**Revisiting the Relationship Between Social Distance and Communication Preferences:
Replications and Reinterpretation of Amit et al. (2013, Experiment 2)**

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Abstract

Amit et al. (2013) concluded that social distance can influence communication preferences: People prefer communicating with closer others using pictures (which are more concrete) and more distant others using words (which are more abstract). We conducted two high-powered preregistered experiments to assess this claim. First, we performed a close replication ($N = 988$) of Amit et al. (2013, Experiment 2) in which we also manipulated the presence of a potential confound we detected in the original instructions. The original effect successfully replicated using the original instructions but was reduced nearly to zero after the removal of the confound. Moreover, we demonstrate that the effect obtained with the original instructions likely relies on a different mechanism (comfort with sending personal pictures to close and distant contacts) than that posited in the original study (preference for concrete and abstract communication). Second, we performed a conceptual replication ($N = 1,280$) in which we attempted to address methodological limitations of the original study and our close replication. The results of this conceptual replication were inconsistent with those of the original study and suggested an overall effect size near zero. Our results suggest that social distance has little or no influence on communication medium preferences.

Keywords: construal level theory, replication, social distance, communication

Revisiting the Relationship Between Social Distance and Communication Preferences:**Replications and Reinterpretation of Amit et al. (2013, Experiment 2)**

Psychological distance refers to the perceived degree of separation between the self and other objects and events. Construal level theory (Trope & Liberman, 2010) is a broad framework that explains how psychological distance affects cognition and behavior: On the cognitive level, things perceived as psychologically close to the self, the here, and the now, are construed in low-level, concrete terms. In contrast, things perceived as psychologically distant from the self, the here, and the now, are construed in abstract, high-level terms. The further away something is perceived to be, the more abstractly it will be construed (Trope & Liberman, 2010).

In addition, construal level theory predicts that psychological distance has downstream consequences on behavior (Trope & Liberman, 2010). For example, psychological distance has been shown to influence behavioral intentions (Eyal et al., 2009) as well as evaluations of close and distant people (e.g., Liviatan et al., 2008). Central to the current research is the claim that psychological distance can affect people's preferences for communication styles. As would be predicted from construal level theory, people have been shown to communicate more abstractly when talking about an event that is happening further away in time compared to something happening soon (Bhatia & Walasek, 2016) and when talking about a geographically distant location compared to a place nearby (Snefjella & Kuperman, 2015).

Relatedly, Amit et al. (2013) examined whether social distance affects people's preferences for the medium of communication. Following the logic of construal level theory, they argued that one should prefer a more concrete mode of communication when interacting with people who are socially close, such as friends or family. In contrast, one should prefer a more abstract mode of communication when interacting with socially distant people, such as acquaintances.

Drawing on basic cognitive research (Glaser, 1992), Amit et al. argued that pictures provide a more concrete mode of communication than words. This is because pictures are inherently more concrete than words. A picture of a dog, for example, is more concrete than the word “dog”, because the picture can provide additional information about the individual exemplar such as the breed, the posture, and the size of the dog.

Following this logic, Amit et al. (2013) predicted that participants would have a relative preference for using pictures over words when communicating with a socially close individual compared to a socially distant one. They argued that this phenomenon should be highly general, stating that “even if a particular distant other would understand and be able to relate to a concrete depiction, a communicator should be more likely to use language over pictures when communicated [sic] with that distant message recipient” (p.45). This broad claim was tested in Amit et al. (2013, Experiment 2). Here we provide a pre-registered direct replication and conceptual replication of this study.

In Amit et al. (2013, Experiment 2) participants were asked to imagine that they were to send invitation cards to guests for a housewarming party. The guest list included socially close (e.g., best friend) and socially distant people (e.g., an acquaintance from the sports club). Participants had a choice of two cards to send to each guest: a picture card and a text card. The *picture card* contained a large picture and a small text. The *text card* contained a small picture and a large text. As predicted, participants preferred sending the picture card to socially close guests and sending the text card to socially distant guests.

While planning the present replication, we contacted the authors, who graciously provided us with the original materials and data, for which we are very grateful. When inspecting the original materials, we identified a potential confound in the instructions. Only the description of the picture card specified the exact content of the picture: “*a big funny picture*

of you and your girl-/boyfriend in your new apartment". In the description of the text card, the picture was described merely as "*a small funny picture*" (for details, see the Method section).

The discrepancy in the description of the two cards provides a possible alternative explanation for the findings, which does not implicate differences in construal level. That is, participants may have been more willing to send the picture card to socially close guests, not because it is more concrete than the text card, but because they feel uncomfortable sharing pictures of their private life with mere acquaintances. In fact, this potential explanation would be relevant even if the particular picture content had been specified for both cards, because people may be more reluctant to send a big, as opposed to a small, picture of themselves and their partner to a distant acquaintance. To investigate this possibility, we experimentally manipulated the presence of the confound by adding a revised wording condition where the description of the exact picture content was removed from both the picture card and the text card. Moreover, we included measures of the extent to which participants felt comfortable sending pictures of themselves and their partner to close and distant social contacts, respectively. Thus, in addition to directly replicating Amit et al. (2013, Experiment 2), we also examined an alternative explanation of the original finding.

Study 1: A Close Replication of Amit et al. (2013, Experiment 2)

Method

Participants and Design

A total of $N = 1,025$ participants were recruited from the survey panel Prolific (<https://www.prolific.co/>) and received payment of 1.24 GBP for completing the study. Panel members eligible for participation were required (a) to have completed at least 50 studies on Prolific, (b) to have an approval rate of at least 95%, (c) to be fluent in the English language, and (d) not to complete the study on a mobile device.

Prior to data collection, a sample size of 1,000 was decided to be satisfactory, considering the statistical power needed to detect effects of interest and resource constraints. Sensitivity analyses indicated that a sample size of $n = 500$ within each between-subjects condition would be sufficient to detect simple main effects of $d = 0.16$ with 95% power and $d = 0.13$ with 80% power, with a paired t -test. For context, the effect observed by Amit et al. (2013, Experiment 2) was approximately $d = 1.06$. Additionally, the sample size would be sufficient to detect between-group differences of $d = 0.23$ with 95% power and $d = 0.18$ with 80% power, with an independent samples t -test. Prior to data collection, the methods, analysis plan, sampling strategy, and exclusion criteria were preregistered on the Open Science Framework (<https://osf.io/xfv74>).

After excluding participants who failed a comprehension check (see below), the final sample included $N = 988$ participants (439 women, 529 men, 4 who preferred not to report gender, and 16 with missing data; $M_{\text{age}} = 28.56$ years, $SD = 10.13$, $Mdn = 25$, range 18–83). Of the 969 participants for whom occupation data were available, 517 (53.3%) were students and 452 (46.6%) were not.

The study used a 2×2 mixed-factorial design with social distance as within-subjects factor (close vs. distant) and instruction wording as a between-subjects factor (original vs. revised). Participants were randomly assigned to one of the between-subjects conditions.

Procedure and Materials

Data for this study were collected along with another study (see <https://osf.io/svdp9/>), and the materials and measures for the present study were administered prior to those of the other study. The present study used an electronic questionnaire on Qualtrics instead of the paper-and-pencil questionnaires which were originally used in Amit et al. (2013, Experiment 2). The full stimulus materials and questionnaire are available on the OSF project page (<https://osf.io/bkuwa/>).

After providing informed consent, participants were asked to imagine that they were planning a housewarming party and were presented with two alternative invitation cards presented next to each other on the screen. One—the *picture card*—contained a larger box with a generic image (the image thumbnail icon in Microsoft PowerPoint) and a smaller box filled with the word “text”. The second invitation—the *text card*—had a larger box filled with the word “text” and a smaller box with the generic image. Participants were asked to imagine that the text was “humoristic” and the picture “funny”.

Two changes were made to the original stimulus material. First, a part of the sentence describing the new apartment (i.e., “it’s only a few blocks from the university and...”) was removed to reflect the fact that our sample did not exclusively comprise university students¹. Second, in Amit et al. (2013, Experiment 2), the image on the picture card was described as a picture of the participant and his/her partner, whereas the image content was not specified in the text card description. To test whether the different wordings for the picture and text cards might be responsible for the original effect, we manipulated the description for the picture card, producing two different wordings. The *original wording* read:

*One card contains a **small** box of humoristic text and a **big** funny picture of you and your girl-/boyfriend in your new apartment.*

*The other card contains a **big** box of humoristic text and a **small** funny picture.*

In the *revised wording*, the content of the image was not specified for either of the two cards:

*One card contains a **small** box of humoristic text and a **big** funny picture.*

*The other card contains a **big** box of humoristic text and a **small** funny picture.*

Participants were randomly assigned to receive one of the two wordings.

¹ Although we made this change to the materials, other parts of the materials refer to being a student. For example, one of the message recipients is referred to as “a fellow student.” Features of the materials that differ from participants’ actual life and experiences may be problematic, but such problems were also present in the original study and are inherent to any procedure that asks participants to imagine a hypothetical situation. Several of the other message targets or elements of the story might be inconsistent with participants’ experiences, regardless of whether they are students.

Participants were then presented with a list of 14 guests, three of which were intended to be socially close (e.g., “my best friend”) and three which were intended to be socially distant (e.g., “an acquaintance from the sports club”). The remaining eight guests were filler targets. We used the same list of guests as the original study, and the six critical targets were identical to those in the original. Participants were instructed to indicate which invitation card (picture or text) to send to each guest. Participants reported their card choice by entering a ‘P’ for picture or ‘T’ for text in a textbox next to each guest on the list. The number of text cards chosen for the six critical targets (ranging from 0 to 3 cards for close and distant targets, respectively) served as the main dependent variable.

On the next page, a comprehension check item assessed participants’ understanding of the instructions and asked participants to select which statement (out of three) best described what the invitation cards looked like. Data from 37 participants (3.6% of the sample) who responded incorrectly to this comprehension check were excluded from analyses. Following the comprehension check, a manipulation check corresponding to the pre-test used in Amit et al. (2013, Experiment 2) asked participants to indicate how socially/personally close they considered each guest to be to themselves, on a scale ranging from 1 (*very close*) to 7 (*very far away*).

To explore alternative explanations for invitation card choice, participants were asked to rate (1) how comfortable they would be sending a picture of themselves and their partner (a) to a close friend and (b) to a distant acquaintance; and (2) how appropriate it would be for someone to send a picture of themselves and their partner (a) to a close friend and (b) to a distant acquaintance. The rating scales ranged from 1 (*very uncomfortable/inappropriate*) to 7 (*very comfortable/appropriate*). Additional measures were collected for future exploratory analyses on the extent to which participants’ card choices were influenced by individual differences. These included the Behavior Identification Form (BIF; Vallacher & Wegner,

1989), which was originally developed to measure people's tendency for abstract and concrete thinking, and the Ten-Item Personality Inventory (TIPI; Gosling et al., 2003), which is a brief scale measuring the Big Five personality dimensions. The data obtained from the BIF and the TIPI are not reported in this paper but are available on OSF (<https://osf.io/bkuwa/>).

Results

Hypothesis Testing

To test the central hypothesis, we conducted a 2×2 mixed ANOVA (Type III sums of squares) with social distance (close vs. distant targets, within subjects) and instruction wording (original vs. revised, between subjects) predicting the number of text cards sent (0–3). There was a significant main effect of social distance, $F(1, 986) = 4.88, p = .027, \omega_p^2 = .004$, and of instruction wording, $F(1, 986) = 3.93, p = .048, \omega_p^2 = .003$, but these effects were qualified by a significant interaction, $F(1, 986) = 33.94, p < .001, \omega_p^2 = .032$. When presented with the original instruction wording, participants chose to send more text cards to socially distant targets ($M = 1.83, SD = 1.17$), compared to socially close targets ($M = 0.81, SD = 1.21$), $t(517) = 11.16, p < .001, d = 0.85, 95\% \text{ CI } [0.73, 0.98]$. This effect's 95% CI excludes the observed effect of the original study, $d = 1.06$, and it is 80% the size of the original. When presented with the revised instruction wording, participants again chose to send more text cards to socially distant targets ($M = 1.51, SD = 1.20$), compared to socially close targets ($M = 1.29, SD = 1.31$), but this effect was substantially smaller, $t(469) = 2.13, p = .034, d = 0.17, 95\% \text{ CI } [0.05, 0.30]$. This effect's 95% CI excludes the observed effect of the original study, and it is 16% the size of the original. These results are displayed in Figure 1, alongside the original results from Amit et al. (2013, Experiment 2). In summary, the replication indicated an effect in the predicted direction when using the original wording, but the observed effect was somewhat smaller than the original. Moreover, when participants were given the revised instructions, the effect was greatly reduced and barely significant.

Exploratory Analyses

Sample-Specific Critical Targets. One might reasonably object that we sampled from a different population than the original study, and our sample may have perceived the social distance of the targets differently. Indeed, as can be seen in Table 1, although the present sample rated the same three targets as the most socially close as in the original study, our participants rated a different set of three targets as most socially distant. Perhaps a more appropriate test of the conceptual hypothesis would involve critical targets specific to this sample (i.e., the three targets rated closest and the three rated most distant).

Figure 1

Number of Text Items Chosen for Critical Targets, Amit et al. (2013, Experiment 2), Study 1, and Study 2

Note. Error bars represent means and 95% confidence intervals. Points jittered horizontally represent individual participants (Amit et al, 2013, Experiment 2, $N = 16$; Study 1, original wording, $N = 518$; Study 1, revised wording, $N = 470$; Study 2, $N = 1,280$).

Table 1*Descriptive Statistics for Social Distance Ratings for Each Target, Study 1*

Target	<i>M</i>	<i>SD</i>	<i>Mdn</i>
A person I met in a party	5.34	1.56	6
A person that I met in my last vacation†	5.29	1.55	6
Fellow student who is not a personal friend of mine	5.21	1.44	5
My neighbor†	5.14	1.56	5
An acquaintance from the sport club†	4.96	1.46	5
A distant family member	4.64	1.41	5
A colleague from work	4.16	1.23	4
A friend of my girl-/boyfriend	3.60	1.36	4
A friend from high school	3.52	1.42	3
My brother's girlfriend	3.51	1.50	3
My cousin	3.36	1.69	3
A close friend*	2.25	1.65	2
A first degree family member (e.g., mother, father, sister)*	2.00	1.86	1
My best friend*	1.93	1.90	1

Note. * = Critical “close” target in original study; † = critical “distant” target in original study.

We reanalyzed the data to examine these sample-specific critical targets using a mixed ANOVA, as in the primary hypothesis test above. There was a significant main effect of social distance, $F(1, 986) = 86.37, p < .001, \omega_p^2 = .079$, no significant main effect of instruction wording, $F(1, 986) = 0.24, p = .623, \omega_p^2 < .001$, and a significant interaction, $F(1, 986) = 47.73, p < .001, \omega_p^2 = .045$. When presented with the original instruction wording, participants chose to send more text cards to socially distant targets ($M = 1.94, SD = 1.23$), compared to socially close targets ($M = 0.81, SD = 1.21$), $t(517) = 11.86, p < .001, d = 0.93, 95\% \text{ CI } [0.80, 1.05]$. When presented with the revised instruction wording, there was no significant difference in the number of text cards sent to socially distant targets ($M = 1.43, SD = 1.26$), compared to socially

close targets ($M = 1.29$, $SD = 1.31$), $t(469) = 1.36$, $p = .174$, $d = 0.11$, 95% CI [-0.02, 0.24]. One might expect that using critical targets that are specific to this sample would maximize the predicted effect of social distance on communication medium preferences. Under the original wording, the effect was again in the predicted direction, and was 88% the size of the original effect. However, when participants were given the revised wording, the difference was nonsignificant and only 10% the size of the original effect.

Reanalysis and Exploration of Mechanisms: A Mixed-Model Approach. We analyzed the data using an ANOVA framework principally because it is directly analogous to the method Amit et al. (2013) used in the original experiment (i.e., a paired t -test). However, this approach has several drawbacks. Because the outcome variable is a count with a range of 0 to 3 and because it is not normally distributed, some of the assumptions of the analysis are violated. These assumption violations are particularly problematic considering that one of the p -values for a key comparison was very close to the significance threshold (i.e., $p = .034$) and therefore runs a high risk of not being robust to analytic variations. Additionally, limiting our analysis to the “critical” targets reduces power and precision by examining only a small portion of the data. Because each participant made a picture/text card decision for each of the 14 targets (both “critical” and “filler”) and also gave a rating of each target’s social distance, we can examine whether each participant’s perception of the targets’ social distance predict their preferred communication medium for that target. With this large amount of available data, such an analysis represents a much more powerful and precise test of the conceptual hypothesis. Moreover, we can examine whether this effect differs under the original and revised wording. To address these limitations and to gain these benefits, we preregistered a plan to analyze the data using logistic mixed-effects modeling.

A logistic mixed-effects modeling approach suits these data well and has numerous advantages over ANOVA (Baayen et al., 2008), including allowing the estimation of the

amount of variance attributable to participants and targets and for easily accommodating continuous/ordinal moderators for further exploratory analysis. Specifically, we were interested in whether participants' ratings of comfort sending a picture of themselves and their partner to close friends and distant acquaintances would help explain why participants may send more picture cards to socially close targets.

With 981 participants providing complete data for card decisions and social distance ratings for each of the 14 targets, as well as comfort ratings (close friends and acquaintances), we have 13,734 observations for this analysis. Using the *lme4* package (Bates et al., 2015) for R, we fit a series of models predicting participants' card choices:

1. Perceived social distance (1 to 7, mean centered) and instruction wording (0 = original, 1 = new) as predictors (fixed effects) and random intercepts for participants and targets.
2. Adding the interaction term for social distance and instruction wording.
3. Adding participants' ratings of comfort sending a picture of themselves and their partner to close friends and distant acquaintances (each 1 to 7, mean centered) as predictors.
4. Adding the two-way interactions of the two comfort variables with social distance and instruction wording.
5. Adding the three-way interactions of the two comfort variables with social distance and instruction wording.

Likelihood ratio tests indicated that each additional model offered significantly better fit with the data compared to the model that preceded it, all $ps < .005$ (for details of model selection, see the supplemental materials, <https://osf.io/mw6vr>). Thus, we retained the fifth and final model for interpretation. Results for the selected model are displayed in Table 2. Notably, the three-way interactions (as well as all but one of the other coefficients) were significant.

Figure 1 displays the data underlying this model and illustrates the interactions with simple slopes, with accompanying text to aid interpretation. As in the analyses above, social distance predicts sending a text card to a target under the original instructions, such that targets perceived to be more distant are more likely to receive a text card. However, under the revised wording, the model suggests that the relationship between social distance and sending a text card is negligible and, in fact, in the direction opposite what is predicted (Figure 1, Distance $\times$ Wording)². Moreover, it appears that perceived social distance predicts sending text cards under the original instructions specifically for people who are uncomfortable sending pictures to acquaintances (Figure 1, Distance $\times$ Wording $\times$ Comfort – Acquaintance) and who are comfortable sending pictures to close friends (Figure 2, Distance $\times$ Wording $\times$ Comfort – Close). Otherwise, this relationship is smaller, nonexistent, or in the opposite direction³. Thus, the predicted relationship between social distance and sending a text card appears to occur only under the original wording, and this effect appears to be explained by people's comfort with sending a picture of themselves and their partner to acquaintances and to close friends, respectively.

² This result may seem inconsistent with the raw proportions of picture cards sent displayed in Figure 1. However, these coefficients represent the estimated effect when accounting for the random effects of participants and targets.

³ Recall that we also measured participants' perceptions of how appropriate it is to send a picture of themselves and their partner to acquaintances and close friends. The appropriateness and comfort ratings were positively correlated (acquaintances, $r = .60$; close, $r = .65$). Results are substantively identical when using perceived appropriateness and the corresponding interaction terms instead of comfort (see <https://osf.io/mw6vr>).

Table 2*Logistic Mixed Effects Model Predicting Sending a Text Card, Study 1*

Fixed effect	Estimate [95% CI]
Intercept	-0.122 [-0.107, 0.351]
Social distance (SD)	0.180 [-0.211, -0.149]
Instruction wording (new) (IW-N)	-0.107 [0.004, 0.211]
Comfort – Acquaintance (C-A)	-0.075 [0.026, 0.123]
Comfort – Close (C-C)	-0.083 [0.025, 0.141]
SD $\times$ IW-N	-0.249 [0.211, 0.288]
SD $\times$ C-A	-0.073 [0.055, 0.092]
IW-N $\times$ C-A	0.054 [-0.125, 0.017]
SD $\times$ C-C	0.068 [-0.089, -0.047]
IW-N $\times$ C-C	0.108 [-0.187, -0.029]
SD $\times$ IW-N $\times$ C-A	0.030 [-0.056, -0.004]
SD $\times$ IW-N $\times$ C-C	-0.058 [0.030, 0.086]
Random effect	Variance
Participant (intercepts)	0.347
Target (intercepts)	0.172

Note. Comfort with sending a picture to an acquaintance or a close friend and perceived social distance are mean centered in this model. Coefficients are log odds ratios.

Figure 2*Proportions of Picture Cards Sent to Targets, by Perceived Social Distance and Instruction**Wording, Moderated by Comfort in Sending a Picture, Study 1*

Note. Solid lines represent raw proportions. Dotted lines represent simple slopes from the logistic mixed effects model. Unstandardized simple slope estimates (b , log odds ratios) are displayed with 95% CIs. Dashed lines are drawn at .50 for reference. For code to reproduce this plot, see <https://osf.io/bkuwa/>.

Discussion

Our direct and extended replication of Amit et al. (2013, Experiment 2) sheds new light on the interpretation and evidential value of the original finding. We have identified what appears to be a critical confound in the original design, the presence of which we manipulated experimentally in the current study by revising the wording of the stimulus description. Using the original wording, we observed a large effect in the same direction as the original (albeit 80% of the original effect size). This suggests that the original effect was most likely a true positive finding. With the revised wording, however, the effect was only 16% of the original and barely significant. This effect was not robust to analytic variations. Moreover, exploratory analyses using statistically more appropriate, powerful, and precise procedures showed that the removal of the confound effectively eliminated the original effect.

Our findings call into question whether the hypothesized link between social distance and preference for communication mode is a necessary and sufficient explanation to account for participants' choice to communicate using words or pictures. In fact, when presented with unconfounded representations of the text and picture formats, participants showed little preference in either direction as a function of social distance. Instead, the original effect can be accounted for by the extent to which individuals feel comfortable with sending pictures of themselves and their partner to close and distant social contacts, respectively. Specifically, the preference for sending text (vs. picture) cards to distant acquaintances was present only when (a) the picture was described as one of the participant and their partner *and* (b) the participant

felt uncomfortable sending such a picture to an acquaintance. Overall, participants felt much less comfortable with sending a private photo to acquaintances (vs. close friends), which follows naturally from people's tendency to reserve details about their private lives for close and trusted contacts (see, e.g., Miguel, 2016). Interestingly, Amit et al. (2013) argued against this explanation for their results: "[An] alternative is whether there are social norms not to reveal too much to distant others, something that pictures might do... [W]e do not think this is the reason for the current effects. One reason is that we took care to hold the content of the communications constant across conditions..." (p.52). However, as we have seen, the content was not in fact held constant. As such, this alternative explanation may have been a more serious threat to the original interpretations than previously acknowledged.

One notable difference between our replication and the original procedures is that we collected data online, in contrast to the original study, which collected data in person. One could argue that effects of this kind might be reduced when procedures are conducted online (Sánchez et al., in press). However, since we were able to produce a large effect with the original wording, our findings cannot be purely attributable to the online modality. Moreover, we see no plausible reason why people's reluctance to share personal photos with distant acquaintances would explain the effect online, but not in person. Thus, our results should qualify interpretations of the original finding, despite the difference in modality.

We would like to address some alternative interpretations of our findings. First, one could argue that the extent to which people feel comfortable with sending picture cards to distant acquaintances is not in fact a moderator of the influence of social distance on communication preferences, but rather a *consequence* of communication preferences. That is, people may generally prefer communicating with distant social contacts using text (for reasons related or unrelated to construal level), and this preference may make them feel uncomfortable sending picture cards to such targets. However, this interpretation is incompatible with our

finding that the preference for text communication with distant others disappeared when we removed the description of the specific content of the picture. Hence, rather than having a general preference for pictures vs. words, it seems more plausible that participants who received the original wording felt uncomfortable because of the specific content of the picture.

A second alternative interpretation is that our removal of the picture content in the revised wording rendered the experimental task artificial: In real life, one typically knows the content of the picture one is considering. Removing the description of the picture content might also have made the picture card more abstract, to the extent that participants no longer viewed it as a concrete option. This objection, however, applies equally to the text option: In real life, one typically also knows the content of the text one is considering. Thus, in an improved design, a description of the specific content would need to be present either for both the text and picture options or for none of the two.

Interlude: Additional Methodological Concerns

Following Study 1, we originally intended to conduct a second close replication study, in which we would address the above alternative interpretations and assess the robustness of the first replication outcome. In preparation of the follow-up study, however, we identified three additional methodological concerns which we believe limit the utility of another close replication attempt.

First, a pretest ($N = 210$) showed that the picture and text invitation cards differ greatly in perceived detailedness, and that this difference runs in the opposite direction of CLT predictions. Amit et al. (2013) argued that pictorial representations are relatively concrete because they communicate more specific details about the referent object compared with verbal representations. Our pretest data, however, showed that people perceive the text invitation card as much richer in details than the picture invitation card (data, materials, and a summary of the pretest results can be found at <https://osf.io/bkuwa/>). Since specific detail is a hallmark of low-

level construals (Trope & Liberman, 2010), the text invitation card may not be a valid proxy for high-level communication strategies.

Second, the invitation cards used in Amit et al. (2013, Experiment 2) differed not only in terms of the relative *size* of the picture and text portions, but also in terms of the *amount* of text provided in the text portion (viz. the word “text” appeared 12 times in the picture card and 36 times in the text card). Therefore, participants may have chosen the text card simply because it enabled them to communicate more words compared with the picture card. When communicating with more socially distant others, people might prioritize sending messages with more information, not because of differences in the abstraction of their mental representations but because less familiar people may simply need more information (e.g., a friend who already knows where you live does not need directions, but a distant family member will need more specific directions). This interpretation is supported by our pre-test data, where participants found the text card to be much more informative than the picture card.

Our third concern has to do with the conceptual fit between Amit et al.’s (2013) theoretical rationale for their hypothesis (as presented in their Introduction section) and their operationalization of picture and text stimuli (i.e., invitation cards) in Experiment 2. Specifically, they expressed an intention to use “a purely pictorial or verbal medium for conveying *the same message content*” (p. 44; emphasis added). Moreover, in the build-up to their hypothesis, Amit et al. argued that pictures and words differ in concreteness when communicating about *the same referent object* (e.g., a picture of a red Honda vs. the text label “RED HONDA”; p. 45). In Experiment 2, however, the picture and text content do not have the same message content or referent object. That is, the text portion of the invitation card is not a verbal description of the content of the picture portion. We argue that a more appropriate test of the conceptual hypothesis necessitates picture and word representations of the same referent object.

Taken together, these concerns dissuaded us from attempting another close replication. These issues, along with the confound we examined in Study 1, weaken the case that the original study provided evidence for the conceptual hypothesis it aimed to test. Thus, we opted for a conceptual replication, using procedures similar to the original experiment but with new materials that provide for a more stringent test of the conceptual hypothesis.

Study 2: A Conceptual Replication of Amit et al. (2013, Experiment 2)

In Study 2, we aimed to overcome the methodological shortcomings we identified in Amit et al. (2013, Experiment 2) and in Study 1. Specifically, we addressed the concerns discussed above by presenting participants with the actual content of the message options. Including the actual content ensured that the verbal and pictorial messages had the same referent object and that they conveyed highly similar information. Additionally, in Study 1 we included participants who were not native English speakers, although the materials were in English. To the extent that the original effect depends on a deep understanding of the language being used, this inclusion may represent a limitation. To address this potential concern, we limited recruitment to native English speakers in Study 2.

Method

Participants and Design

A total of 1,302 participants were recruited from Prolific and received 0.63 GBP for completing the study. Completion time was estimated to 5 minutes, which corresponded to an hourly wage of 7.56 GBP. The following eligibility criteria were applied to the pre-screening tool in Prolific: Participants had to (1) have completed a minimum of 50 survey submissions with an approval rate of 95%, (2) be a native English speaker, (3) complete the study on a laptop or desktop computer, and (4) not have taken part in the pre-tests for the current study.

An *a priori* power analysis indicated that a sample size of 1,300 would provide approximately .95 power to detect $d = 0.10$ with a paired *t*-test, and .80 power to detect an

effect of $d = 0.08$, which was concluded satisfactory given resource availability and the plausible size of the effects of interest. After excluding data from participants who had failed to complete the full survey or provide correct answer on an attention check (see below), 1,280 participants (835 women, 424 men, 3 preferred not to say, 18 missing data; $M_{\text{age}} = 38.61$ years, $SD = 13.42$, range 18–81) were included in the final sample.

The present study used a within-subject design where the outcome variable was participants' choice of picture or text instructions for each of the 14 targets (i.e., guests). The predictor variable was participants' rating of how socially close or socially distant each target is to themselves. Prior to data collection, the methods, analysis plan, sampling strategy, and exclusion criteria were preregistered on the Open Science Framework (<https://osf.io/z3y7x>).

Procedure and Materials

The study was conducted on the online survey platform Qualtrics. After giving informed consent, participants were asked to imagine that they would rent out their apartment when they are away travelling. As a part of the fictitious scenario, participants would give each prospective guest a set of instructions that explained how to use different devices in their home. Participants were randomly assigned to one of three devices: a dishwasher, a Bluetooth speaker, or an induction cooktop. For each device, participants were presented with two types of instructions displayed next to each other: (1) a picture version, in which instructions were presented as three steps shown in pictures, and (2) a text version, in which instructions were presented as three steps described in words (see Figure 3 and supplemental materials available at <https://www.osf.io/hbju7/>).

Figure 3

An example of the picture and word instructions (i.e., the Bluetooth speaker)

The pictorial and verbal stimuli created for the current study were pretested (<https://osf.io/9ywzr/>) to examine perceptual differences in informativeness and usefulness as well as overall preference (i.e., dichotomous choice). Data for the pre-test were collected in four batches of $N = 100$ on Prolific. Data from each batch informed revisions of the stimuli. The stimuli were tested and revised until we had achieved a distribution as close to 50/50 for the dichotomous choices as possible (i.e., preferences for the picture and text instructions). Our pretests suggested the following distributions for each choice: 68.2% picture and 31.8% text for the dishwasher; 55.0% picture and 45.0% text for the Bluetooth speaker; 55.1% picture and 44.9% text for the induction cooktop.

Below the two instructions (picture and text) for the device, participants were presented with a list of 14 persons that varied in social distance ranging from close (e.g., “My best friend”) to distant (e.g., “A person working at my favourite café”). For each person in the list, participants were instructed to imagine that they were coming to stay in their apartment. The guest list was similar to the list used in Study 1, but three targets from the original material

were revised as they were aimed specifically at a student sample. For example, the target “A fellow student, who is not a personal friend of mine” was changed to “A fellow volunteer worker, who is not a personal friend of mine”. Social distance ratings for each person on the guest list were collected in the pretests (see <https://osf.io/th9ug/>), in which participants rated how socially close they considered each person to be to themselves, on a scale ranging from 1 (*very close*) to 7 (*very far away*), corresponding to the measure used in the pre-test for Amit et al. (2013, Experiment, 2). The mean social distance rating for each guest confirmed that the target guests varied in social distance as intended (see <https://osf.io/8crb7/>). Moreover, mean social distance ratings for each target, as well as the rank order of targets by mean distance rating, were highly similar to the ratings in the main study (see Table 3). As such, it seems unlikely that the task of selecting instructions to send to each target meaningfully influenced people’s perceptions of the social distance of each target.

As in Study 1, participants reported their choice of instructions for each guest by entering a ‘P’ for picture or ‘T’ for text in a designated text box positioned next to each guest on the list. Next, we asked participants to indicate how socially close they considered each guest to be to themselves, using a scale from 1 (*very close*) to 7 (*very far away*).

To explore participants’ reasoning behind their choice of instructions, they were asked the following open-ended question: “Please tell us how you decided which instructions to give to which person”. In the interest of space, we do not report formal analyses of these data. Finally, an attention check asked participants to report what device the instructions were for. Participants had to select one of four options: (1) a dishwasher, (2) a Bluetooth speaker, (3) an induction cooktop, or (4) a burglar alarm. We excluded the data of 22 participants who failed to respond correctly to this item.

Results

Hypothesis Testing

Table 3 displays descriptive statistics for participants' social distance ratings for each of the 14 targets, as well as the percentage of text instructions selected for each target. We tested the hypothesis that perceived social distance predicts instruction choice using a logistic mixed effects model. This analysis was conducted using the *lme4* package for R. With 1,280 participants each providing 14 decisions, there were 17,920 valid observations included in the model. The model predicted instruction choice (0 = picture, 1 = text) from the social distance rating for that target (1 to 7), with random intercepts for each participant, each target, and each device (i.e., dishwasher, speaker, cooktop). Estimates from this model are presented in the upper panel of Table 4. The coefficient for social distance was significant and negative, such that participants were slightly less likely to select text instructions for targets who were more socially distant. This effect is opposite what is predicted by construal level theory. However, this result should be interpreted with caution, since planned exploratory analyses, in which we added random slopes to the model, suggested that this effect is not robust to analytic variations.

Per our preregistration, we fit two additional mixed effects logistic regression models, one that added random slopes for social distance for each participant and one that added random slopes for both participants and devices. We compared each of these models using a likelihood ratio test and found that the model with random slopes for participants and tasks fit the data the best, $ps < .006$ (for more detailed fit statistics, see the supplemental materials, <https://osf.io/hbju7/>). The results for this model are displayed in the lower panel of Table 4. As can be seen, the average effect of social distance in this model is not significantly different from zero (though the point estimate remains negative). Additionally, participants' random slope estimates varied considerably, ranging from -1.21 to 1.36 (log odds). In other words, even though the average effect of perceived social distance was near zero, the substantial amount of variance in the random slopes for participants suggests that perceived social distance predicted individual participants' decisions to select text or pictures in widely varying ways. The

distribution of random slopes is displayed in Figure 4. The effect ranged from strongly negative to strongly positive but was generally small in absolute magnitude.

Table 3

Mean Social Distance Ratings and Percentage of Text Instructions Chosen for Each Target in Study 2

Target	<i>M</i>	<i>SD</i>	<i>Mdn</i>	% Text
A person I met at a party	5.58	1.41	6	37
A person that I met on my last vacation	5.56	1.46	6	38
A person working at my favourite cafe	5.55	1.39	6	34
A fellow volunteer worker, who is not a personal friend	5.48	1.37	6	39
An acquaintance from the gym	5.25	1.34	5	34
A distant family member	4.64	1.39	5	38
A colleague from work	4.12	1.23	4	47
A friend of my girl-/boyfriend	3.88	1.46	4	38
My brother's girlfriend	3.49	1.47	3	38
My cousin	3.34	1.61	3	41
A friend from university	3.16	1.41	3	46
A close friend	2.21	1.38	2	42
My best friend	1.75	1.56	1	41
A first degree family member (e.g., mother, father, sister)	1.66	1.60	1	41

Note. ‘% Text’ indicates the percentage of text instructions chosen for each target.

Table 4*Logistic Mixed Effects Models Predicting Selecting Text Instructions, Study 2*

<i>Planned model (random intercepts only)</i>		
Fixed effect	Estimate [95% CI]	
Intercept	-0.886 [-1.538, -0.233]	
Social distance	-0.052 [-0.083, -0.021]	
Random effect	Variance	
Participant (intercepts)	12.422	
Target (intercepts)	0.086	
Device (intercepts)	0.270	
<i>Exploratory random slopes model</i>		
Fixed effect	Estimate [95% CI]	
Intercept	-1.290 [-2.440, -0.140]	
Social distance	-0.024 [-0.144, 0.096]	
Random effect	Intercept variance	Slope variance
Participant	43.878	0.581
Target	0.120	-
Device	0.905	0.009

Note. Coefficients are log odds ratios.

Figure 4

Distribution of Participants' Random Slopes for Social Distance Predicting Selecting Text Instructions, Study 2

Note. For comparison, vertical lines depict the model-estimated average slope (black dashed line; log odds = -0.02), the difference in the number of text instructions sent to the three targets rated most socially close and three targets rated most socially distant (black dotted line; $d = -0.12$ converted to log odds = -0.22; see Exploratory Analyses), and the original effect from Amit et al. (2013, Experiment 2; red dotted line; $d = 1.06$ converted to log odds = 1.92). A grey dashed vertical line is drawn at 0.

Exploratory Analyses

For the sake of consistency with the original analyses in Amit et al. (2013, Experiment 2), we also analyzed the present data in an ANOVA framework. For this analysis, we selected

the three targets rated to be the most socially close and the three rated to be the most socially distant in the pretest (which were identical to those rated most close and most distant in the main data of Study 2; see Table 3). For each participant, we calculated how many text instructions were sent (0 to 3) to these critical close and critical distant targets. The two scores were treated as repeated measures in a mixed ANOVA (Type III sums of squares), with the device (dishwasher, speaker, cooktop) as a between-subjects factor. There was a significant main effect of social distance, $F(1, 1277) = 17.75, p < .001, \omega_p^2 = .013$, a significant main effect of device, $F(2, 1277) = 14.89, p < .001, \omega_p^2 = .021$, and a significant interaction, $F(2, 1277) = 7.63, p < .001, \omega_p^2 = .010$. The main effect of social distance was such that participants overall selected more text instructions for close targets ($M = 1.26, SD = 1.34$) compared to distant targets ($M = 1.11, SD = 1.22$), $t(1279) = 4.18, p < .001, d = -0.12, 95\% \text{ CI } [-0.19, -0.04]$. This effect was opposite the hypothesized direction (see Figure 1). This main effect was, however, qualified by an interaction, such that participants selected significantly more text instructions for close targets compared to distant targets for the dishwasher, $t(417) = 4.08, p < .001, d = -0.20, 95\% \text{ CI } [-0.34, -0.07]$, and the speaker, $t(433) = 3.84, p < .001, d = -0.18, 95\% \text{ CI } [-0.32, -0.05]$, but not for the cooktop, $t(427) = 0.76, p = .438, d = 0.04, 95\% \text{ CI } [-0.09, 0.18]$. In summary, two out of the three devices suggested an effect opposite the hypothesized direction, and one device suggested a nonexistent or miniscule effect. We recommend caution when interpreting these results because although this analysis is analogous to the analysis in the original study, it is less statistically appropriate than the primary planned hypothesis test (i.e., the mixed-effects logistic regression).

Discussion

In a conceptual replication using procedures similar to Amit et al. (2013, Experiment 2), we found no evidence to support the hypothesis that people increasingly prefer text (vs. pictures) as a means of communication with increasing social distance to the target. If anything,

there was weak evidence of an effect in the direction opposite the predictions, but this effect was not robust to variations in statistical analysis. The stimulus materials we used here were designed to address many of the methodological limitations of both the original study and Study 1 and to provide a stronger test of the conceptual hypothesis that social distance influences preferences for communication medium. As such, these results should qualify the conclusions in the original experiment.

In providing participants with the actual content of the message options, there is a risk that the present results are limited to the particular stimuli we used. This risk is mitigated by the fact we used three sets of stimuli, and each stimulus set was seen by more than 400 participants, allowing for a reasonably high degree of precision in the estimation of effects. Moreover, we believe each stimulus set offered a fair test of the conceptual hypothesis: The text and picture instructions had the same referent object, communicated highly similar information, and were understandable by any receiver on the list. That is, if the hypothesis were true, the predicted phenomenon presumably should have been observable in each stimulus set, even if the size of the effect varied somewhat across stimuli. Instead, we saw no indications of the predicted phenomenon.

General Discussion

Our aim was to test the hypothesis that social distance influences preferences for communication medium, such that text is preferred for more socially distant targets and pictures are preferred for socially closer targets (Amit et al., 2013). In two high-powered studies—a close replication of Amit et al. (2013, Experiment 2) and a conceptual replication—we failed to find reliable support for the hypothesis. Given these results, which constitute the overwhelming majority of the data addressing the hypothesis (99.2%; $N = 2,268$ in the present studies, $N = 16$ in the original), we argue that the original finding should no longer be cited as

evidence of the relationship between social distance and preference for communication medium. We outline our reasons below.

A defining property of a replication is that its outcome should affect one's confidence in the veracity of a claim (Nosek & Errington, 2020). Outcomes consistent with a claim should increase one's confidence, whereas outcomes inconsistent with a claim should decrease one's confidence. This process is complicated by inevitable differences between replications and the original studies in terms of units (*viz.* participants), treatments, outcomes, and settings (see Shadish, Cook, & Campbell, 2002). The importance of differences in these features depends on the nature of the hypothesis being tested. To illustrate, we can imagine two versions of the hypothesis that people prefer to communicate with distant contacts with words and with close contacts using pictures. A "weak" version of this hypothesis would assert this pattern of results only when using the exact treatments and outcomes featured in Amit et al. (2013, Experiment 2), but that we might expect it to generalize across a variety of units and settings. That is, a weak hypothesis might be that the results do not depend on the exact people in the original experiment or the specific context in which they participated, but that using the specific manipulations and measures is crucial. A "strong" version of the hypothesis would assert that this pattern of results is highly general and should extend across a wide range of units, treatments, outcomes, and settings. Indeed, construal level theory purports to be a highly general description of basic cognitive processes (Trope & Liberman, 2010), and as such, tests of strong versions of the hypothesis (*viz.* conceptual replications) are relevant to the theory's validity.

Which version of the hypothesis—weak or strong—have we tested here? We would argue, both. The results of Study 1 should decrease our confidence in weak versions of the hypothesis limited to the treatments and outcomes used by Amit et al. (2013), and the results of Study 2 reduce the potential generalizability space of strong versions of the hypothesis (for

a discussion of the notion of generalizability space, see Nosek & Errington, 2020). The present results cannot, of course, address every possible version of this hypothesis. However, given that the present research tested this hypothesis with several more treatment variations than the original and with a total sample 141 times the size of the original, the broad hypothesis has so far failed substantially more than it has succeeded.

The results of the present study carry theoretical implications. The original finding, that people prefer pictorial messages for closer targets and verbal messages for distant targets, was explained by an overgeneralization of a basic cognitive process. That is, congruence between the level of abstraction in mental representations of the messages and the recipients is typically useful for effective communication, and this generality is expected to influence medium preferences even when such congruence is not strictly necessary for the recipient to understand the message (Amit et al., 2013). However, rather than pervasive overgeneralization of a fundamental cognitive process, the wide variance in effects of social distance across individuals observed in Study 2 is more consistent with extensive idiosyncrasy. These results do not suggest a total absence of any relationship between social distance on communication medium preference. Rather, the data suggest there are quite many relationships, varying widely across individuals, and these effects happen to average out to a value near zero. This observation is inconsistent with the hypothesis that communication medium preferences are substantially influenced by one highly general cognitive process.

Our findings also hold wider implications that extend beyond the specific phenomenon examined here. The present studies demonstrate that the replicability of established psychological findings may, to an unknown extent, be contingent on undisclosed, subtle procedural details. Similar arguments have been made to explain how a failed replication need not mean a hypothesis is false (see, e.g., Baumeister, 2016; Gilbert et al., 2016). However, the present research underscores that subtle procedural details may also artificially make a

hypothesis appear to be true when it is, in fact, false. Crucially, as the full instructions were not reported in the Method section of Amit et al. (2013, Experiment 2), we were able to detect the confounds in the original instructions only by receiving the stimulus materials from the original authors. We attribute the failure to include this information to the limited reporting standards typical of many psychology journals. Editors and journals must insist on more thorough documentation of methods and results, and, where possible, the inclusion of original research materials. Full transparency in the documentation of methods and results is key for the reproducibility of research.

Conclusion

To the best of our knowledge, the original study along with our two replications, account for all the available research testing the hypothesized link between social distance and preferences for communication medium. Given the notable confounds in the original paper and the results of the current studies, there appears to be little to no available evidence supporting the claim people prefer to communicate with distant contacts using words and with close contacts using pictures.

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