**Attraction depending on the level of abstraction of the character descriptions**

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# Abstract

With the recent expansion of social networking platforms, we find ourselves presented with burgeoning opportunities to evaluate other people by reading their profiles without direct interactions. Therefore, it is important to examine the determinants of interpersonal attraction in such unilateral communication. The Uncertainty Reduction Theory posits that as an individual’s uncertainty diminishes, they will be evaluated as more attractive. While past studies have predominantly examined the relationship between uncertainty and attraction by focusing on the effect of the amount of accessible information, little attention has been paid to the qualitative aspects of information (i.e., how information is described). In light of this, our present study investigates the effect of expression abstractness within profiles on the attraction attributed to the focal individual. Given that concrete expressions contain richer information than abstract counterparts, we hypothesize that (1) a person described in more concrete terms will be perceived as more attractive, and (2) the level of uncertainty will mediate this effect. To empirically test these hypotheses, we will conduct an online experiment with 1,000 native adult Japanese speakers.

*Keywords:* attributional confidence, familiarity, interpersonal attraction, the uncertainty reduction theory

# Introduction

Meeting acquaintances engenders a greater sense of relaxation. Despite the initial awkwardness in first-time interactions, multiple encounters make it easier and much more relaxed. Consequently, individuals would experience a phenomenon wherein more encounters yield more favorable impressions of the person. Previous studies have demonstrated that people perceive greater attractiveness in a person encountering more, namely with whom they feel more familiarity (Zajonc, 1968; Ebbesen et al., 1976; Moreland & Zajonc, 1982; Lee, 2001; Peskin & Newell, 2004). Along with these studies, the positive relationship between familiarity and attraction has been suggested by many researchers.

Among various aspects of familiarity, our investigation centered on the amount of information, particularly that obtained through non-face-to-face channels. The rapid development of information technology has highlighted the need to investigate how the information acquired without direct interaction influences interpersonal attraction. Since social media has become popular, interacting and building relationships online has become more common (Parks & Floyd, 1996; Gennaro & Button, 2007). Distinct qualitative differences likely exist between online opportunities that enhance familiarity with an individual and those occurring face-to-face. Online platforms host not only real-time interactions, such as conversations, but also unilateral engagements, such as browsing a person's profile or posts (Ramirez et al., 2002; Wise et al., 2010) that serve as an important way of online information-seeking (Antheunis et al., 2010). It has also been suggested that such one-sided information search is more prevalent in the early stages of relationships (Fox & Anderegg, 2014). In summary, the evolution of online communication underscores the significance of information acquired without interaction among the diverse facets of familiarity.

## The Uncertainty Reduction Theory

The uncertainty reduction theory (URT: Berger & Calabrese, 1975) explains the correlation between the amount of information and attraction. URT explains interactions in the early stage of relationships using the concept of uncertainty. URT identifies at least two distinct forms of uncertainty: predictive uncertainty and explanatory uncertainty. Predictive uncertainty relates to the diverse potential paths a person’s future actions might take, and more alternatives raise uncertainty. For example, if people know a person well, they can predict what they are likely to do with a narrower range of options, and there will be fewer alternatives, which contributes to reduced uncertainty. Explanatory uncertainty is defined as the number of interpretations attributed to a person’s past actions, and more possible interpretations raise uncertainty. If people did not know much about the person, they could not explain the intent of their actions well; thus, a greater number of alternative interpretations left, leading to heightened uncertainty. The main assumption of URT is that individuals actively seek to minimize uncertainty through interaction and information-seeking. Derived from this assumption, URT assumes that when uncertainty is high, a person appears less attractive. Given this prediction and the fact that information-seeking contributes to reducing uncertainty, it is expected that more information will reduce uncertainty and increase attraction.

Indeed, some studies demonstrated that increased information heightens attraction, as URT predicts. For instance, research suggests that larger amounts of trait information (Baruh & Cemalcılar, 2018), more diagnostic information (Bosson et al., 2006), and a larger subjective amount of knowledge (Weaver & Bosson, 2011) improved attraction.

On the contrary, some studies reported that the relationship between the amount of information and attraction is not necessarily positive. For example, Norton et al. (2007) found a negative correlation between the amount of information and attraction using the trait information paradigm. In this paradigm, participants evaluated a target person’s attractiveness based on a set of traits, while experimenters manipulated the number of traits. Surprisingly, more traits led to diminished attraction, and this effect was mediated by perceived dissimilarities with the target person. Likewise, it was found that uncertainty did not increase attraction but rather reinforced both positive and negative emotional valence (Wilson et al., 2005; Kurtz et al., 2007; Bar-Anan et al., 2009). In short, more information can reveal more dissimilarity and decrease attraction.

However, Reis et al. (2011) highlighted that the trait information paradigm overlooked the intricate dynamics of interpersonal interaction and information exchange in real-world contexts. They conducted additional experiments that more closely approximated real-life communication: two participants reciprocally asked and responded to a question. Their findings revealed that people felt more attracted to the person who provided more information through answering questions more. Subsequently, both groups of researchers jointly proposed an integrative model that takes into account the relationship stage (Finkel et al., 2015). According to this model, a negative correlation between the quantity of information and attraction shown through the trait information paradigm arose because the traits were randomly chosen from a list of positive and negative traits, leading to a loss of consistency of the target person. Consequently, this model predicts a positive correlation between the amount of information and attraction during the early stage of relationships, as long as consistency is maintained.

To summarize the points, the debate started by Norton et al. (2007) suggested a positive correlation between the amount of information and attraction during the initial phases of interpersonal relationships, provided that individuals maintain consistency in their perceptions of the target person. This finding underscores the importance of considering the stage of relationships when we investigate the relationship between the amount of information and attraction.

It is plausible that excessive certainty can dampen interest and fail to engender attraction in more mature relationships. Empirical evidence indeed demonstrated that ambiguous affection is more likely to heighten romantic attraction than unambiguous affection (Whitchurch et al., 2011) and that uncertainty increased arousal (Greco & Roger, 2003; Ramsøy et al., 2012), which contributes to heightened attraction (Foster et al., 1998; Lewandowski & Aron, 2004; Little et al., 2014). However, in the early stages of a relationship―when uncertainty prevails―it is reasonable to posit that uncertainty reduction will contribute to heightened attraction before people get bored.

Although URT was originally established to address face-to-face interactions, it has been suggested that one-sided information-seeking also plays a role in mitigating uncertainty (Courtois et al., 2012; Carr & Walther, 2014). For instance, Baruh and Cemalcılar (2018) conducted an experiment employing stimuli constructed by fictitious social media profile screens and self-introduction items extracted from real social media profiles. By manipulating the number of items presented to participants, they showed a positive relation between the number of items and the perceived attractiveness of individuals introduced through these profiles. These findings substantiate the applicability of URT to contexts where information is accessed unilaterally. Specifically, the phase during which information is obtained from a stranger's profile can be construed as the early stage of relationships. Therefore, URT suggests that richer information about an unfamiliar individual may heighten their attraction when one reads their profile.

## Manipulating the Amount of Information

The most straightforward approach for manipulating the amount of information involves adjusting the number of presented items that represent the target person’s traits (Baruh & Cemalcılar, 2018; Norton et al., 2007). However, as mentioned above, this method could suffer from information inconsistency and potential attrition in attraction. Moreover, there is an inherent constraint on the amount of information individuals can feasibly convey in real life. When confronted with an excessive influx of information, individuals may experience stress and struggle to form accurate impressions (Eppler & Mengis, 2004). Therefore, it is meaningful to develop a methodology to manipulate the amount of information through the qualitative change in stimuli, rather than relying on quantitative adjustment.

One such approach, as demonstrated by Study 2 from Baruh & Cemalcılar (2018), involves manipulating the intimacy of information to mitigate uncertainty. However, this manipulation also largely changes the contents of information. Intimate information―typically reserved for disclosure only to one’s closest confidants―may be embedded within profiles, potentially introducing negative aspects. Using this method is problematic because the content of information itself (e.g. the inherent favorability), rather than uncertainty, may govern the result. Moreover, disclosure of intimate information in the early stages of relationships violates established social norms and could potentially diminish attraction (Altman & Taylor, 1973; Collins & Miller, 1994; Orben & Dunbar, 2017).

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In the current study, we propose a novel approach for manipulating the amount of information: specifically, by altering the level of abstraction of the information. For instance, consider the comparison between two expressions: “I played sports during my school days” and “I played basketball during my school days.” Notably, the latter expression is more concrete given that “sports” is a concept that includes “basketball.” The utilization of more abstract expressions would introduce heightened uncertainty by indicating a greater number of alternative exemplars. Conversely, employing more concrete expressions would serve to mitigate uncertainty by delineating fewer alternative exemplars. The salient advantage of this method is that it enables the investigation of the impact of uncertainty without changing the contents of information by manipulating the qualitative aspect of information. Based on URT, we hypothesized that more concrete information about a target individual will diminish their uncertainty and increase their attraction.

The present investigation endeavors to investigate the effect of abstractness in expression on uncertainty and attraction within the context of unilateral information browsing. While prior research extensively examined the effect of the amount of information and uncertainty on interpersonal attraction, much of this work has focused on face-to-face or online communication (e.g., Reis et al., 2011). However, the permeation of social media enables individuals to unilaterally browse others’ information and form impressions without direct interaction. Also, as discussed above, considering that the existing methodology for manipulating the amount of information poses potential problems, it is necessary to develop a new method to manipulate the amount of information in ways other than merely adjusting the number of items. Given that real-world social media profiles have inherent limitations on the number of items they can accommodate, how people express their particular information becomes crucial, as well as the amount of information. In light of this discussion, the current study specifically focuses on the degree of abstractness in the expression of text and investigates the following prediction: A more concrete expression in a profile will mitigate uncertainty and enhance attraction if the abstract expression works as a qualitative manipulation changing uncertainty.

The current study sheds light on new academic and practical aspects pertaining to the study of uncertainty. First, it provides a new paradigm that manipulates abstractness of expression to vary uncertainty, as opposed to those that predominantly rely on quantitative manipulation (e.g., adjusting the number of items). Second, it contributes to broadening insights by indicating that predictions from URT are adaptable for abstractness in expression. Furthermore, our study addresses a cultural gap in existing knowledge concerning uncertainty. While prior investigations have been conducted on English-speaking participants living in the US and other countries, which are considered to have low-context cultures (Hall, 1976), our study will be conducted in Japan, which has a high-context culture. It would provide a novel insight into the role of uncertainty in a novel form of communication―browsing others’ information unilaterally.

To test our hypotheses, we employ profiles comprising five sentences as stimuli. Within these profiles, two of five sentences describe actions, varying in abstractness: the abstract condition employs more abstract language, while the concrete condition employs more specific language. Participants in both conditions subsequently evaluate the attraction and uncertainty associated with the target person after reading profiles. Our prediction is as follows: participants in the concrete condition would assess the target person as less uncertain and more attractive.

# Method

## Preliminary Survey

### Objectives

The preliminary survey aims to select stimuli for use in the main experiment. Specifically, we will select 20 pairs of sentences exhibiting varying levels of abstractness, while maintaining comparable favorability. This selection process involves measuring both the abstractness of sentences and the favorability associated with the referenced actions.

To mitigate potential confounding variables beyond abstractness, we intentionally choose sentence pairs with similar favorability. Notably, when one is given information about a target person, their overall attraction is not solely determined by cumulative favorability of each piece of information. Instead, individuals integrate them to construct a representation of the target and form impressions including attraction (e.g., Skowronski & Carlston, 1989). We predict that the impact of the expression abstractness (i.e., uncertainty) works predominantly in the latter part of this cognitive process. In other words, even when receiving information of equivalent favorability, more concrete information will encourage a more favorable impression of the target person, because it reduces uncertainty of the target. Thus, even when controlling for the inherent favorability of the action itself, we expect that profiles expressed more concretely foster heightened attraction by minimizing uncertainty of the target person.

### Participants

A total of 250 adult native Japanese speakers recruited from a crowdsourcing platform will participate in the survey in exchange for monetary compensation. We calculated the required sample size for a paired *t*-test under the assumption of α = .05 and Cohen’s *d* = 0.3, and for the Two One-Sided Test (TOST; Schuirmann, 1987) under the assumption of α = .05, the upper and lower bounds (Δ) = 0.33, and *SD* of 1.1. We used the PowerTOST package (Labes et al., 2024) in R to perform the power analysis for TOST. The analyses showed that 71 and 192 participants, respectively, would suffice to achieve 80% statistical power in the *t*-test and TOST. Consequently, we decided to collect data from 250 participants in the preliminary study. We determined the target effect sizes based on our minimally interested effect size in the preliminary study: Cohen’s *d* = 0.3. The assumed value for *SD* of favorability ratings, 1.1, was derived from our small pilot study.

### Procedure

This survey will be conducted online. We will develop the experimental program using jsPsych (de Leeuw, 2015). Upon providing consent, participants will answer the questionnaire which is divided into two distinct sections, regarding the abstractness of the sentences and the favorability of the depicted acts. In the first section, participants will read each sentence and evaluate the favorability of the corresponding action. In the second section, participants will revisit the same sentences and assess the level of abstractness of expression in each. Both sections contain four items from the Directed Questions Scale (DQS; Maniaci & Rogge, 2014) which instruct to select a specific number. The order of sentences and DQS items will be randomized within each section.

### Materials

We curated 20 different actions in accordance with Japanese cultural norms and subsequently generated six sentences for each action, all of which exhibit semantic similarity. Each set comprises one abstract sentence alongside five concrete sentences. For instance, consider the abstract sentence: “*Frequently caring about one's parents.*” This abstract sentence corresponds to five sentences with concrete descriptions of the same action: “*Often inviting parents on a trip*,” “*Sending a birthday present to parents*,” “*Periodically sending money to parents,*” “*Frequently visiting parents’ house*,” “*Maintaining regular contact with parents.*” All items are listed in the appendix.

### Measures

*Abstractness* To assess the abstractness of each sentence, we employed a seven-point scale positioned directly beneath each sentence. Numbers as its scale were placed in ascending order from left to right. Each side of the endpoints was labeled; 1 as “Concrete” and 7 as “Abstract”. Refer to the actual format of the survey in the appendix.

*Favorability* The favorability of each sentence was rated on a 7-point scale, likewise the abstractness. Its scales were placed in ascending order from left to right. It represented the degree of favorability by labeling each endpoint; 1 as “not at all favorable” and 7 as “very favorable”. A sample of the actual survey format is in the appendix.

*DQS* Within each section, we administered four items of the DQS (e.g., “Choose 2 in this question.”). These items were designed to identify participants who engaged in the survey without paying attention (i.e., satisficers).

### Data Analyses

We will perform all analyses using R version 4.3.3 (R Core Team, 2024). We will use a significant level (α) of .05 in the analyses. All data except that obtained from participants who failed any of the DQS items will be analyzed in the following steps.

First, a paired one-tailed *t*-test will be conducted on the means of the rated abstractness of the abstract and concrete sentences for each pair. We will exclude pairs whose rated abstractness do not exhibit significant differences, or where the effect size of its difference is below Cohen’s *d* = 0.3. This step is to ensure that our manipulation works efficiently enough. Second, to ascertain that abstract and concrete sentences refer to acts with equivalent favorability, we will perform two one-sided tests (TOST) using the “equivalence” package in R (Robinson, 2016) on the means of favorability associated with the acts mentioned in the two sentences. The purpose of this test is to statistically reject null hypotheses regarding the difference between two items, ≦ -Δ and ≧ Δ, thereby ensuring their equivalence. In the TOST procedure, we will set the upper and lower equivalence bounds (Δ) to Δ = 0.33, assuming SD as 1.1. If we do not have a sufficient number of experimental stimuli (i.e., 20 pairs) as a result of the TOST, we will conduct a non-inferiority test. Δ = 0.33 will be used in the test, as well as in the TOST. We will select the rest of the stimuli such that the favorability of the act of the abstract sentence is not inferior to that of the concrete sentence.

We will create ten profiles using 20 pairs of sentences that are selected through the above analysis. When creating profiles, we will carefully select sentences not to diminish the consistency of personality of the depicted person and not to include too private information.

## Main Experiment

### Hypotheses

H1: Participants would rate the target persons described in concrete expressions as more attractive than those described in abstract expressions.

H2: Perceived uncertainty would mediate the effect of abstractness level on attraction.

### Participants

A total of 1,000 adult native Japanese speakers will be recruited from a crowdsourcing platform to participate in the main experiment in exchange for monetary compensation. Participants of the preliminary survey will not be allowed to participate in the main experiment.

The sample size has been determined based on a power analysis using Monte Carlo simulation. We assume that the effect sizes of experimental manipulation on uncertainty and uncertainty on attraction are β = .34, .51, respectively. We created the simulation code referring to Pan et al. (2018). The code is available on the OSF (<https://osf.io/zj5mq>). Our analysis indicates that 685 participants are necessary to achieve 80% statistical power for both H1 and H2, under the assumption of the complete mediation model, and α = .05, ICC = 0.6. Thus, assuming that some participants will drop out, we decided to recruit 1,000 participants.

The assumed effect size of uncertainty on attraction (β = .51) was determined based on a previous study (Baruh & Cemalcılar, 2018). For the effect of experimental manipulation on uncertainty, we could not assume a specific value due to the lack of study that adopts the same manipulation as ours. Instead, we speculated the effect size would be between small and medium (β = .34), considering that we confirmed that there are certain differences in the abstractness of stimuli (*d* < 0.3) in the preliminary survey. Similarly, we could not estimate a specific ICC value because no previous study adopted similar stimuli to this study. However, we speculated that it will be at least a moderate size because the ratings for all profiles will be made by the same individuals. Thus, we assumed ICC as 0.6 in our simulation. Although we could assume higher values (e.g., 0.8), it is equivalent to assuming that our manipulation has little or no effect, thus we thought it was meaningless.

### Design

The main experiment will employ a single-factor (abstractness: abstract vs. concrete) between-subjects design. Participants will be randomly assigned to either the abstract or concrete condition.

### Procedure

The main experiment will be conducted entirely online. We will create the experimental program using jsPsych. Participants will be assigned randomly to either the concrete condition or the abstract condition. For randomization, we will use the “jsPsych.randomization.sampleBernoulli” function in jsPsych.

After consenting to participate in the experiment, participants will answer demographic questions. Thereafter, they will review a profile comprising two positive sentences and three neutral sentences. Notably, the abstractness of the positive sentences will vary between the conditions (see the preliminary survey section). Afterward, participants will complete questionnaires assessing their attributional confidence (Clatterbuck, 1979) and attraction (adapted from Montoya & Horton, 2004) toward the target individual. These question items are translated into Japanese. In addition, similar to the preliminary survey, we will include one DQS item (e.g., “Choose 2 in this question.”) per target person to identify satisficers. Participants will evaluate the profiles of ten target individuals in total. Participants will answer one manipulation check item (“How abstract did you feel the profiles were?”; 7 points scale: “abstract” - “concrete” ) for each profile.

### Materials

We create profiles for ten target persons. Each profile comprises two positive sentences and three neutral sentences. The positive sentences are chosen in the preliminary survey. The abstractness of the positive sentences differs depending on the experimental condition, while the inherent favorability of the referenced action in those sentences is equivalent.

### Measures

*Attributional confidence* To rate attributional confidence for the target person, we will use seven items (e.g., “How confident are you of your general ability to predict how he/she will behave?”), each rated on a 7-point scale. This measure was adapted from an existing questionnaire on attributional confidence (Clatterbuck, 1979). The scale will be positioned beneath each question, with numerical values ascending from left to right. Each side of the endpoint was labeled; 1 as “I have no confidence at all.” and 7 as “I have a lot of confidence.” Refer to the actual format of the survey in the appendix.

*Attraction*To assess attraction of the target person, we will employ seven items (e.g., “I would like to meet this person.”), each rated on a 7-point scale. This measure was adapted from Interpersonal Attraction Items (Montoya & Horton, 2004). To contextualize these items within our experiment, we have adjusted by removing some items. The scale will be positioned beneath each question. Numerical values of its scale will be placed in ascending order from left to right. Each side of the endpoint was labeled; 1 as “strongly disagree” and 7 as “strongly agree”. Refer to the actual format of the survey in the appendix.

*Manipulation Check* Participants will answer one manipulation check item (“How abstract did you feel the profiles were?”; 7 points scale: “abstract” - “concrete” ) for each profile. All manipulation check items will be placed at the end of the questionnaire to avoid demand characteristics.

*DQS*  One item of DQS for each profile such as “Choose 1 in this question.” will be operated in order to detect participation without paying attention (i.e., satisficers).

### Data Analyses

We will set the significance level (α) as .05 for the analyses. Data from participants who failed any of the DQS items will be excluded from the analyses.

First, we will check whether our manipulation worked successfully by conducting one-tailed *t*-tests of the perceived abstractness of ten pairs of profiles. Although all pairs will be included in the hypothesis-testing analyses regardless of whether the differences in perceived abstractness of profile turn out significant, we will conduct an additional sensitivity analysis that excludes pairs of profiles whose perceived abstractness do not differ significantly by condition.

Given the multilevel structure of the data, we will test our hypotheses using a linear mixed model (LMM) implemented in the R package “lme4” (Bates et al., 2015), “lmerTest” (Kuznetsova et al., 2017), and “mediation” (Tingley et al., 2014). To test H1, we will include abstractness (dummy variable: abstract condition = 0, concrete condition = 1) and random intercepts of participants as predictors, with attraction as the dependent variable. If the coefficient for abstractness is significantly positive in a one-sided test, we will adopt H1. Regardless of whether H1 is supported, we will proceed to test H2 by conducting a multilevel mediation analysis on attraction with abstractness, random intercepts of participants as predictors, and attributional confidence as a mediator. To estimate the indirect effect, we will employ a quasi-Bayesian confidence interval (5,000 resamples). If the indirect effect becomes significant in a one-sided test (i.e., the lower bound of 90% confidence interval is above 0), we will adopt H2.

## Ethics

The ethics committee of Kyushu University approved the study protocol (Approval no. 2022-021). We will conduct a preliminary survey and main experiment in accordance with the Declaration of Helsinki.

## Design Table for the Preliminary Survey

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Question** | **Hypothesis** | **Sampling plan** | **Analysis Plan** | **Rationale for deciding the sensitivity of the test for confirming or disconfirming the hypothesis** | **Interpretation given different outcomes** | **Theory that could be shown wrong by the outcomes** |
| N/A | N/A | We will recruit a total of 250 adult native Japanese speakers from a crowdsourcing platform. | First, we will perform a paired one-tailed *t*-test on the means of the abstractness of the abstract and concrete sentences for each pair. We will exclude pairs whose abstractness do not differ significantly, or where the effect size of its difference is below Cohen’s *d* = 0.3.Second, we will perform two one-sided tests (TOST) on the means of favorability associated with the acts mentioned in the two sentences. We will set the upper and lower equivalence bounds (Δ) to Δ = 0.33.If we do not have a sufficient number of experimental stimuli (i.e., 20 pairs) as a result of the TOST, we will conduct a non-inferiority test. Δ = 0.33 will be used in the test, as well as in the TOST. | We calculated the required sample size for a paired t-test under the assumption of α = .05 and Cohen’s *d* = 0.3, and for the Two One-Sided Test (TOST; Schuirmann, 1987) under the assumption of α = .05, the upper and lower bounds (Δ) = 0.33, and SD of 1.1.We determined effect sizes (Cohen’s *d* for *t*-test, Δ for TOST) used in the power analysis based on our minimally interested effect size: Cohen’s *d* = 0.3. As for TOST, we assumed SD of ratings as 1.1, based on our pilot study. | N/A | N/A |

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## Design Table for the Main Experiment

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Question** | **Hypothesis** | **Sampling plan** | **Analysis Plan** | **Rationale for deciding the sensitivity of the test for confirming or disconfirming the hypothesis** | **Interpretation given different outcomes** | **Theory that could be shown wrong by the outcomes** |
| Q1: Does the abstractness of sentences in a profile decrease the interpersonal attraction of the depicted person? | H1: Participants would rate the target persons described in concrete expressions as more attractive than those described in abstract expressions. | We will recruit 1,000 participants for the main experiment. The number of participants is decided based on a power analysis. | To test H1, we will conduct a linear mixed model (LLM) for the attraction of the target persons, with abstractness (dummy variable: concrete condition = 0, abstract condition = 1) and the random intercepts of participants as predictors. A significant level (α) will be set as .05. The significance of coefficients will be tested in one-sided tests. | The power analysis using Monte Carlo simulation showed that 685 participants are needed to achieve .80 power for both H1 and H2, under α = .05, ICC = 0.6. Assuming some data from some participants will be excluded from the analysis, we decided to collect 1,000 participants.The assumed effect size of uncertainty on attraction (β = .51) was determined based on a previous study (Baruh & Cemalcılar, 2018). For the effect of experimental manipulation on uncertainty, we speculated the effect size will be between small and medium (β = .34), considering that we confirmed that there are certain differences in the abstractness of stimuli (d < 0.3) in the preliminary survey. Since we could not estimate a specific ICC value because no previous study adopted similar stimuli to this study, we speculated that it will be at least a moderate size because the ratings for all profiles will be made by the same individuals. Thus, we assumed ICC as 0.6 in our simulation. | If H1 is not supported, we cannot conclude that the abstractness of expression in profiles influences the attraction of the target person.  | If our hypotheses are not supported, the results will show the following proposition are wrong:“More concrete expressions in online profiles contribute to uncertainty reduction, resulting in increased attraction of the target person.”However, even if we obtain such a contrary result, it will not necessarily mean the URT is invalid. This is because the situation dealt with in this study, in which participants one-sidedly rate the target person without interactions, differs from the situation that URT originally assumed. |
| Q2: Does the uncertainty mediate the effect of abstractness on attraction? | H2: Perceived uncertainty would mediate the effect of the abstractness level on attraction. | To test H2, a multilevel causal mediation analysis on the attraction with abstractness and the random intercepts of participants as predictors, and attributional confidence as a mediator will be performed. A significant level (α) will be set as .05. In the analysis, we will use a quasi-Bayesian confidence interval (5,000 resamples) to estimate the effect.The analyses will be performed by using the R package ‘lme4’ (Bates et al., 2015) and ‘mediation' (Tingley et al., 2014). |   | If H2 is not supported, the result will indicate that the effect of abstractness on attraction is mediated by factors other than uncertainty, or that there is no predicted effect of abstractness on attraction. |

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**Authors’ contributions**

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Conceptualization: HK, KO, KH, MU, and YY; Funding acquisition: YY; Methodology: HK, KO, KH, MU, and YY; Project administration: YY; Supervision: YY; Writing - original draft: HK, KO, KH, MU, and YY.

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