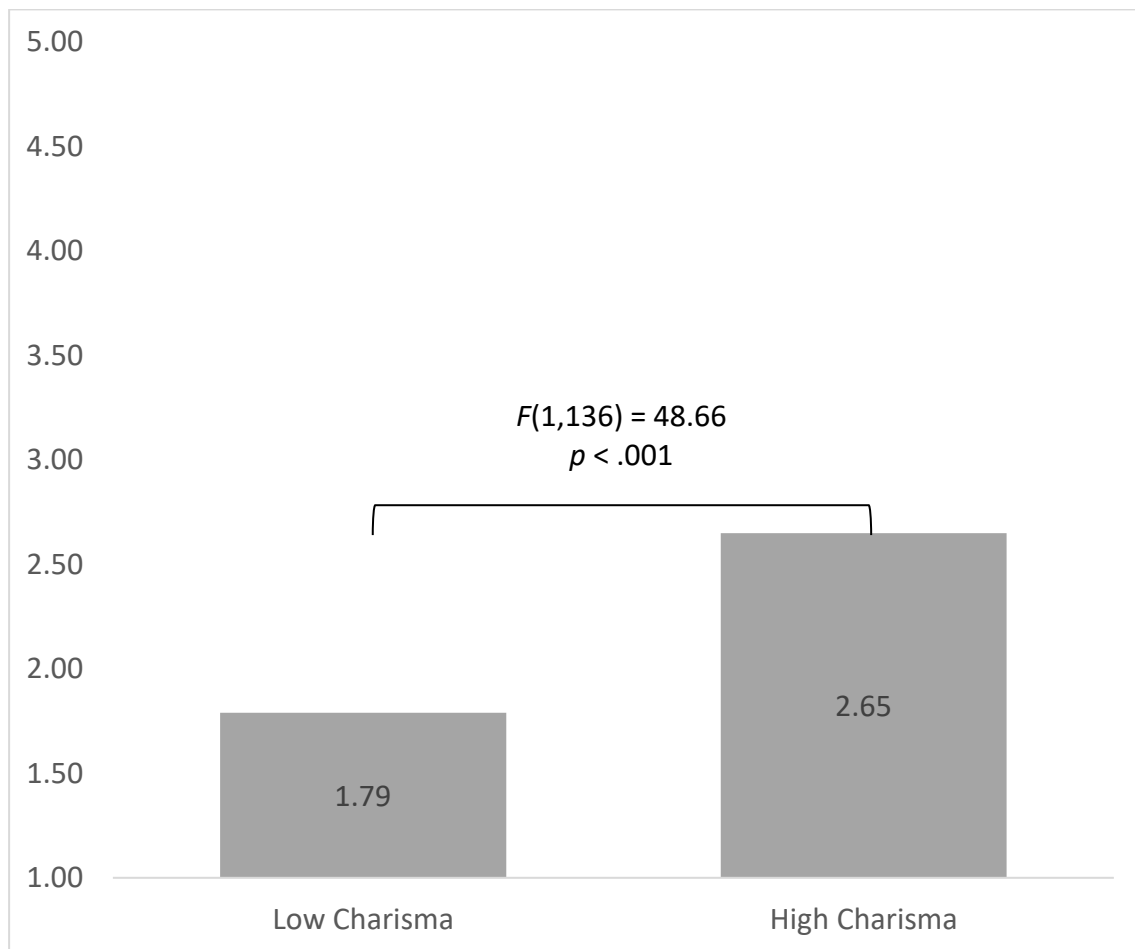
Figure B1*Perceived Attractiveness*

Figure B2*Perceived Eeriness*

Appendix C

Main Study: Other Measures and Results

Other Measures

Propensity to Invest

This is a four-item scale created Clarke et al. (2018) that measures the investors' likelihood to pursue the investment process. This scale is an alternative to the one-item scale of whether or not the investor is willing to invest, and it has been judged more representative of real life (Clarke et al., 2018). The questionnaire asked whether the investors want to take further action by "finding out more information about the business, doing further research into the industry and/or market of the business, meeting with the entrepreneur again, finding out more information about the entrepreneur/management team" (Clarke et al., 2018, p. 31). The items were rated on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Scores on the item were averaged with a higher score meaning a higher propensity to invest ($M = 3.68$, $SD = 1.10$, $\alpha = .95$).

Perceived Company Growth

This is a seven-item scale (three reversed items) measures the perceived potential for growth, profitability, and viability of the startup developed by the researchers. A sample item is: "To what extent do you agree that this company will grow?" rated on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Scores on the items were averaged and higher values indicate more perceived potential for growth ($M = 3.36$, $SD = 0.85$, $\alpha = .95$).

Perceived Entrepreneurial Success

This is a 10-item scale (three reversed items) measuring the perceived qualities associated with being a successful entrepreneur in the virtual human. We used items from a list of important qualities of an entrepreneur by venture capitalists to evaluate new venture

proposals (MacMillan et al., 1985). Participants were asked: “To what extent do you agree that the entrepreneur is ...” rated on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Entrepreneurial success was assessed with assertions such as being able to perform a sustained effort, able to communicate about the startup well, able to demonstrate leadership. Scores on the items were averaged with higher values indicating greater perceived success as an entrepreneur ($M = 3.45$, $SD = 0.68$, $\alpha = .88$).

Ability of Entrepreneur to Execute

This is a seven-item scale (three reversed items) measuring to what extent the entrepreneur was perceived as able to execute the task developed by the researchers. Research suggests that in early-stage investments, venture capitalists focus particular attention on their perceptions on the ability of the entrepreneur to execute (Huang & Pearce, 2015). A sample item is: “To what extent do you believe that this entrepreneur will be able to execute the business expansion?” rated on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Scores on the items were averaged with higher values indicating more perceived ability of entrepreneur to execute ($M = 3.60$, $SD = 0.65$, $\alpha = .86$).

Perceived Masculinity and Femininity

This is a 20-item scale (10 reversed items) that measures to what extent the entrepreneur was perceived as masculine or feminine. Agency is a term developed by Bakan (1966), which focuses on one’s self-assertion and separation. Being agentic is associated to typical masculine qualities (Eagly & Steffen, 1984). We used fourteen items from the Bem Sex-Role inventory (BSRI; 1974) and added six items developed by the researcher.

Participants were asked: “To what extent do you agree that the entrepreneur is ...” rated on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*).

Masculinity was assessed with adjectives such as assertive, competitive, or ambitious and femininity with adjectives such as supportive, compassionate, or sympathetic. Scores on the

items were averaged with higher values indicating more masculinity ($M = 3.27$, $SD = 0.54$, $\alpha = .78$) or femininity respectively ($M = 2.54$, $SD = 0.58$, $\alpha = .82$).

Perceived Entrepreneur Characteristics

This scale consists of four subscales that measure perceived warmth, dominance, competence, and honesty of the entrepreneur. In total, it contains 16 items. Each subscale consists of four items, including one reversed item. We used four items from the dominance scale developed by Hareli, Shomrat, and Hess (2009), two items from the perceived competence scale developed by DeSarbo and Harshman (1985), furthermore, we added ten items developed by the researchers. Participants were asked: “To what extent do you agree that the entrepreneur is ...” rated on a five-point Likert like scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Warmth was assessed with adjectives such as warm, likeable, approachable, and cold. Dominance was assessed with adjectives such as dominant, controlling, forceful, and submissive. Due to a low alpha reliability, we excluded the reversed item and measured dominance using the three items. Competence was assessed with adjectives such as competent, qualified, skilled, or incompetent. Honesty was measured with adjectives such as honest, sincere, truthful, and deceitful. Scores on the items were averaged for each quality and higher values indicated more warmth ($M = 3.27$, $SD = 0.90$, $\alpha = .89$), dominance ($M = 2.52$, $SD = 0.78$, $\alpha = .73$), competence ($M = 3.63$, $SD = 0.67$, $\alpha = .83$), and honesty respectively ($M = 3.67$, $SD = 0.67$, $\alpha = .82$).

Other Results

Means, standard deviations, and correlations are reported in Table D1. We regressed entrepreneur gender, verbal, and nonverbal charisma on (a) investor impressions (propensity to invest and perceived company growth; Table D2), (b) professional impressions about the entrepreneurs (perceived entrepreneurial success and ability of the entrepreneur to execute; Table D3), and (c) the personality perceptions of the entrepreneur, such as perceived

masculinity and femininity (Table D4), warmth and competence (Table D5), dominance and honesty (Table D6).

To answer research question 2 of whether charismatic entrepreneurial pitches result in higher measures for the dependent variables compared to non-charismatic pitches, we regressed charisma on the propensity to invest and perceived company growth (Table D2), perceived entrepreneurial success and ability of the entrepreneur to execute (Table D3), perceived masculinity and femininity (Table D4), warmth and competence (Table D5), and dominance and honesty (Table D6). Charisma did not have a significant impact on any of the dependent variables.

To answer research question 3 of whether verbal or nonverbal charisma of the entrepreneur would lead to greater measures for the dependent variables we regressed the verbal and nonverbal charisma on the propensity to invest and perceived company growth (Table D7), perceived entrepreneurial success and ability of the entrepreneur to execute (Table D8), perceived masculinity and femininity (Table D9), warmth and competence (Table D10), and dominance and honesty (Table D11).

Entrepreneurs with high verbal charisma were perceived to have a lower ability to execute ($B = -0.16, p = .004$; Table D8), robust to covariates ($B = -0.16, p = .004$). In Figure D1 we can observe that entrepreneurs with low verbal charisma ($M = 3.68, SD = 0.61$) were perceived as having a higher ability to execute, $F(1, 555) = 8.18, p = .004$, than entrepreneurs with high verbal charisma ($M = 3.52, SD = 0.68$).

To answer the research question of whether verbal and nonverbal charisma would have the same effect for female and male entrepreneurs, we regressed entrepreneur gender, verbal, and nonverbal charisma on the dependent variables. The results revealed that entrepreneurs who delivered the speech using high nonverbal charisma were perceived as warmer ($B = 0.34, p < .001$), robust to covariates ($B = 0.33, p < .001$; Table D5). In Figure D2

we can observe that entrepreneurs who used more nonverbal charisma ($M = 3.44$, $SD = 0.85$) were perceived as significantly more warm, $F(1, 555) = 20.07$, $p < .001$, than entrepreneurs who did not use nonverbal charisma in their pitch ($M = 3.10$, $SD = 0.92$).

Furthermore, women entrepreneurs were perceived as more dominant than men entrepreneurs ($B = 0.26$, $p < .001$) robust to covariates ($B = 0.26$, $p < .001$; Table E6). In Figure D3 we can observe that women entrepreneurs ($M = 2.65$, $SD = 0.79$) were perceived significantly more dominant, $F(1, 554) = 16.23$, $p < .001$, when compared to men entrepreneurs ($M = 2.38$, $SD = 0.74$). These findings are consistent with research on backlash against agentic women: When women assuming agentic professional roles they are considered as being more interpersonally hostile and lacking social skills. (Rudman & Glick, 2001).

Discussion

Results reveal that entrepreneurs with high verbal charisma in the pitch were perceived to have a lower ability to execute the project. The ability of the entrepreneur to execute contained items, such as the ability to put in extra work for the startup or ability to make sacrifices for the success of the startup (Huang & Pearce, 2015), thus this finding contradicts previous literature suggesting that charismatic leaders being perceived as able to sustain sacrifices for their cause (House, 1977). Entrepreneurs with high nonverbal charisma were perceived as warmer than entrepreneurs with low nonverbal charisma, confirming past research (Michel et al., 2013). Women entrepreneurs were perceived as more dominant than male entrepreneurs, in line with research on the backlash effect against women with who occupy an agentic professional role (Rudman & Glick, 2001).

Tables and Figures

Table C1

Main Study: Means, Standard Deviations, and Correlations

Variables	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.
1. Perceived market potential	3.37	0.87	-						
2. Propensity to invest	3.70	1.10	.51***	-					
3. Entrepreneurial success	3.45	0.68	.46***	.49***	-				
4. Ability to execute	3.61	0.65	.46***	.55***	.76***	-			
5. Perceived company growth	3.36	0.85	.71***	.66***	.66***	.66***	-		
6. Perceived masculinity	3.27	0.54	.21***	.33***	.49***	.42***	.33***	-	
7. Perceived femininity	2.54	0.58	.35***	.42***	.59***	.52***	.49***	.40***	-
8. Perceived warmth	3.27	0.90	.33***	.41***	.56***	.50***	.44***	.31***	.73***
9. Perceived dominance	2.52	0.78	-.08	-.02	-.04	-.07	-.06	.44***	-.16***
10. Perceived competence	3.64	0.67	.42***	.47***	.75***	.71***	.57***	.51***	.57***
11. Perceived honesty	3.67	0.67	.33***	.40***	.57***	.62***	.47***	.25***	.63***
12. Participant gender	1.52	0.54	.20***	.08	.08	.06	.15***	.03	.11*
13. Participant age	40.12	14.13	-.15***	-.11*	-.08*	-.04	-.10*	-.04	-.08

Note. $N = 558$.

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

Table C1*Main Study: Means, Standard Deviations, and Correlations - continuation*

Variables	<i>M</i>	<i>SD</i>	8.	9.	10.	11.	12.	13.
1. Perceived market potential	3.37	0.87						
2. Propensity to invest	3.70	1.10						
3. Entrepreneurial success	3.45	0.68						
4. Ability to execute	3.61	0.65						
5. Perceived company growth	3.36	0.85						
6. Perceived masculinity	3.27	0.54						
7. Perceived femininity	2.54	0.58						
8. Perceived warmth	3.27	0.90	-					
9. Perceived dominance	2.52	0.78	-.24***	-				
10. Perceived competence	3.64	0.67	.58***	-.04	-			
11. Perceived honesty	3.67	0.67	.61***	-.27***	.65***	-		
12. Participant gender	1.52	0.54	.06	-.07	.01	.02	-	
13. Participant age	40.12	14.13	-.05	.11*	-.04	.06	-.03	-

Note. $N = 558$.* $p < .05$. ** $p < .01$. *** $p < .001$.

Table C2*Main Study: Regression Coefficients – Propensity to Invest and Perceived Company Growth*

Variables	(1)	(2)	(3)	(4)
	Propensity		Growth	
Charisma	-0.11 (-0.87)	-0.14 (-1.06)	-0.16 (-1.55)	-0.19 (-1.87)
Participant gender		0.07 (0.54)		0.14 (1.26)
Participant age		-0.01 (-2.15)		-0.01* (-3.31)
Participant education		-0.05 (-0.94)		-0.1 (-2.45)
Participant employment		0.03 (0.55)		0.02 (0.51)
Experience 1		-0.07 (-0.68)		-0.04 (-0.42)
Experience 2		0.04 (0.54)		-0.06 (-1.06)
Constant	3.81* (41.24)	4.22* (11.32)	3.45* (47.81)	4.19* (13.81)
R-squared	0.00	0.03	0.01	0.10

Note. $N = 280$. Robust t-statistics in parentheses. Models 1 – 2 are regressed on the propensity to invest; models 3 - 4 are regressed on the perceived company growth.

* $p < .005$.

Table C3

Main Study: Regression Coefficients – Perceived Entrepreneurial Success and Ability of the Entrepreneur to Execute

Variables	(1)	(2)	(3)	(4)
	Success		Ability	
Charisma	-0.01 (-0.18)	-0.04 (-0.47)	-0.15 (-1.87)	-0.16 (-2.13)
Participant gender		0.07 (0.85)		0.06 (0.76)
Participant age		-0.01 (-2.13)		-0.00 (-1.29)
Participant education		-0.09 (-2.73)		-0.06 (-1.64)
Participant employment		0.00 (0.06)		-0.01 (-0.39)
Experience 1		-0.10 (-1.19)		-0.07 (-0.93)
Experience 2		-0.00 (-0.09)		0.00 (0.09)
Constant	3.47* (59.96)	4.10* (15.67)	3.67* (67.86)	4.09* (16.42)
R-squared	0.00	0.07	0.01	0.05

Note. $N = 280$. Robust t-statistics in parentheses. Models 1 – 2 are regressed on the perceived entrepreneurial success; models 3 - 4 are regressed on the perceived ability of the entrepreneur to execute.

* $p < .005$.

Table C4*Main Study: Regression Coefficients – Perceived Masculinity and Femininity*

Variables	(1)	(2)	(3)	(4)
	Masculinity		Femininity	
Charisma	0.07 (1.06)	0.07 (1.05)	0.00 (0.06)	-0.00 (-0.03)
Participant gender		0.02 (0.25)		0.10 (1.60)
Participant age		-0.00 (-0.63)		-0.00 (-0.59)
Participant education		-0.02 (-0.95)		-0.08* (-3.34)
Participant employment		0.03 (1.02)		0.02 (0.53)
Experience 1		-0.05 (-0.74)		-0.00 (-0.02)
Experience 2		0.03 (0.73)		-0.02 (-0.52)
Constant	3.23* (65.06)	3.24* (13.99)	2.54* (51.84)	2.70* (12.07)
R-squared	0.00	0.02	0.00	0.05

Note. $N = 280$. Robust t-statistics in parentheses. Models 1 – 2 are regressed on the perceived masculinity; models 3 - 4 are regressed on the perceived femininity.

* $p < .005$.

Table C5*Main Study: Regression Coefficients – Perceived Warmth and Competence*

Variables	(1)	(2)	(3)	(4)
	Warmth		Competence	
Charisma	0.21 (1.92)	0.21 (1.91)	-0.04 (-0.44)	-0.05 (-0.63)
Participant gender		0.05 (0.43)		-0.02 (-0.17)
Participant age		-0.00 (-0.52)		-0.00 (-1.12)
Participant education		-0.08 (-2.01)		-0.07 (-2.07)
Participant employment		0.01 (0.11)		-0.00 (-0.11)
Experience 1		-0.01 (-0.12)		-0.05 (-0.71)
Experience 2		-0.1 (-1.67)		-0.04 (-0.79)
Constant	3.16* (40.28)	3.64* (10.12)	3.62* (59.24)	4.22* (15.33)
R-squared	0.01	0.04	0.00	0.03

Note. $N = 280$. Robust t-statistics in parentheses. Models 1 – 2 are regressed on the perceived warmth; models 3 - 4 are regressed on the perceived competence.

* $p < .005$.

Table C6*Main Study: Regression Coefficients – Perceived Dominance and Honesty*

Variables	(1)	(2)	(3)	(4)
	Dominance		Honesty	
Charisma	0.02 (0.25)	0.04 (0.41)	-0.11 (-1.33)	-0.10 (-1.34)
Participant gender		-0.17 (-2.06)		0.02 (0.20)
Participant age		0.00 (1.07)		0.00 (0.58)
Participant education		0.08 (2.20)		-0.06 (-1.84)
Participant employment		0.01 (0.34)		-0.01 (-0.15)
Experience 1		0.14 (1.88)		-0.07 (-0.77)
Experience 2		-0.01 (-0.29)		-0.05 (-1.09)
Constant	2.48* (40.34)	2.09* (7.35)	3.72* (67.93)	4.03* (15.64)
R-squared	0.00	0.05	0.01	0.04

Note. $N = 280$. Robust t-statistics in parentheses. Models 1 – 2 are regressed on the perceived dominance; models 3 - 4 are regressed on the perceived honesty.

* $p < .005$.

Table C7*Main Study: Regression Coefficients – Propensity to Invest and Perceived Company Growth*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Propensity				Growth			
Verbal charisma	-0.14 (-1.51)	-0.28 (-2.08)	-0.14 (-1.50)	-0.26 (-1.93)	-0.10 (-1.39)	-0.12 (-1.18)	-0.09 (-1.29)	-0.10 (-0.95)
Nonverbal charisma	0.03 (0.27)	-0.12 (-0.92)	0.01 (0.07)	-0.12 (-0.92)	-0.06 (-0.81)	-0.08 (-0.79)	-0.08 (-1.07)	-0.08 (-0.84)
Verbal*nonverbal		0.29 (1.55)		0.25 (1.36)		0.04 (0.30)		0.01 (0.10)
Participant gender			0.15 (1.58)	0.15 (1.56)			0.23 (2.81)	0.23 (2.80)
Participant age			-0.01 (-2.23)	-0.01 (-2.19)			-0.01 (-2.24)	-0.01 (-2.23)
Participant education			-0.05 (-1.26)	-0.04 (-1.21)			-0.07 (-2.61)	-0.07 (-2.60)
Participant employment			0.04 (1.01)	0.04 (0.93)			0.03 (0.78)	0.03 (0.77)
Experience 1			-0.03 (-0.45)	-0.03 (-0.45)			-0.02 (-0.37)	-0.02 (-0.36)
Experience 2			0.06 (1.12)	0.06 (1.09)			-0.01 (-0.32)	-0.01 (-0.32)
Constant	3.74* (46.61)	3.81* (41.24)	3.81* (14.18)	3.87* (14.43)	3.43* (54.99)	3.45* (47.81)	3.56* (16.67)	3.56* (16.61)
R-squared	0.00	0.01	0.03	0.03	0.00	0.00	0.05	0.05

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the propensity

to invest; models 5 -8 are regressed on the perceived company growth.

* $p < .005$.

Table C8

Main Study: Regression Coefficients – Perceived Entrepreneurial Success and Ability of the Entrepreneur to Execute

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Success				Ability			
Verbal charisma	-0.11 (-1.95)	-0.13 (-1.49)	-0.11 (-1.95)	-0.11 (-1.31)	-0.16* (-2.86)	-0.14 (-1.81)	-0.16* (-2.89)	-0.14 (-1.69)
Nonverbal charisma	0.10 (1.70)	0.08 (1.10)	0.09 (1.54)	0.09 (1.17)	0.01 (0.17)	0.02 (0.30)	0.00 (0.06)	0.02 (0.33)
Verbal*nonverbal		0.03 (0.26)		0.00 (0.02)		-0.02 (-0.23)		-0.04 (-0.39)
Participant gender			0.09 (1.62)	0.09 (1.61)			0.07 (1.21)	0.07 (1.21)
Participant age			0.00 (-1.71)	0.00 (-1.71)			-0.00 (-0.75)	-0.00 (-0.76)
Participant education			-0.07* (-3.04)	-0.07* (-3.04)			-0.05 (-2.27)	-0.05 (-2.27)
Participant employment			0.03 (1.36)	0.03 (1.35)			0.01 (0.60)	0.02 (0.62)
Experience 1			-0.02 (-0.51)	-0.02 (-0.51)			0.00 (0.02)	0.00 (0.02)
Experience 2			0.01 (0.36)	0.01 (0.36)			0.01 (0.31)	0.01 (0.32)
Constant	3.46* (69.42)	3.47* (59.96)	3.59* (21.66)	3.59* (21.53)	3.68* (78.14)	3.67* (67.86)	3.75* (23.40)	3.73* (23.42)
R-squared	0.01	0.01	0.04	0.04	0.01	0.01	0.03	0.03

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the perceived entrepreneurial success; models 5 -8 are regressed on the perceived ability of the entrepreneur to execute.

* $p < .005$.

Table C9*Main Study: Regression Coefficients – Perceived Masculinity, Femininity*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Masculinity				Femininity			
Verbal charisma	-0.04 (-0.82)	-0.02 (-0.32)	-0.04 (-0.80)	-0.01 (-0.21)	-0.07 (-1.37)	-0.08 (-1.10)	-0.06 (-1.32)	-0.06 (-0.91)
Nonverbal charisma	0.11 (2.41)	0.12 (1.95)	0.11 (2.31)	0.13 (1.97)	0.07 (1.45)	0.06 (0.91)	0.06 (1.20)	0.06 (0.91)
Verbal*nonverbal		-0.03 (-0.35)		-0.04 (-0.49)		0.02 (0.23)		0.00 (0.01)
Participant gender			0.02 (0.50)	0.02 (0.51)			0.11* (2.40)	0.11 (2.40)
Participant age			-0.00 (-0.73)	-0.00 (-0.75)			-0.00 (-1.30)	-0.00 (-1.29)
Participant education			-0.03 (-1.63)	-0.03 (-1.64)			-0.07* (-4.03)	-0.07* (-4.02)
Participant employment			0.02 (0.92)	0.02 (0.94)			0.01 (0.58)	0.01 (0.57)
Experience 1			0.02 (0.60)	0.02 (0.61)			0.03 (0.60)	0.03 (0.60)
Experience 2			-0.00 (-0.10)	-0.00 (-0.09)			-0.02 (-0.54)	-0.02 (-0.54)
Constant	3.24* (77.48)	3.23* (65.06)	3.26* (23.08)	3.25* (22.68)	2.54* (59.79)	2.54* (51.84)	2.67* (18.79)	2.67* (18.85)
R-squared	0.01	0.01	0.02	0.02	0.01	0.01	0.05	0.05

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the perceived masculinity; models 5 -8 are regressed on the perceived femininity.

* $p < .005$.

Table C10*Main Study: Regression Coefficients – Perceived Warmth and Competence*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Warmth				Competence			
Verbal charisma	-0.12 (-1.63)	-0.13 (-1.15)	-0.12 (-1.57)	-0.11 (-1.00)	-0.10 (-1.78)	-0.04 (-0.52)	-0.10 (-1.76)	-0.03 (-0.39)
Nonverbal charisma	0.34* (4.48)	0.33* (3.24)	0.33* (4.38)	0.34* (3.31)	0.06 (1.12)	0.12 (1.54)	0.05 (0.97)	0.12 (1.54)
Verbal*nonverbal		0.01 (0.05)		-0.01 (-0.10)		-0.12 (-1.04)		-0.13 (-1.19)
Participant gender			0.10 (1.24)	0.10 (1.24)			0.01 (0.12)	0.01 (0.12)
Participant age			-0.00 (-0.85)	-0.00 (-0.85)			-0.00 (-0.85)	-0.00 (-0.89)
Participant education			-0.07 (-2.35)	-0.07 (-2.35)			-0.06 (-2.84)	-0.06* (-2.88)
Participant employment			0.03 (0.96)	0.03 (0.96)			0.02 (0.74)	0.02 (0.79)
Experience 1			0.02 (0.27)	0.02 (0.27)			0.02 (0.42)	0.02 (0.42)
Experience 2			-0.03 (-0.79)	-0.03 (-0.79)			-0.02 (-0.78)	-0.02 (-0.75)
Constant	3.16* (47.17)	3.16* (40.28)	3.26* (13.58)	3.25* (13.55)	3.65* (70.63)	3.62* (59.24)	3.88* (23.05)	3.85* (22.43)
R-squared	0.04	0.04	0.06	0.06	0.01	0.01	0.03	0.03

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the perceived

warmth; models 5 -8 are regressed on the perceived competence.

* $p < .005$.

Table C11*Main Study: Regression Coefficients – Perceived Dominance, and Honesty*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dominance				Honesty			
Verbal charisma	0.03 (0.44)	0.07 (0.77)	0.03 (0.42)	0.06 (0.68)	-0.10 (-1.69)	-0.08 (-1.00)	-0.10 (-1.76)	-0.08 (-1.00)
Nonverbal charisma	-0.00 (-0.07)	0.04 (0.41)	0.01 (0.21)	0.05 (0.56)	-0.01 (-0.16)	0.00 (0.04)	-0.00 (-0.08)	0.01 (0.15)
Verbal*nonverbal		-0.08 (-0.62)		-0.07 (-0.54)		-0.02 (-0.22)		-0.03 (-0.29)
Participant gender			-0.10 (-1.69)	-0.10 (-1.68)			0.02 (0.29)	0.02 (0.29)
Participant age			0.01 (2.00)	0.01 (1.98)			0.00 (1.29)	0.00 (1.27)
Participant education			0.05 (1.98)	0.04 (1.96)			-0.06 (-2.43)	-0.06 (-2.44)
Participant employment			0.01 (0.50)	0.02 (0.52)			0.01 (0.29)	0.01 (0.31)
Experience 1			0.13 (2.50)	0.13 (2.49)			-0.01 (-0.25)	-0.01 (-0.25)
Experience 2			-0.02 (-0.65)	-0.02 (-0.63)			-0.01 (-0.40)	-0.01 (-0.39)
Constant	2.50* (45.89)	2.48* (40.34)	2.10* (11.03)	2.08* (10.73)	3.72* (77.69)	3.72* (67.93)	3.78* (23.16)	3.77* (23.22)
R-squared	0.00	0.00	0.03	0.03	0.01	0.01	0.02	0.02

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the perceived

dominance; models 5 -8 are regressed on the perceived honesty.

* $p < .005$.

Table C12*Main Study: Regression Coefficients – Propensity to Invest and Perceived Company Growth*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Propensity				Growth			
Woman entrepreneur (WE)	0.06 (0.67)	-0.10 (-0.55)	0.05 (0.55)	-0.11 (-0.59)	0.09 (1.30)	-0.14 (-0.96)	0.08 (1.17)	-0.14 (-1.00)
Verbal charisma	-0.14 (-1.51)	-0.43 (-2.17)	-0.14 (-1.49)	-0.42 (-2.12)	-0.10 (-1.38)	-0.24 (-1.66)	-0.09 (-1.27)	-0.23 (-1.57)
Nonverbal charisma	0.02 (0.27)	-0.26 (-1.45)	0.01 (0.07)	-0.27 (-1.44)	-0.06 (-0.82)	-0.25 (-1.76)	-0.08 (-1.08)	-0.25 (-1.77)
WE*verbal		0.28 (1.03)		0.31 (1.12)		0.23 (1.09)		0.25 (1.22)
WE *nonverbal		0.29 (1.14)		0.29 (1.13)		0.33 (1.66)		0.32 (1.63)
Verbal*nonverbal		0.53 (1.99)		0.53 (1.97)		0.14 (0.68)		0.14 (0.70)
WE *verbal*nonverbal		-0.47 (-1.27)		-0.54 (-1.45)		-0.18 (-0.62)		-0.24 (-0.85)
Participant gender			0.14 (1.56)	0.14 (1.52)			0.23 (2.77)	0.22 (2.63)
Participant age			-0.01 (-2.25)	-0.01 (-2.25)			-0.01 (-2.27)	-0.01 (-2.30)
Participant education			-0.05 (-1.23)	-0.05 (-1.27)			-0.07 (-2.55)	-0.07 (-2.55)
Participant employment			0.04 (1.01)	0.04 (0.90)			0.03 (0.79)	0.02 (0.67)
Experience 1			-0.03 (-0.45)	-0.03 (-0.39)			-0.02 (-0.38)	-0.02 (-0.36)
Experience 2			0.06 (1.10)	0.05 (1.06)			-0.01 (-0.35)	-0.02 (-0.38)
Constant	3.71* (39.49)	3.86* (29.93)	3.79* (14.23)	3.95* (14.14)	3.39* (47.02)	3.52* (35.32)	3.52* (16.34)	3.67* (16.12)
R-squared	0.01	0.01	0.03	0.04	0.01	0.02	0.05	0.06

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the propensity

to invest; models 5 -8 are regressed on the perceived company growth.

* $p < .005$.

Table C13

Main Study: Regression Coefficients – Perceived Entrepreneurial Success and Ability of the Entrepreneur to Execute

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Success				Ability			
Woman entrepreneur (WE)	0.12 (2.15)	-0.08 (-0.72)	0.11 (2.01)	-0.09 (-0.80)	0.06 (1.09)	-0.15 (-1.38)	0.05 (0.94)	-0.16 (-1.47)
Verbal charisma	-0.11 (-1.94)	-0.27 (-2.23)	-0.11 (-1.94)	-0.27 (-2.18)	-0.16 (-2.85)	-0.26 (-2.18)	-0.16* (-2.87)	-0.26 (-2.20)
Nonverbal charisma	0.10 (1.69)	-0.08 (-0.75)	0.09 (1.53)	-0.08 (-0.71)	0.01 (0.17)	-0.18 (-1.65)	0.00 (0.05)	-0.18 (-1.62)
WE *verbal charisma		0.28 (1.67)		0.31 (1.80)		0.22 (1.40)		0.25 (1.55)
WE *nonverbal charisma		0.32 (2.16)		0.32 (2.17)		0.40 (2.73)		0.39 (2.71)
Verbal*nonverbal charisma		0.22 (1.40)		0.22 (1.40)		0.18 (1.15)		0.18 (1.17)
WE *verbal*nonverbal		-0.38 (-1.67)		-0.43 (-1.92)		-0.40 (-1.82)		-0.44 (-2.02)
Participant gender			0.09 (1.56)	0.08 (1.46)			0.07 (1.19)	0.06 (1.06)
Participant age			0.00 (-1.78)	0.00 (-1.83)			0.00 (-0.77)	0.00 (-0.86)
Participant education			-0.06* (-2.95)	-0.07* (-3.01)			-0.05 (-2.23)	-0.05 (-2.30)
Participant employment			0.03 (1.37)	0.03 (1.26)			0.01 (0.60)	0.01 (0.52)
Experience 1			-0.02 (-0.54)	-0.02 (-0.47)			0.00 (0.00)	0.00 (-0.00)
Experience 2			0.01 (0.30)	0.01 (0.28)			0.01 (0.28)	0.01 (0.30)
Constant	3.40* (57.24)	3.51* (40.79)	3.54* (21.15)	3.67* (20.26)	3.65* (63.57)	3.75* (45.59)	3.72* (23.25)	3.85* (22.67)
R-squared	0.02	0.03	0.05	0.06	0.02	0.03	0.03	0.05

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the perceived entrepreneurial success; models 5 -8 are regressed on the perceived ability of the entrepreneur to execute.

* $p < .005$.

Table C14*Main Study: Regression Coefficients – Perceived Masculinity, Femininity*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Masculinity				Femininity			
Woman entrepreneur (WE)	0.03 (0.69)	-0.11 (-1.13)	0.03 (0.58)	-0.12 (-1.19)	0.12 (2.50)	-0.02 (-0.18)	0.11 (2.33)	-0.03 (-0.32)
Verbal charisma	-0.04 (-0.82)	-0.10 (-1.02)	-0.04 (-0.80)	-0.10 (-1.04)	-0.07 (-1.36)	-0.16 (-1.62)	-0.06 (-1.30)	-0.16 (-1.67)
Nonverbal charisma	0.11 (2.40)	0.03 (0.27)	0.11 (2.31)	0.03 (0.30)	0.07 (1.44)	-0.01 (-0.12)	0.06 (1.19)	-0.01 (-0.12)
WE *verbal charisma		0.16 (1.17)		0.18 (1.32)		0.16 (1.09)		0.20 (1.40)
WE *nonverbal charisma		0.19 (1.51)		0.19 (1.48)		0.14 (1.04)		0.13 (1.02)
Verbal*nonverbal charisma		0.03 (0.23)		0.03 (0.24)		0.03 (0.25)		0.04 (0.33)
WE *verbal*nonverbal		-0.12 (-0.68)		-0.15 (-0.83)		-0.02 (-0.10)		-0.08 (-0.42)
Participant gender			0.02 (0.49)	0.02 (0.37)			0.11 (2.33)	0.10 (2.20)
Participant age			-0.00 (-0.74)	-0.00 (-0.79)			-0.00 (-1.36)	-0.00 (-1.35)
Participant education			-0.03 (-1.61)	-0.03 (-1.63)			-0.07* (-3.94)	-0.07* (-3.91)
Participant employment			0.02 (0.92)	0.02 (0.84)			0.01 (0.58)	0.01 (0.46)
Experience 1			0.02 (0.60)	0.02 (0.62)			0.03 (0.58)	0.03 (0.63)
Experience 2			-0.00 (-0.12)	-0.00 (-0.13)			-0.02 (-0.61)	-0.02 (-0.66)
Constant	3.22* (66.36)	3.29* (45.65)	3.25* (23.03)	3.33* (21.66)	2.48* (51.85)	2.55* (38.08)	2.62* (18.11)	2.71* (17.48)
R-squared	0.01	0.02	0.02	0.03	0.02	0.03	0.06	0.07

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the perceived masculinity; models 5 -8 are regressed on the perceived femininity.

* $p < .005$.

Table C15*Main Study: Regression Coefficients – Perceived Warmth and Competence*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Warmth				Competence			
Woman entrepreneur (WE)	-0.09 (-1.25)	-0.25 (-1.60)	-0.10 (-1.38)	-0.26 (-1.66)	0.10 (1.71)	-0.03 (-0.21)	0.09 (1.61)	-0.04 (-0.33)
Verbal charisma	-0.12 (-1.64)	-0.28 (-1.77)	-0.12 (-1.59)	-0.28 (-1.74)	-0.10 (-1.77)	-0.14 (-1.16)	-0.10 (-1.74)	-0.15 (-1.22)
Nonverbal charisma	0.34* (4.49)	0.24 (1.68)	0.33* (4.39)	0.25 (1.76)	0.06 (1.11)	-0.00 (-0.01)	0.05 (0.96)	-0.00 (-0.04)
WE *verbal charisma		0.30 (1.37)		0.33 (1.50)		0.20 (1.21)		0.23 (1.42)
WE *nonverbal charisma		0.19 (0.93)		0.18 (0.86)		0.24 (1.51)		0.24 (1.55)
Verbal*nonverbal charisma		0.18 (0.87)		0.18 (0.88)		0.07 (0.47)		0.08 (0.51)
WE *verbal*nonverbal		-0.35 (-1.16)		-0.40 (-1.32)		-0.37 (-1.66)		-0.43 (-1.88)
Participant gender			0.10 (1.28)	0.10 (1.26)			0.01 (0.08)	0.00 (0.06)
Participant age			-0.00 (-0.81)	-0.00 (-0.82)			-0.00 (-0.89)	-0.00 (-0.98)
Participant education			-0.07 (-2.43)	-0.07 (-2.50)			-0.06 (-2.79)	-0.06* (-2.90)
Participant employment			0.03 (0.96)	0.03 (0.91)			0.02 (0.74)	0.02 (0.76)
Experience 1			0.02 (0.28)	0.03 (0.37)			0.02 (0.39)	0.02 (0.44)
Experience 2			-0.03 (-0.75)	-0.03 (-0.76)			-0.03 (-0.83)	-0.02 (-0.80)
Constant	3.21* (41.76)	3.29* (29.72)	3.30* (13.82)	3.39* (13.17)	3.60* (58.08)	3.64* (38.29)	3.84* (22.64)	3.89* (21.18)
R-squared	0.04	0.05	0.06	0.06	0.01	0.02	0.03	0.04

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the perceived warmth; models 5 – 8 are regressed on the perceived competence.

* $p < .005$.

Table C16*Main Study: Regression Coefficients – Perceived Dominance, and Honesty*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dominance				Honesty			
Woman entrepreneur (WE)	0.26*	0.31	0.26*	0.32	0.08	-0.04	0.07	-0.04
	(4.03)	(2.57)	(4.11)	(2.66)	(1.42)	(-0.35)	(1.30)	(-0.39)
Verbal charisma	0.03	0.16	0.03	0.16	-0.1	-0.15	-0.1	-0.16
	(0.48)	(1.25)	(0.46)	(1.19)	(-1.68)	(-1.15)	(-1.75)	(-1.21)
Nonverbal charisma	-0.01	0.06	0.01	0.08	-0.01	-0.10	-0.01	-0.09
	(-0.10)	(0.49)	(0.18)	(0.67)	(-0.17)	(-0.90)	(-0.09)	(-0.80)
WE *verbal charisma		-0.18		-0.19		0.13		0.14
		(-1.01)		(-1.03)		(0.76)		(0.84)
WE *nonverbal charisma		-0.05		-0.07		0.21		0.20
		(-0.31)		(-0.42)		(1.38)		(1.32)
Verbal*nonverbal charisma		-0.22		-0.22		0.07		0.08
		(-1.21)		(-1.25)		(0.44)		(0.45)
WE *verbal*nonverbal		0.27		0.31		-0.19		-0.21
		(1.05)		(1.19)		(-0.84)		(-0.93)
Participant gender			-0.11	-0.11			0.02	0.01
			(-1.82)	(-1.84)			(0.27)	(0.21)
Participant age			0.00	0.00			0.00	0.00
			(1.91)	(1.89)			(1.26)	(1.20)
Participant education			0.05	0.05			-0.05	-0.06
			(2.22)	(2.29)			(-2.40)	(-2.42)
Participant employment			0.01	0.01			0.01	0.01
			(0.50)	(0.52)			(0.30)	(0.25)
Experience 1			0.13	0.12			-0.01	-0.01
			(2.46)	(2.33)			(-0.26)	(-0.25)
Experience 2			-0.03	-0.03			-0.01	-0.01
			(-0.80)	(-0.78)			(-0.43)	(-0.43)
Constant	2.37*	2.33*	1.98*	1.94*	3.68*	3.74*	3.75*	3.82*
	(37.23)	(26.06)	(10.67)	(9.62)	(62.37)	(43.75)	(22.93)	(21.88)
R-squared	0.03	0.03	0.06	0.07	0.01	0.01	0.03	0.03

Note. $N = 558$. Robust t-statistics in parentheses. Models 1 – 4 are regressed on the perceived dominance; models 5 -8 are regressed on the perceived honesty.

* $p < .005$.

Figure C1

Main Study: Perceived Ability of Entrepreneur to Execute

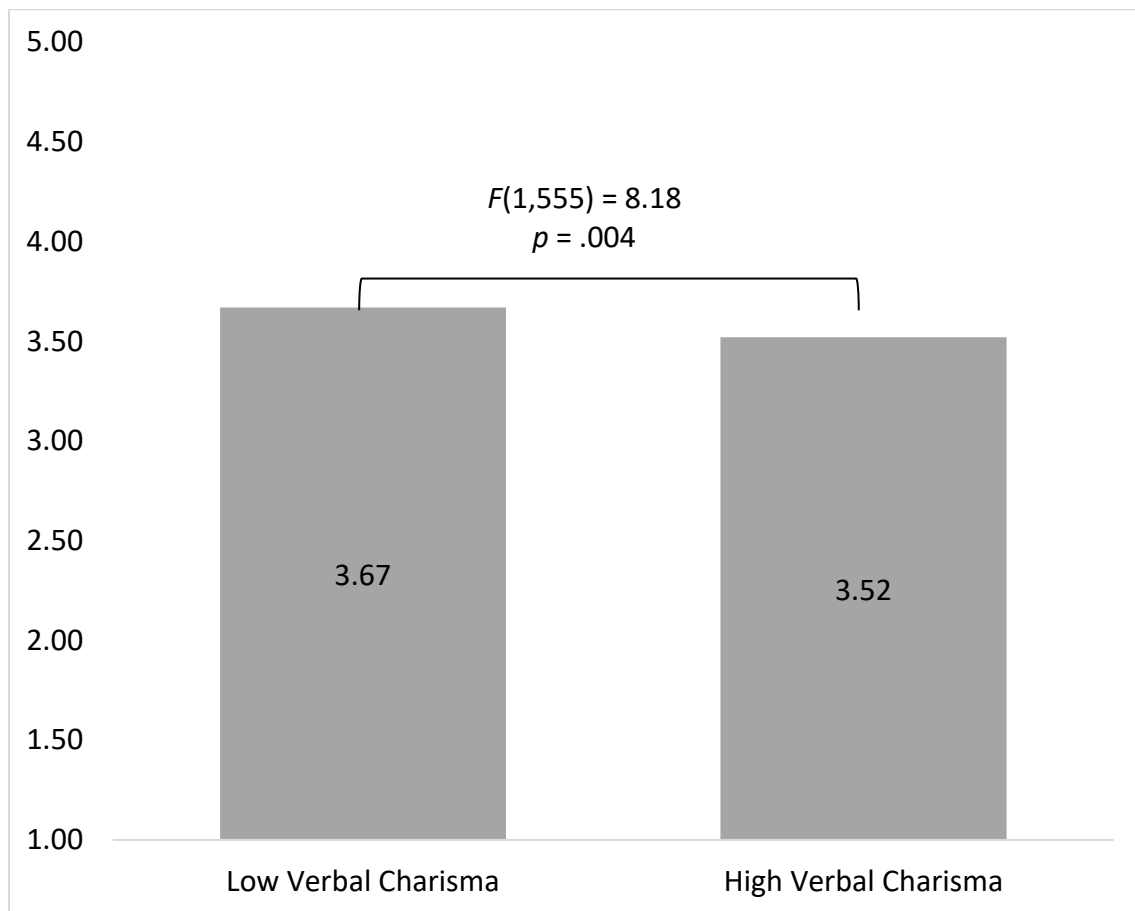


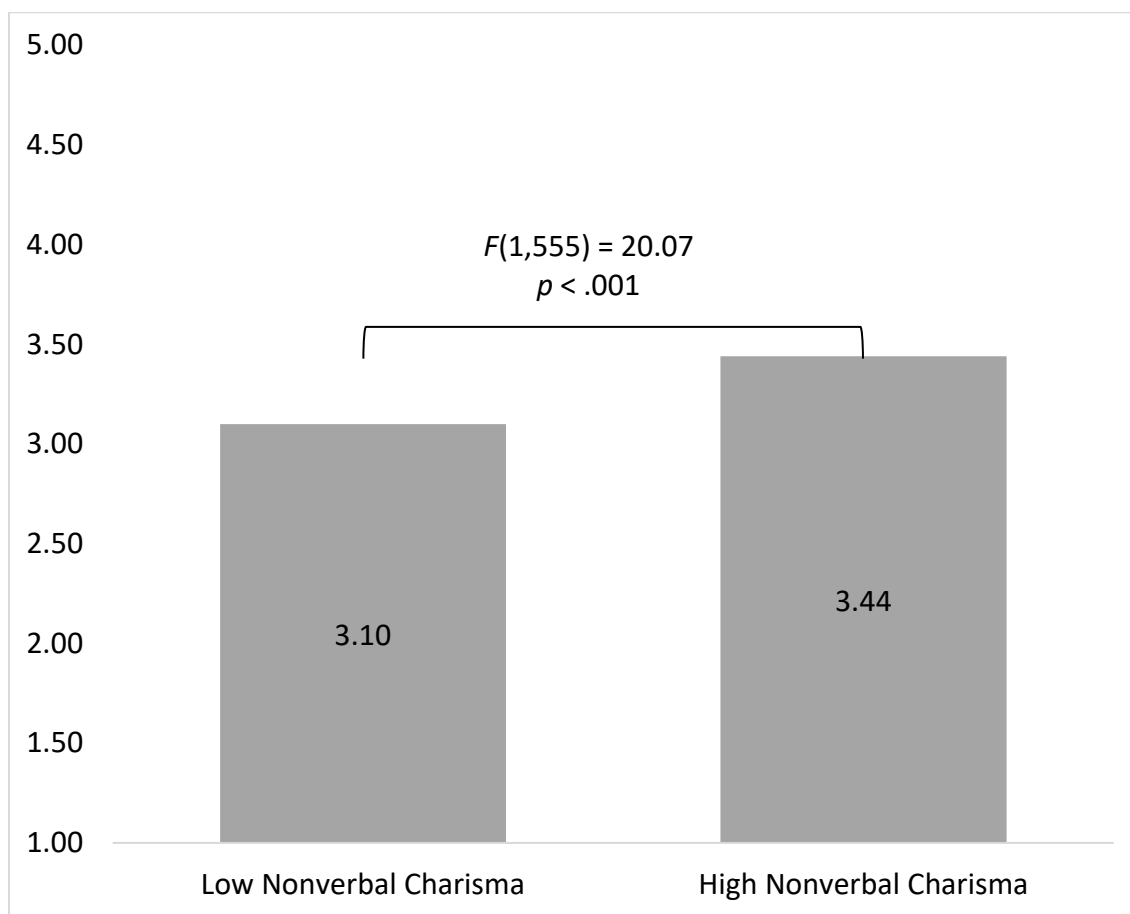
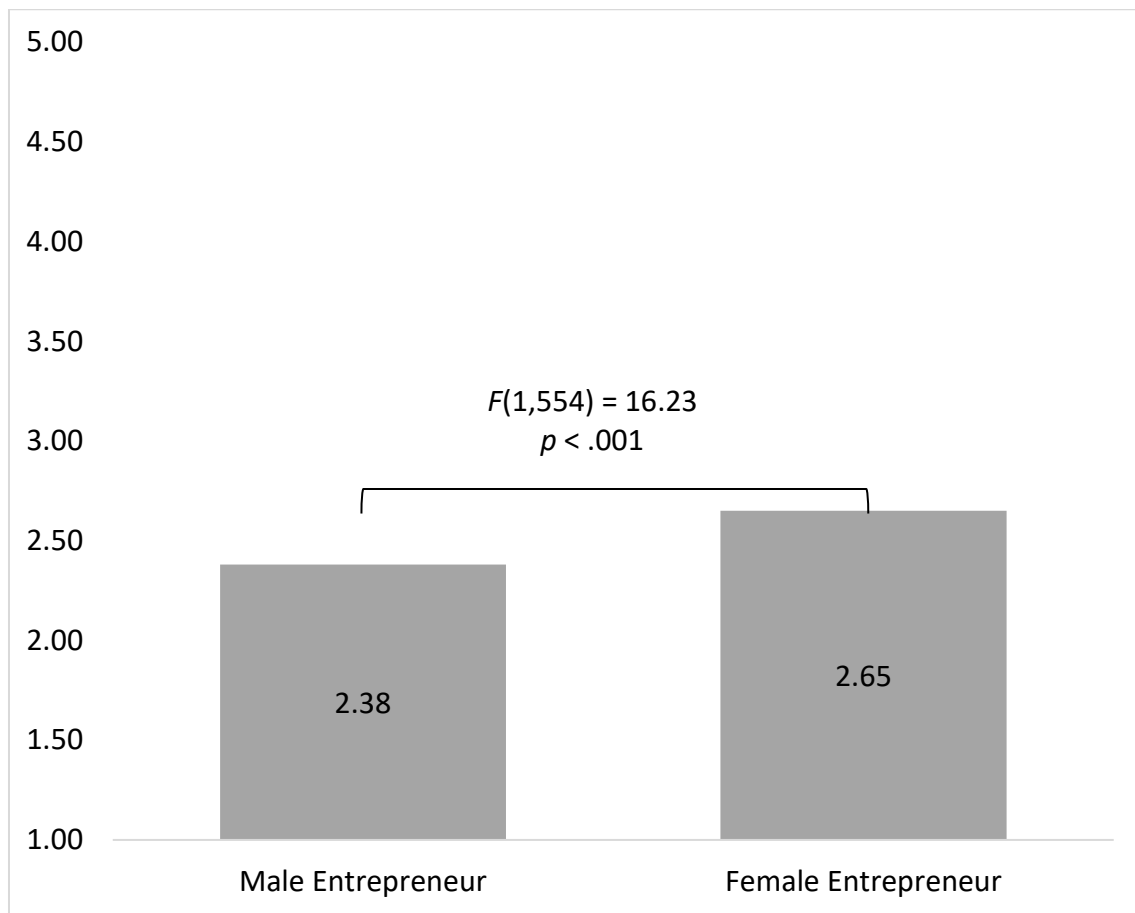
Figure C2*Main Study: Perceived Warmth*

Figure C3*Main Study: Perceived Dominance*

Appendix D

Main Study: Entrepreneurial Pitches

Non-Charismatic Entrepreneurial Pitch

Hi investors!

I am the founder of Foodfix.

I am here today to ask you for 400'000 dollars in exchange for 5% equity in our rapidly growing company.

I believe that this could be a valuable investment opportunity for you and the community.

Our company works in meal preparation to help people make healthy meals at home.

The goal of Foodfix is to provide our customers with healthy and sustainable meals at their homes and help them to eat better.

The idea of Foodfix originated when I was still at university.

All of the students were busy with class work and we needed to attend meetings and deadlines.

It was a lot of work.

Eating a healthy dinner and making sure that I did not waste groceries was a real challenge.

I did not have a lot of energy to do that on top of my studies.

It took extra time and money, also it would not be easy.

I knew that I would not be able to go through all the food I bought anyways, so I would end up throwing most of it away.

What I often did instead of cooking was stopping by a fast food for take-out.

Once I started an office job, I had the same problem with getting healthy dinner.

It was stressful to make time for my groceries and a healthy dinner.

I'm convinced that I was not the only one who encountered this kind of problem.

I was sure there was a better way to have dinner, so I started Foodfix.

Foodfix is there to help with your dinner preparation.

The Foodfix service delivers all the ingredients in the exact portions you need to make a chef-designed, delicious meal at home in 30 minutes or less which is also very nutritious.

You come to the site, pick out only exactly what you want how much and then we deliver all the ingredients along with recipe cards and instructional videos teaching you how to make a delicious dish at home.

It is very easy.

A possible next step for us is to expand our business.

We already won over thousands of clients in our region. Foodfix could really help our future customers.

Thank you for listening to our pitch!

Charismatic Entrepreneurial Pitch

Hi investors!

I'm the founder of Foodfix.

I'm here today to ask you for 400'000 dollars in exchange for 5% equity in our rapidly growing company.

This is not an ordinary investment deal.

This is an investment in a better future for all of us.

A future where eating a healthy meal after a busy day is easy and accessible to everyone.

At Foodfix, our mission is to help people, like you and, me, eat better, eat healthier, and eat more sustainably at home.

I first had the idea of Foodfix when I was studying at university.

Every day, going to meetings, classes, and managing deadlines felt like pushing through the busy underground.

I remember being so hungry and tired on my way back home in the evening that going to the grocery store to get healthy food felt like getting stuck behind someone on my way out..

It was difficult, time consuming, and expensive.

I knew that I wouldn't be able to go through all the food I bought anyways, so I would end up throwing most of it away.

Stopping by a fast food to get take-out was just the easier option.

When I moved from the classroom to the office, this problem did not go away.

It became worse.

The underground got even more crowded.

I am sure that you feel this too when you come back home from a long day at work.

I was sure there was a better way to have dinner, so I started Foodfix.

Foodfix is there help you navigate your way through the crowd.

Foodfix, like a caring crew member, delivers all the ingredients in the exact portions you need to make a chef-designed, delicious, nutritious meal at home in 30 minutes or less.

You are only 3 steps away from your next healthy dinner.

One, pick out your meal on our web site.

Two, wait for the delivery to your doorstep.

Three, prepare the meal with the help of our recipe cards or instructional videos.

Could it be easier?

Eating healthy with Foodfix is simple, sustainable, and smart.

We already won over thousands of clients in our region.

Foodfix will make sure you make your way through the busy crowd.

So, ladies and gentlemen, who's hungry?

Appendix E

Main Study: Manipulation Checks of Virtual Humans

Manipulation Check of Gesturing

To test whether the manipulation of nonverbal charisma was perceived and whether the nonverbal language of the virtual human was perceived as gender neutral, we recruited 60 participants from the Prolific platform. One participant was excluded for failing an attention check. The final sample consisted of 59 participants (31 women). Their average age was 37.08 years ($SD = 10.64$, $range = 18 - 61$). The participants logged into an online questionnaire, and after giving their informed consent, watched four videos in random order of the virtual human with no salient physical attributes performing the nonverbal language used in the pitch (Figure 7). Participants reported to what extent they perceived the stick figure as nonverbally expressive, using a seven-item measure developed by the researchers (reliability across four videos was at least $\alpha > .72$) rated on a five-point Likert scale from 1 (*very inexpressive*) to 5 (*very expressive*) and whether they perceived the gesturing of the stick figure in the video to be gendered using a two-item measure developed by the researchers (reliability across four videos was at least $\alpha > .83$), rated on a five-point Likert scale from 1 (*completely masculine*) to 5 (*completely feminine*).

Concerning expressiveness, the results of a repeated measure ANOVA revealed that there was only significant effect of nonverbal charisma, $F(1, 58) = 142.57$, $p < .001$, meaning that virtual humans with high nonverbal charisma were perceived as more charismatic than the ones with low nonverbal charisma. The results also revealed that virtual humans with high nonverbal charisma were perceived as more masculine, $F(1, 58) = 9.59$, $p = .003$. Virtual humans with high nonverbal charisma were perceived as having more masculine gestures when they were enacting both the high and low charisma pitches ($t(58) = -2.76$, $p = .008$; $t(58) = -4.35$, $p < .001$; t -test of the score for the high and low charisma pitches against 3, the

midpoint of the scale). Because of the process of transferring the nonverbal behavior of the stick figure to the virtual human, we needed the actress to hold the elbows slightly away from the waist to avoid technical issues during the transfer (i.e., the elbows colliding with the upper body of the final virtual human). Despite the elbows being visibly away from the waist in the stick figure form (Figure 6), the elbows appeared naturally positioned in the virtual human for (Figure 7). We assume that the virtual humans enacting high nonverbal charisma were perceived as more masculine because they were more expansive than the non-charismatic videos due to the position of the elbows. Expansive body posture is associated with high rank (Hall et al., 2005) and signals agency and dominance (Witkower et al., 2019).

Manipulation Check of Virtual Humans

We created 12 virtual humans (six women) that were grouped into six pairs man-woman pairs based on matching physical appearance (i.e., hair, skin, eye color, and physical complexion) and attire. The goal was to choose at least two pairs of virtual humans, in which the women and men were matched on hair color, skin color, and attire.

We recruited 604 participants on the Prolific online platform and five participants were excluded for failing attention check questions. The final sample consisted of 599 participants (301 men, 297 women, 1 other). Participants were between 18 and 65 years of age, with the modal age range between 18 and 24 years³. The participants logged into an online questionnaire, and after giving their informed consent, they saw an image of a virtual human and had to report their impressions about the perceived attractiveness, competence, likability, femininity, and realism of the virtual human using a five-point Likert scale from 1 (*completely disagree*) to 5 (*completely agree*). Furthermore, the participants had to provide an estimate of the age of the virtual human on a continuous scale using a slider from 15 to 70. To conduct our manipulation check, we compared the means of groups of three women and three men virtual humans, and we selected three pairs who were matched in terms of perceived

attractiveness, $F(1, 587) = 0.02, p = .893$, perceived competence, $F(1, 587) = 0.51, p = .475$, perceived likability, $F(1, 587) = 0.02, p = .887$, perceived realism, $F(1, 587) = 1.74, p = .188$, and perceived age, $F(1, 587) = 0.02, p = .897$. The women virtual humans were perceived as more feminine ($M = 2.32, SD = 0.61$) than the male ($M = 3.06, SD = 0.87$) virtual humans, $F(1, 587) = 78.67, p < .001$.

Manipulation Check of Animated Virtual Humans with Voice

During the recording process we used a microphone to record the voice of the actress. For the virtual male entrepreneur, we used the Praat software to modify the pitch frequency of the actress's voice to transform it into a man's voice; for the virtual woman entrepreneur, we used the original voice recording of the actress, which we slightly distorted, to match the perceived quality of the man's voice which had undergone transformations that impacted the quality of the audio.

We created two versions of the man's voice and two versions of the woman's voice that we combined with the three women and three men virtual humans. Our goal was to select a combination of virtual humans and voice that yielded equally realistic results for the women and men virtual humans. To conduct this manipulation check, we recruited 721 participants (362 men, 356 women, 3 other) from the Prolific platform. We excluded 28 participants from the study based on their failed attention checks. The final sample consisted of 693 participants (345 men, 345 women, 3 other). Their average age was 36.85 years ($SD = 12.50$, range = 18 - 78). The participants accessed an online questionnaire and after providing their informed consent they watched one of the 12 brief clips of a virtual human saying a phrase. After watching the videos, participants using a one-item scale for each measure reported their ratings on the perceived attractiveness, age, and realism of the human and the perceived quality of the video. All measures were reported using one-item measure per scale rated on a five-point Likert scale from 1 (*very low, unrealistic, not at all attractive*) to 5 (*very good*,

realistic, attractive). As a result of the manipulation check, we chose two pairs of virtual women and men virtual humans, whose videos in combination with the voices were matched in terms of perceived attractiveness, $F(1,681) = 1.07, p = .301$ perceived age, $F(1,681) = 3.39, p = .066$, perceived video quality, $F(1,681) = 0.25, p = .615$, and perceived realism, $F(1, 681) = 0.10, p = .753$, by testing the means of women virtual humans vs. the mean of the men virtual humans for each respective measure. Moreover, the gender of the women virtual humans was perceived correctly 97.54% of the time, whereas for the men virtual humans it was perceived correctly 99.16% of the times.