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van Horen, Femke; Millet, Kobe

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Unpredictable Love?

How Uncertainty Influences Partner Preferences

Femke van Horen and Kobe Millet[1]

Marketing Department, Vrije Universiteit Amsterdam, The Netherlands

Authors note

Femke van Horen, https://orcid.org/0000-0001-8887-2695. Kobe Millet, https://orcid.org/0000-0003-4365-6109.

Correspondence concerning this article should be addressed to Femke van Horen, Marketing Department, De Boelelaan 1105, 1081 HV, Vrije Universiteit Amsterdam, The Netherlands. Phone: +31 (0)20 5987145, Email: femke.van.horen@vu.nl

Abstract

Do uncertain events (such as COVID-19) influence the types of partners that males and females feel attracted to in (online) dating? Four studies show that partner preferences are not fixed but dynamic and depend on people's temporary psychological state of uncertainty. Specifically, we show that when facing uncertainty, women are more attracted to men with tougher versus more tender facial features, whereas men are more attracted to women with more tender versus tougher facial features. This effect attenuates under certainty. We show furthermore that uncertainty (but not certainty) increases the preference of stereotypical partner types (caring versus strong), which can be inferred from these facial features. These results are replicated with different facial stimuli and when uncertainty is activated due to COVID-19, pointing to the timeliness and generalizability of the findings. These findings have implications for our understanding of how and why partner preferences are influenced by uncertainty.

Keywords: uncertainty, partner preferences, facial features, attractiveness, stereotypes

Unpredictable Love? How Uncertainty Influences Partner Preferences

Uncertainty is a fundamental aspect of human life. From pandemics and financial crises, to climate change and political revolutions, people are ever more confronted with uncertainty and change (Arkin et al., 2013). Earlier research has demonstrated that people respond to such increased feelings of uncertainty through softness seeking (Van Horen & Mussweiler, 2014), re-establishing order and structure (Kay et al., 2008; Whitson & Galinsky, 2008), or holding more extreme convictions and increased beliefs in conspiracy theories (McGregor et al., 2001; Van Prooijen & Jostmann, 2013). In the present research, we examine how temporal uncertain events may influence the types of partners males and females feel they are attracted to.

It is often argued that attraction to particular partner types is stable and differs across the sexes: men seek women who can take care of their offspring, whereas women are primarily concerned with finding a partner that provides resources (e.g., Buss, 1989; Kenrick & Keefe, 1992). While some research investigated biological factors, such as female fertility (Penton-Voak et al., 1999) and pathogen load within the society (DeBruine et al., 2010) that may strenghten these mating preferences, *temporary* psychological states activated through situational variables have comparatively been neglected (Pettijohn & Jungeberg, 2004; Marzoli et al., 2013). Moreover, it has recently been highlighted that correlational studies examining partner preferences prevail, whereas experimental studies in this domain are rare (Ledgerwood et al., 2018; Eastwick et al., 2019). Here we show in a set of four experimental studies and a single paper meta-analysis that gender-specific partner preferences turn out to be flexible and change depending on fleeting states of activated uncertainty.

Uncertainty and Partner Preferences

Among the various conceptualizations of uncertainty in the literature, Fox and Ülkümen (2011) distinguished between two key dimensions: aleatory and epistemic

uncertainty. Aleatory uncertainty refers to probabilistic variability, which cannot be reduced and is perceived as random and unpredictable (e.g., Will one's home team win the soccer game?), whereas epistemic uncertainty refers to a lack of confidence in one's knowledge (e.g., What is the answer to a Trivial pursuit question). People feel particularly uncertain when events involve both forms of uncertainty (i.e., unknown probabilities). This is due to a lack of confidence in one's assessment of the probability distribution.

Uncertainty due to external, unpredictable events (e.g., pandemics, economic crises) is typically characterized by a combination of aleatory and epistemic uncertainty. Because of the complexity of the events and the absence of reliable estimates regarding their occurrence and outcomes, people are not able to make an assessment of the probability that, for instance, their job will be lost due to an economic crisis (Milliken, 1987; Faraji-Rad & Pham, 2007). We therefore define uncertainty as the inability to estimate the impact of unpredictable societal or personal events on one's life, and the incapability to predict their associated outcomes.

When uncertainty stems from external, unpredictable events, people are often unable to resolve the situation, due to which they may display compensatory behaviors. It has for instance been shown that uncertainty can lead to a search for softness (Van Horen & Mussweiler, 2014) and to an increased reliance on affective decision-making (Faraji-Rad & Pham, 2017). Research has shown in addition that feelings of uncertainty and randomness have led to an increased need for order and structure, for instance through the perception of coherent and meaningful patterns in random stimuli (Whitson & Galinksy, 2008), increased endorsement of religious as well as secular systems (Kay et al., 2008; Rutjens et al., 2013), and through an increased preference for boundaries in the environment (i.e., organized shopping environments, Cutright, 2012). This research indicates that under uncertainty people shift their focus towards cues that provide a feeling of predictability.

Recent research shows that stereotyping can also help to increase predictability and to create more certainty about the world. Stereotypes often maintain an existing state of affairs (i.e., the system they are part of) and using these stereotypes enables people to view their environment as a predictable place (Jost et al., 2005). For instance, political conservatives, as compared to liberals, are more likely to use stereotypes in order to quickly categorize people into groups, as such categorization provides them with a sense of predictability and certainty (Stern et al., 2015). In addition, it is shown that when people feel a lack of control or when uncertainty is activated, stereotyping is increased, especially when needs for predictability and structure are high (Ma et al., 2019; Wichman, 2012).

Instead of an increase in the use of stereotypes, we propose here that when feeling uncertain people are more attracted to particular facial features from which they *infer* specific gender stereotypes when evaluating potential dating partners. As uncertainty can threaten goals to predict events (Wichman, 2012) searching for stereotypical partner types may help to regain predictability in a dating context (i.e., "know what you get"). Thus, in a dating context, gender stereotypes may feel helpful when uncertainty is high.

Gender stereotypes are beliefs generally thought to be representative of women or men and often relate to preconceptions regarding traditional gender roles. These roles prescribe women to be warm, caring, and socially skilled, whereas men to be strong, protective, and taking care of income, which are, depending on the theoretical perspective, thought to origin from either sexual selection pressures (e.g., Buss & Schmitt, 2011) or from biosocial factors (e.g., Wood & Eagly, 2012). We propose that if people indeed rely more on stereotypes reflecting traditional gender roles under uncertainty, 'caring' women should be preferred by males whereas 'strong' men should be preferred by females on a dating market.

But how do people infer personality characteristics, such as caring and strong, when looking for a potential partner? Research has demonstrated that people often form

impressions and infer characteristics through facial appearance, and that they do so in a very fast and automatic manner (Willis & Todorov, 2006). For instance, people believe that men with feminine facial features are gay (vs. straight; Freeman et al., 2010) and that those men who appear dominant belong to the Republican (vs. Democratic) party (Rule & Ambady, 2010). These snap judgments have also been shown to impact partner choices. Research has demonstrated that people find faces more attractive when they are perceived to possess traits that are desired in potential partners (e.g., assertiveness; Little et al., 2006). As such, a more fun and outgoing look on a dating website predicted increased dating success for men, whereas a smarter and more serious look predicted increased female's dating success (Todorov et al., 2015).

Caring versus strong characteristics of a potential partner may be reflected in facial cues, such as people's tender versus tough facial features. Tender- versus toughness is the most important dimension amongst which men and women are differentiated (Feingold, 1994; Slepian et al., 2010). Research has shown that tender facial features evoke attributions such as warmth and caring (Burriss et al., 2011), whereas tough facial features are typically associated with strength (Mueller & Mazur, 1996). In the current research we therefore manipulated people's facial features representing varying levels of tenderness (vs toughness). We predict that under uncertainty, women prefer tougher whereas men prefer more tender facial features, as people look for a gender stereotypical partner type when feeling uncertain, and such personality characteristics are inferred from these facial features.

Overview of Studies

The current research tests the idea that under external uncertainty, women will prefer men with tougher (over more tender) facial features whereas men will prefer women with more tender (over tougher) facial features. These effects attenuate or disappear under certainty (Hypothesis 1). We predict further that these preferences for tougher versus more

tender facial features are due to the gender stereotypical partner types people look for under uncertainty: stronger versus more caring (Hypothesis 2). We explore this underlying mechanism by means of an experimental-causal-chain design, which tests the presumed process behind the effect by focusing on two parts of the process in separate studies (Spencer et al., 2005). In the Web Appendix (Study WA1), we report an additional study in which we activate uncertainty due to COVID-19 and use different facial stimuli (Appendix B), testing the timeliness and generalizability of the findings.

The findings of four experiments contribute to the existing literature by illustrating how gender-specific preferences for potential partners are dynamic and dependent on fleeting states activated through the context, particularly uncertainty. In addition, the findings show how uncertainty leads people to prefer stereotypical partner types in online dating. Finally, since the literature on partner preferences is largely correlational in nature, this paper makes an important contribution by providing experimental evidence to identify one of the situational drivers that determines partner preferences: uncertainty. All data, variables, and codes are publicly available at https://osf.io/shr2p/.

Study 1

Study 1 tests Hypothesis 1. Under uncertainty, we predict that women prefer men with tough over tender facial features, whereas men prefer women with tender over tough facial features. We expect these effects to attenuate or disappear under certainty.

Method

One-hundred and seventy-three heterosexual participants were recruited from Amazon Mechanical Turk (91 men, $M_{age} = 32.36$, $SD = 10.31$) for a small financial compensation and randomly allocated to a condition of a 2 (uncertainty: uncertain, certain) × 2 (features: tender, tough) × 2 (gender: male, female) mixed design, with uncertainty and gender as between-subjects factors and features as within-subject factor (see Web Appendix

(WA 2A-D) for sample size determination, exclusions, and sensitivity analyses per study). In order to direct people's attention towards the facial features of interest, while controlling for more salient features such as eye color and hairstyle, we manipulated tough versus tender within participants. By doing so, we increase the power of our design (cf. Meyvis & Van Osselaer, 2017). By directing attention to the focal facial features our research design still allows for a conservative test of our central proposition that uncertainty (but not certainty) will amplify the gender difference on preference for tender (vs. tough) facial features.

After informed consent, participants indicated, aside to other demographics such as age, education level, nationality, their gender in order to direct them to the faces of the other sex. Then, participants were instructed to think and write about a situation in which they felt either uncertain or certain (see WA 2A). Thereafter, in a second independent task, participants were asked to imagine that they were looking for a date on an online dating platform. After a short introduction on online dating, they were presented with the tender and tough features version of four different male or female faces (see WA 2A for stimuli development and pretest of the faces, see Appendix A for set of faces) and were asked to rate these faces on three items ("I think this Candidate is attractive", "I like this Candidate", "I would like to go on a date with this Candidate") all from 1 (*strongly disagree*) to 7 (*strongly agree)*, which were averaged into one attractiveness scale, αs > .90. Finally, participants answered a manipulation check question and reported their mood (see WA 2A).

Results and Discussion

Confirming the main hypothesis, results of the repeated measures ANOVA revealed a significant 3-way interaction between uncertainty, features, and gender, $F(1, 169) = 6.57$, $p = .01$, $\eta_p^2 = .04$. To get a better insight into this 3-way interaction, the results were further analyzed for the uncertainty and certainty condition separately. In the uncertainty condition, the repeated measures ANOVA revealed, as predicted, a significant interaction between

features and gender, $F(1, 89) = 21.20$, $p < .001$, $\eta_p^2 = .19$. Additional simple effect tests

showed that under uncertainty, men rated tender female faces as more attractive ($M = 4.95$,

$SD = 0.69$) than tough female faces ($M = 4.36$, $SD = 0.84$), $F(1, 89) = 14.19$, $p < .001$, $\eta_p^2 = $

.14, whereas women rated tough male faces as more attractive ($M = 3.92$, $SD = 1.35$) than

tender male faces ($M = 3.49$, $SD = 1.22$), $F(1, 89) = 7.50$, $p = .007$, $\eta_p^2 = .08$ (see Figure 1,

left panel). In the certainty condition, the interaction between features and gender was, as

predicted, non-significant, $F(1, 80) = 1.19$, $p = .28$ $\eta_p^2 = .02$ (see Figure 1, right panel; see

WA 2A for consistent results using dummy coding instead of decomposing the data).

Figure 1 about here

We find that under uncertainty men feel more attracted to and are more willing to go

on a date with women with tender facial features than with tough facial features, whereas the

opposite holds true for women. These differences attenuate or disappear under certainty. But

why do men and women feel attracted to different types of faces when feeling uncertain? We

hypothesize that under uncertainty people have an increased desire for gender stereotypical

partner types (caring versus strong), due to which they are more attracted to particular facial

features from which these stereotypical characteristics are inferred. Studies 2 and 3 were set

up to test this rationale. A powerful methodological approach to assess mediation is an

experimental-causal-chain design, in which a series of experiments are conducted to

demonstrate the proposed process (Spencer et al., 2005). If gender differences on the

perceived attractiveness of tender versus tough facial features under uncertainty can indeed

be explained by an increased preference for a gender stereotypical partner type inferred from

these facial features, then (1) activating uncertainty should lead men (women) to show a

preference for a caring (strong) as compared to a strong (caring) partner type, but not under

certainty, and (2) searching for a caring (strong) partner type should increase attractiveness of

tender (tough) facial features for both sexes.

Study 2

Study 2 tests the first link in the causal chain. Like in Study 1, participants were made

to think of (un)certainty and were asked to indicate the extent in which they preferred a partner

type with (strong versus caring) personality characteristics.

Method

One hundred and seventy-four heterosexual students (94 men, age: $M = 19.51$, $SD =$

1.32) participated for course credits. They were randomly assigned to a condition of a 2

(uncertainty: uncertain, certain) × 2 (partner type: caring, strong) × 2 (gender: male, female)

mixed design, with uncertainty and gender as between-subjects variables and partner type as

within-subject variable. After informed consent and indication of their gender, participants

were asked to read and write about life events that were characterized by high levels of either

uncertainty (e.g., financial crisis, shifts in political climate) or certainty (e.g., financial

stability, reliable insurances; see WA 2B). After the manipulation check, participants were

asked to imagine themselves they were looking for a date. They read they had the possibility

to choose between two types of partners: A caring partner or a strong partner. They were then

asked to indicate the extent in which they were drawn towards a caring partner, and to a

strong partner (two items, randomized), ranging from 1 (*not at all*) to 7 (*very much*). Finally,

participants reported their age, relationship status, nationality, and sexual orientation.

Results and Discussion

The results of the mixed ANOVA revealed a marginally significant 3-way interaction

between uncertainty, partner type, and gender on preference, $F(1, 170) = 3.41$, $p = .07$, $\eta_p^2 =$

.02. Analyses for the uncertainty and certainty conditions separately, revealed, as predicted, a

significant interaction between partner type and gender when participants felt uncertain, $F(1,$

82) = 12.57, $p < .001$, $\eta_p^2 = .13$. Additional simple effect tests showed that under uncertainty, men preferred a caring ($M = 5.09$, $SD = 1.18$) rather than a strong female partner ($M = 4.22$, $SD = 1.64$), $F(1, 82) = 5.68$, $p = .02$, $\eta_p^2 = .07$, whereas women preferred a strong ($M = 5.21$, $SD = 1.22$) rather than a caring male partner ($M = 4.18$, $SD = 1.39$), $F(1, 82) = 6.89$, $p = .01$, $\eta_p^2 = .08$ (see Figure 2, left panel). When participants felt certain, the interaction between partner type and gender was non-significant, $F(1, 88) = 0.95$, $p = .33$, $\eta_p^2 = .01$ (see Figure 2, right panel). These results show, consistent with our hypothesis, that people look for stereotypical partner types when feeling uncertain, but these gender stereotypical partner preferences attenuate or disappear when people feel certain.

Figure 2 about here

Study 3

Study 3 sought to establish the second link between our proposed process mechanism (preference for gender stereotypical partner types) and our focal dependent measure (attractiveness of tender versus tough facial features). To establish the causal chain, we kept materials as consistent as possible. Therefore, we first manipulated preference for partner type and then exposed participants to the same four female or male faces as in Study 1. We predicted that when people imagine they are looking for a partner with caring (vs. strong) personality characteristics, the attractiveness of tender (vs. tough) facial features would increase for both men and women.

Method

One hundred and forty-one heterosexual students (81 men, age: $M = 19.22$, $SD = 5.95$) took part in the study for course credits. They were randomly assigned to a 2 (partner type: caring, strong) × 2 (features: tough, tender) × 2 (gender: male, female) mixed design,

with partner type and gender as between-subjects factors, and features as within-subject

factors. After indicating their gender, participants were first asked to imagine a particular

type of woman/man as partner. In the caring condition, they read "Please think of a woman

(man) who likes to care for other people. A woman (man) who makes you feel at home and is

comforting." In the strong condition, they read "Please think of a woman (man) who is

strong. A woman (man) who provides protection and you can rely on when needed". In the

second task they were asked, as in Study 1, to imagine they were without relationship and

were looking for a date, specifically for someone who is caring (strong). They were then

presented with the same set of (tender and tough) faces as used in Study 1 and were asked to

rate the attractiveness of the faces (as the three items correlated highly in Study 1, only the

attractiveness item was used). Participants then answered the manipulation check (see WA

2C) and provided demographics such as age, nationality, relationship status, and sexual

orientation.

Results and Discussion

As predicted, results of the mixed ANOVA revealed a significant interaction between

partner type and features, $F(1, 137) = 53.38$, $p < .001$, $\eta_p^2 = .28$. There was also a significant

3-way interaction between partner type, features, and gender, $F(1, 137) = 6.49$, $p = .01$, $\eta_p^2 =$

.05. Analyses for men and women separately showed for both genders a significant

interaction between features and partner type, $F_{Men}(1, 79) = 12.74$, $p < .001$, $\eta_p^2 = .14$, and

$F_{Women}(1, 58) = 44.96$, $p < .001$, $\eta_p^2 = .44$. Simple-effect tests showed that the pattern of

results was the same for both genders, albeit stronger for women: for men, tender facial

features were rated as more attractive when they were asked to think about a caring partner

($M = 4.19$, $SD = 1.18$) than about a strong partner ($M = 3.54$, $SD = 1.02$), $F(1, 79) = 6.88$, $p =$

.01, $\eta_p^2 = .08$. Tough facial features were rated as marginally more attractive when asked to

think about a strong partner ($M = 3.76$, $SD = 1.09$) than about a caring partner ($M = 3.34$, SD

= 0.91), $F(1, 79) = 3.56$, $p = .06$, $\eta_p^2 = .04$ (see Figure 3, left panel). Like men, women rated tender facial features as more attractive when asked to think about a caring partner ($M = 3.82$, $SD = 1.10$) than about a strong partner ($M = 2.39$, $SD = 0.76$), $F(1, 58) = 33.92$, $p < .001$, $\eta_p^2 = .37$. Tough facial features were rated as more attractive when thinking about a strong ($M = 3.97$, $SD = 1.14$) than about a caring partner ($M = 3.18$, $SD = 0.96$), $F(1, 58) = 8.22$, $p = .01$, $\eta_p^2 = .12$ (see Figure 3, right panel).

Figure 3 about here

As predicted, the results of Study 3 demonstrate that faces of the other sex with tender facial features are perceived as more attractive when people search for a partner with caring characteristics, whereas faces with tough facial features are judged as more attractive when searching for a partner with strong characteristics (for men marginally so). This is compelling evidence that people infer from tender facial features that a partner is comforting and caring, and from tough facial features that a partner is protective and strong.

Generalization and Replication

Uncertainty Due to COVID-19 (Study WA1)

As the COVID-19 pandemic has caused unprecedented uncertainty across the globe, we tested whether reported effects would hold while activating uncertainty due to COVID-19. In addition, to test the robustness of the results, we created, with a professional graphic design company, new facial stimuli (Appendix B). The general set up was the same as Study 1. However, instead of including a within-subject factor, we created a continuous measure using a morphing technique (blends). This allowed us to measure the attractiveness of a particular face ranging from extremely tender to extremely tough more subtly. Consistent with Study 1, we found a moderation between uncertainty due to COVID-19 and gender:

under COVID-19 uncertainty men felt more attracted to a woman with a more tender looking face, whereas women tended to feel more attracted to a man with a more tough looking face, than under certainty. These results demonstrate the timeliness and generalizability of our findings (See for full details and results Web Appendix Study WA1 and WA 2D).

Internal Meta-Analysis

To assess the overall effect of uncertainty on gender specific partner preferences and to provide additional evidence for the robustness of our findings, we conducted a single-paper meta-analysis (McShane & Böckenholt, 2017). This was important given that we conducted a number of studies which effects differed in magnitude. Data for the meta-analysis included Studies 1, 2, and WA1. The results showed a significant and robust interaction between uncertainty and gender across studies (SPM Estimate = -0.58, SE = 0.17, 95% CI [-0.91, -0.24]). In addition, more specifically, the gender difference in partner preferences was significant under uncertainty (SPM Estimate = -0.66, SE = 0.12, 95% CI [-0.89, -0.42]), but not under certainty (SPM Estimate = -0.08, SE = 0.12, 95% CI [-0.32, 0.16]; for full details see WA4).

General Discussion

Four studies and an internal meta-analysis provide converging evidence that the level of uncertainty moderates sex differences in the attractiveness of facial features associated with stereotypical partner types in online dating. The results show that women (men) feel more attracted to men (women) with tougher (more tender) facial features under uncertainty because of the increased desire for a stereotypical partner type (strong versus caring) inferred from such facial features. These effects attenuate or disappear under certainty. These results show that partner preferences are not fixed, but are affected by fleeting psychological states, such as feelings of uncertainty due to external, unpredictable events. We demonstrate the robustness of the findings using different facial stimuli and generalize this phenomenon to

COVID-19 induced uncertainty. This highlights the importance of our findings during a time in which uncertainty is highly prevalent and online dating increases even more in popularity.

Theoretical Contributions

The current work contributes to the existing literature on partner preferences. First, our findings show that *temporary* psychological states activated through situational variables can produce individual variation in partner preferences: when uncertainty is situationally activated, gender specific partner preferences are increased (in accordance with evolutionary based theories; Buss 1989). The findings reveal however that when certainty is activated, these basic motivations are not predictive for attractiveness of a potential partner. The extent to which such situational variables affect partner preferences has so far been neglected in the literature or is correlational in nature (Eastwick et al., 2019; Ledgerwood et al., 2018; Marzoli et al., 2013).

Second, to the best of our knowledge, this research is the first to demonstrate how (un)certainty influences partner preferences. Earlier literature has demonstrated how economic downturns and high mortality increases preference for older, heavier Playboy playmates (Pettijohn & Jungeberg, 2004) and increases spending on beauty products to impress potential partners (Hill et al., 2012). The current research adds to this literature by showing that external uncertainty increases attractiveness of particular facial features from which gender stereotypical personality characteristics are inferred.

Additional Observations

In the first two studies and in Study WA1, we focused on how uncertainty moderates gender differences in preferences for particular facial features and partner types and provide empirical evidence for our propositions. Sensitivity analyses (WA 2A-D), indicated that the sample sizes used in these studies provide 80% power to detect an effect of respectively $f =$ .12 (Studies 1 and 2) and $f = .15$ (Study WA1). Effect sizes of similar uncertainty

manipulations as those used in the current studies are in the range of Cohen's d = .25 to .71 (f = .13 to .36; see WA5). Thus, sensitivity analyses indicate that the sample sizes in the studies are larger than needed to detect the smallest reported effect size of the uncertainty manipulations we identified in the literature. Therefore, we believe our sample sizes turn out to be sufficiently large to detect the effect of uncertainty on sex differences in relative partner preferences.

The number of men and women participating in Studies 1 and 2 are too low to explore specific effects of uncertainty (a) on women's preference for a tough features/strong partner type and (b) on men's preference for a tender features/caring partner type. Still, an exploration of specifically these effects in Studies 1 and 2 may be valuable given previous work on ideal partner preferences and to inspire future research avenues. Earlier research indicates that women appreciate characteristics associated with a male gender stereotype (e.g., strength) much more than men do, but at the same time women do also appreciate characteristics associated with a female gender stereotype more than men do (e.g., warmth and caring; Fletcher et al., 2004).

Zooming in on the two dimensions separately suggests that our effects are indeed stronger and more consistent on the tough/strong than the tender/caring dimension. Exploratory analyses (WA3) show that the uncertainty manipulation increases female preferences for tough features (Study 1) and a strong partner type (Study 2), whereas male preferences do not increase (or they decrease). A post hoc power analysis indicates however that the power of the studies is too low to detect gender differences on the tough/strong dimension of this size (WA 3). For the tender/caring dimension, uncertainty only increases male preference for tender features (Study 1), but not a caring partner type (Study 2). Together, these results suggest that the findings on female preferences for tough features/strong partner type are more consistent across studies than male preferences for

tender features/caring partner type. Future research should use a larger sample to reliably test for gender differences when zooming into the specific preferences for tough features/strong partner type or tender features/caring partner.

The above findings suggest that gender stereotypes and ideal partner preferences are less aligned when focusing on traits reflecting caring. This is consistent with literature showing that caring is associated with warmth and kind (Auster & Ohm, 2000; Prentice & Carranza, 2002) and that women in general rate warmth higher than men do when they evaluate traits in an ideal partner (Fletcher et al., 2004). This may also explain the pattern of results when focusing on the effects of uncertainty on partner preferences for men and women separately (see exploratory analyses (WA 2A and 2B) and internal meta-analysis (WA4). These results reveal that the effect of uncertainty on gender stereotypical partner preferences is more pronounced for women than for men, likely because stereotypes and ideal partner qualities line up more precisely for characteristics reflecting strength.

Limitations and Future Research Directions

Our findings suggest several avenues for future research. First, our pattern of results is in line with the observation in Western countries – where there is relatively more certainty due to increasing wealth and decreasing insecurity in many domains of life (e.g., health, financial) – that sex differences in partner preferences decrease (Zhu & Chang, 2019). Where some studies suggest that this is due to an increase in nations' gender equality (Zentner & Mitura, 2012; Eagly & Wood, 1999), future cross-cultural research could investigate if changes in perceived uncertainty between countries (rather than, or alongside, gender equality) are predictive for gender differences in partner preferences.

Second, the current research may help to better understand when sex differences in ideal partner preferences (e.g., the desirability of attractiveness and earning potential in a partner when making use of hypothetical scenarios) result in choices for partners that have

these attributes (e.g., in real life). A meta-analysis indicated that attractiveness and earning potential in actual partner preferences are not sex differentiated (Eastwick et al., 2014). As Eastwick and colleagues request for research to identify the conditions under which ideals do and do not predict mating-relevant behaviors and evaluations, our work may suggest that (un)certainty could be an important driver to take into account.

Third, in the present research the focus is on very specific characteristics that belong to gender stereotypes. However, gender stereotypes are much broader than the characteristics we allocated attention to (strong vs. caring). Future research may investigate if other gender-stereotypical traits (e.g., assertive, competitive, aggressive vs. communal, cooperative, affectionate) may be more preferred under uncertainty. Moreover, whereas we find in Study 3 that the activation of a strong (caring) partner type results in increased attractiveness of tough (tender) facial features in a potential partner, it remains to be tested if a more general preference for stereotypical partners will result in similar attractiveness ratings.

Fourth, we investigated the effect of uncertainty on attractiveness of faces of the other sex in an online context. Although the omnipresence of internet dating and use of online images make these findings timely and important, an interesting avenue for future research would be to examine whether the results prevail in an offline dating context and whether they particularly hold when searching for a short-term relationship, for a long-term, or both. It may also be of interest to explore this research question in a real dating context since stated preferences are not always correlated with preferences for potential partners after a face-to-face interaction (Finkel & Eastwick, 2008).

Fifth, in the current research we focused on dating, as selecting a partner is one of the most important decisions people face and physical attractiveness plays a fundamental role in such decisions. If people prefer stereotypical partner types inferred from facial features, it is however conceivable that the current effects hold in other domains as well. Future research

could for instance investigate whether advertisements using a tender looking female model or

a tough looking male model are more effective under uncertainty. Finally, future research

may also examine if stereotyping is functional in that uncertainty is reduced after one has

indicated preference for a stereotypical partner and whether uncertainty leads to preferences

for stereotypical partner types inferred from other cues than facial features.

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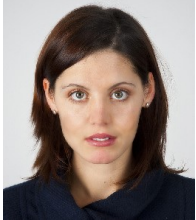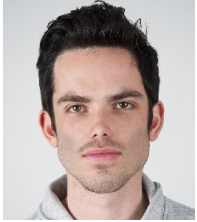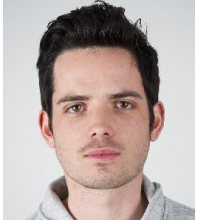
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Appendix A

Stimuli Studies 1 and 3

Female faces				
Tough				
Tender				
Male faces				
Tough				
Tender				

Note. Four female and four male faces each with tough versus tender facial features

Appendix B

Stimuli Study WA1

Note. Female and male face gradually changing from (1) very tender to (7) very tough facial features, by using a morphing technique

Supporting Information

Additional supporting information may be found in the online version of this article at the

publisher's website:

Web Appendix 1: Study WA1 - Uncertainty due to COVID-19: Conceptual replication and

generalization of Study 1 (additional study not included in the manuscript)

Web Appendix 2: Additional details, pretests and analyses for studies in manuscript

Web Appendix 3: Additional observations tough/strong and tender/caring dimensions

Web Appendix 4: Single paper meta-analysis

Web Appendix 5: Effect sizes of prior studies using similar uncertainty manipulations in the

literature

All data, variables, and codes are publicly available at https://osf.io/shr2p/.
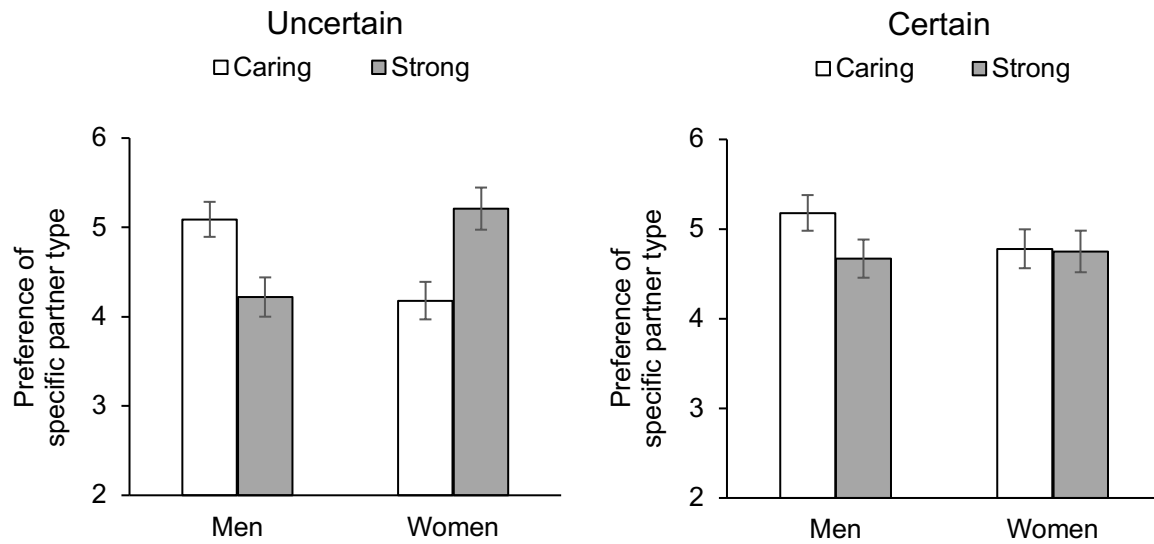
Figure 1

Attractiveness Ratings of Other Sex with Tender versus Tough Facial Features is Moderated

by Uncertainty (Uncertain (Left Panel) versus Certain (Right Panel)).
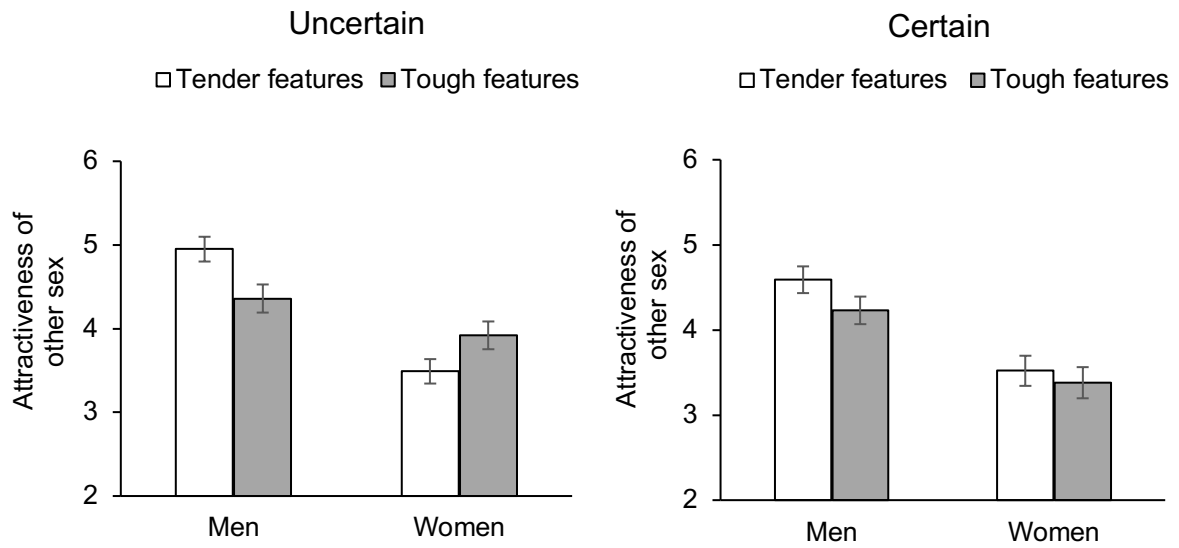
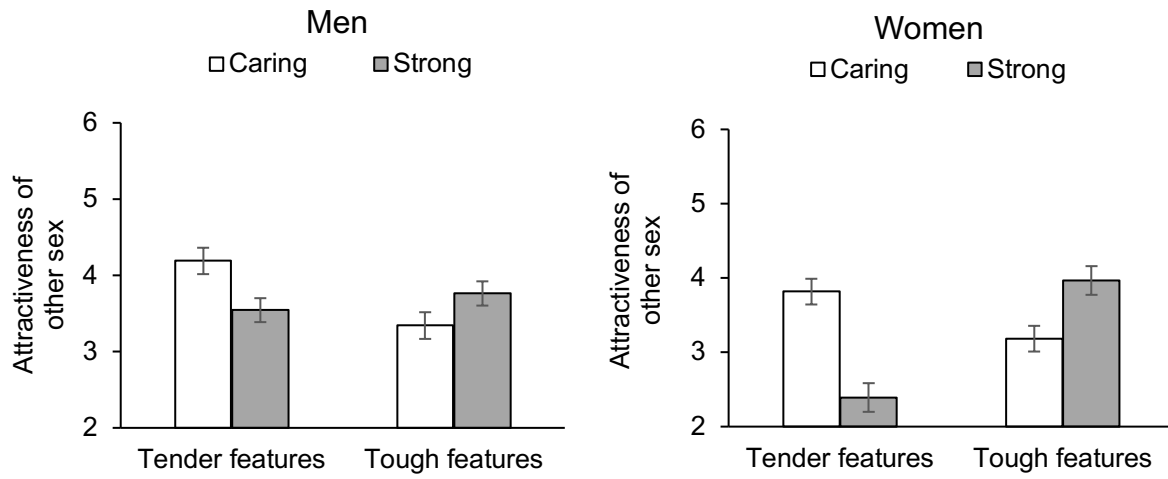*Note.* Error bars represent +/–1 Standard Error of the Mean.

Figure 2

Preference of Men and Women for Specific Partner Types (Caring versus Strong) is Moderated by Uncertainty (Uncertain (Left Panel) versus Certain (Right Panel)).

Note. Error bars represent +/–1 Standard Error of the Mean.

Figure 3

Attractiveness Ratings of Faces with Tender versus Tough Facial Features is Moderated by Partner Type (Caring versus Strong) for Men (Left Panel) and Women (Right Panel).

Note. Error bars represent +/–1 Standard Error of the Mean.