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Elinor Amit[1], Cheryl Wakslak[2], and Yaacov Trope[3]

Abstract

The current study investigated the effect of distance on medium preferences in interpersonal communication. Five experiments showed that people's preference for using pictures (vs. words) is increasingly higher when communicating with temporally, socially, or geographically proximal (vs. distal) others. In contrast, preference for words is increasingly higher when communicating with those who were distal. A sixth experiment showed that communication's medium influences distance preferences, such that people's preference for communicating a message to a distant (vs. proximal) target is greater for verbal compared with pictorial communications. A seventh experiment showed that recipients are more likely to heed a sender's suggestions when the medium and distance are congruent. These findings reflect the suitability of pictures for communication with proximal others and words with distal others. Implications of these findings for construal-level theory, perspective taking, embodied cognition, the development of language, and social skills with children are discussed.

Keywords

pictures, words, distance, communication

Imagine that you have just returned from a vacation. You want to get back in touch with your close friends by sending them an email. One option is to send them some pictures from the vacation; a different option is to describe the vacation using words. What would you do? Now, suppose that instead of sending the email to your close friends, you plan to send an email to your boss or to a coworker who is only a casual acquaintance. Does your answer change? In everyday life, we often face dilemmas like this while interacting with other people. For example, we need to decide whether to write an email, call on the phone, or have a face-to-face interaction with another person; add an emoticon (emotion icon) to an email or write a plain text; create a photo album or write a text in the "status" box in our Facebook page; add a picture to a twitter message or not; and so on.

Moreover, this type of decision extends to communication in domains beyond peer-to-peer contexts. Marketing agencies, for example, may decide whether to place an ad on television, on billboards, or in a newspaper, and in each medium determine how much text versus visual information to include. A writer of a textbook needs to choose how many visual illustrations to include in the book and how much space to allocate to illustrations relative to the text. An editor of a newspaper needs to decide what should be the proportion of pictures versus text for a specific article, and for the newspaper as a whole. A furniture or toy company might decide what proportion of an instruction manual should contain visual illustrations versus text. Such decisions made by the messenger can have a tremendous impact on how the message will be accepted by the recipient, in terms of attention, comprehension, recall, and adherence (Houts, Doak, Doak, & Loscalzo, 2006).

What influences decisions about which medium of representation to use to what degree? Although these decisions may sometimes be constrained by factors such as the ease of generating a visual versus verbal message and the message's complexity, even within the limits of those constraints, it is usually the case that people *can* choose (at least to some degree) the relative amount of verbal representations and the relative amount of visual representations that they include.[1] This leeway leaves room for a lot of variation in how people communicate with others, and they might find verbal and visual communication more or less suitable for different purposes. Our central claim in the current research is that such choices are influenced by the communicator's perceived distance from the recipient. Perceived distance is a subjective

[1]Harvard University, Cambridge, MA, USA
[2]University of Southern California, Los Angeles, USA
[3]New York University, New York City, USA

Corresponding Author:
Elinor Amit, Department of Psychology, Harvard University, William James Hall 1484, 33 Kirkland Street Cambridge, MA 02138, USA
Email: amit@wjh.harvard.edu

experience that something is close or far away from the self, temporally, geographically, or socially. We hypothesize that people's preference for using words and pictures will be influenced by the communication target's distance: When communicating with distal others, people will increasingly prefer to use words. In contrast, when communicating with proximal others, people will increasingly prefer to use pictures.

Past Research on Interpersonal Communication

Past research on the effect of distance on communication has not specifically compared the use of pictures and words as means of communication. However, a considerable amount of research has examined communication that is rich in verbal information (e.g., textual emails) versus nonverbal information (e.g., face-to-face communication). For example, Baym, Zhang, and Lin (2004) found that face-to-face communication was the dominant medium in local relationships, whereas the Internet was the preferred medium of communication in long-distance relationships. Other studies have similarly shown that email predominates in long-distance relationships (Boase & Wellman, 2006; Dimmick, Kline, & Stafford, 2000; Hampton & Wellman, 2001; Quan-Haase, Wellman, Witte, & Hampton, 2002; Stafford, Kline, & Dimmick, 1999; Utz, 2010; Wellman & Gulia, 1999) and that feeling close to someone is associated with a significant increase in the use of phone and face-to-face communication, and much less with an increase in the use of email (Cummings, Kraut, & Kiesler, 2001). Moreover, recent research suggests that even within the domain of online communication, interpersonal closeness influences preference for visual communication, with people favoring the use of video, compared with written text or voice options, for online communication with friends and significant others who live in different locations (Baron, 2008).

Although these studies provide some evidence in support of the notion that the use of verbal versus nonverbal means of communication is related to distance, the evidence is tentative and indirect. First, the studies have typically compared different media of communication (e.g., face-to-face communication vs. online communication) without controlling the content of the communication. It is therefore unclear whether the findings reflect the effect of the medium of the communication or its content. Second, the "real life" media that have been studied typically mix verbal and nonverbal information to various degrees. For example, face-to-face communication typically includes both language and facial expressions. It is therefore difficult to isolate the contribution of pictorial versus linguistic information. Finally, because past research has been correlational, the effect of distance may reflect ecological differences in the availability, feasibility, and cost of use of the various media of communication at different distances. For example, differences in time zones might make telephone conversations more difficult and costly relative to email messages across large geographical distances, and this might be responsible for increased use of such media to communicate with distal others.

The current research aims to more systematically study the relationship between distance and the use of pictorial versus verbal communication by experimentally varying distance (including spatial, temporal, and social distance dimensions) and using a purely pictorial or verbal medium for conveying the same message content. We predict that people will increasingly prefer to use words relative to pictures when communicating with a distal, rather than a proximal, target. At the basis of this hypothesis is the idea that the unique characteristics of pictures and words endow them with differential advantages when communicating with distal versus proximal others. We will elaborate on the rationale for this hypothesis in the next section.

Differences Between Pictures and Words

Pictures and words are symbols used to represent real objects, events, and actions. Pictures are concrete representations that in nearly all cases[2] physically resemble their referent objects; they are analogies of the real world. In contrast, words in nearly all cases[3] are abstract representations that have an arbitrary relationship with their corresponding objects. Each word is actually a category that refers to a broad range of concrete objects (Glaser, 1992; Paivio, 1986). Words carry the essence of an object, abstracting a stimulus into its basic, invariant properties.

That pictures and words reliably differ in their level of abstraction is well known. However, this structural difference implicates different cognitive functions. Recent research, for instance, has argued that words are more suitable for representation of distal things, whereas pictures are more suitable for representations of proximal things (Amit, Algom, & Trope, 2009; Amit, Algom, Trope, & Liberman, 2009; Amit & Greene, 2012). The rationale for this medium/distance association is based on construal-level theory (CLT; Liberman & Trope, 2008; Trope & Liberman, 2010). According to CLT, people traverse psychological distance by using abstractions, because abstraction, more than concrete and specific depictions, are more likely to remain unchanged as one gets closer to an object or farther away from it. As pictures are more concrete than words, they should be more suitable for representation of proximal things, whereas words should be more suitable for representation of distal things. Of course, sometimes the concrete details will not change across distance, but because abstraction is generally functional, people exhibit a general tendency to engage in it when considering remote objects, regardless of its benefit in any one instance.

Drawing on and expanding this logic, we shift from the intrapersonal focus that has largely characterized CLT to an interpersonal focus, suggesting that abstraction in the form of

language facilitates the bridging of distance in communication. Because words are abstract, they preserve the central gist of representations and omit incidental details. Therefore, words enable shared reality with social partners who exist in different times, remote locations, and are different from the self, and therefore may not have the same access to those incidental details, and for whom a concrete picture may not be relevant or understandable. For example, a pictorial message that was sent recently would be more comprehensible than a pictorial message from long ago. In contrast, verbal messages have a better chance of being understood across time periods. Similarly, putting in your Facebook page a picture of a red car without labeling it would leave a distal acquaintance a bit confused: Did you mean that you like red Honda compacts? Cars in general? Or maybe it is actually the beautiful location that appears in the background of the car? There are many details in the picture and therefore it is impossible to know to which one you wanted people to pay attention to. However, writing in the label of the picture RED HONDA will make your intention clear and focus your audience on the gist of what you mean to convey. In contrast, including the very same picture without the label is likely to be a clear message for a close friend who is familiar with your enthusiasm about red Honda. Furthermore, pictures have an advantage when communicating with proximal others. Because pictures are concrete, they provide additional information that could benefit those who are proximal (temporally, geographically, or socially). Put differently, the specificity of a picture is useful when the object is known. For example, a close friend might like to know that the exact hue of red that you prefer is crimson.

Because we expect verbal messages to facilitate communication across distance and pictorial messages to facilitate proximal communication, words should be increasingly preferred to communicate with distal others and pictures to communicate with proximal others. Moreover, as is generally the case with construal-level effects, we expect this to extend more generally so 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 with that distant message recipient.

Finally, drawing on the bidirectional link between abstraction and distance that CLT has suggested (e.g., Liberman, Trope, McCrea, & Sherman, 2007; Wakslak & Trope, 2009), we expect that medium of a communication might actually influence choice of recipient. That is, for verbal communication, people might communicate to a greater degree with distant others than when a communication consists of pictures. This idea suggests that people will not always prefer to communicate with proximal over distal others (e.g., Festinger, Schachter, & Back, 1950), but that this preference will be influenced by the message's medium.

We conducted five studies that explored this relationship across different dimensions of distance. Of note, we did not make predictions regarding the main effect of preference for pictures versus words in these studies. Presumably, other factors might influence whether pictures or text are preferred (e.g., ease of creating a visual vs. verbal message, complexity of the message that is to be conveyed, or attractiveness of the presentation form). It is therefore likely that the main effects for medium will be influenced by and reflect these and other factors. In the current Experiments 1 to 5, our focus is thus on the *relative* preference for pictures and words across distance, beyond any main effect of medium that might occur in any particular context we examine. In Experiment 6, we tested the reverse direction of causality, namely, the effect of medium on distance preferences. We predicted that people's relative preference for communicating with distal others would increase when communication involved words rather than pictures. Finally, Experiment 7 explores the functionality of the congruency between medium and distance to the recipient.

Experiment 1

Experiment 1 was an ecological test of the medium/distance hypothesis. Participants were asked to choose a restroom sign for a restaurant that will be opened either next week or next year. One sign was a visual symbol of a man and a woman and the other sign consisted of the words "Men" and "Women." We predicted that the visual sign would be preferred for the restaurant that is to be open in the near (vs. distant) future, whereas the verbal sign would be preferred for the restaurant that is to be open in the distal (vs. near) future.

Method

Participants. We recruited participants online (N = 112, 61.9% female; M_{age} = 33.2 years; SD_{age} = 12.16; U.S. residents only), using Amazon's Mechanical Turk (www.mturk.com; see Buhrmester, Kwang, & Gosling, 2011; Horton, Rand, & Zeckhauser, 2011). To maximize the reliability and generalizability of our results, we used attentiveness checks based on recommendations of Oppenheimer, Meyvis, and Davidenko (2009). In all, 29 participants who failed in the attentiveness checks were excluded from the analysis.

Stimuli and procedure. To select restroom signs that are equally likeable, we conducted a pretest on a separate group of participants. In the pretest, we presented eight visual signs and eight verbal signs. We selected one visual sign and one verbal sign that were the most generic in style and also did not differ in their likeability ratings on a scale that ranged from 1 (*do not like it at all*) to 9 (*like it very much*); Ms = 4 and 4.5, respectively, $t(17) = 1.4$, $p > .05$.

A fresh group of participants were asked to imagine they are going to open a restaurant either next week or next year (between-subjects), and instructed to choose one of two signs for the restaurant's restroom. One sign was a visual symbol of a man and a woman, and the other consisted of the words "Men" and "Women."

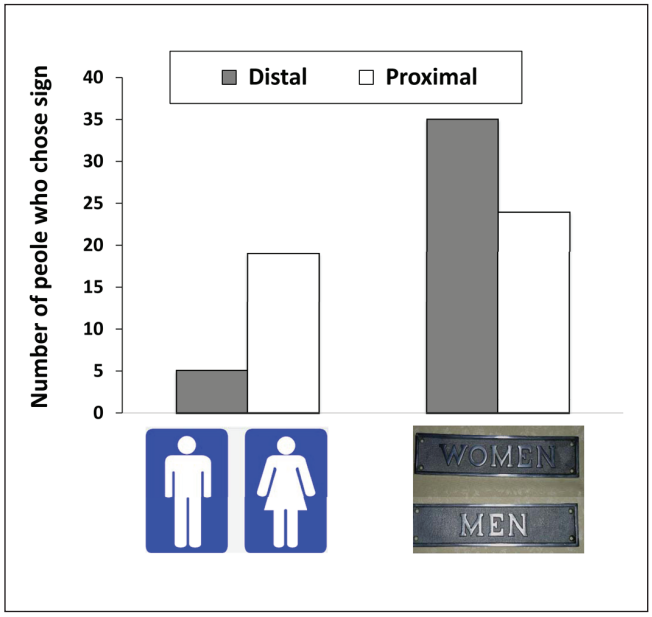

Figure 1. Number of people who chose visual versus verbal signs, as a function of temporal distance

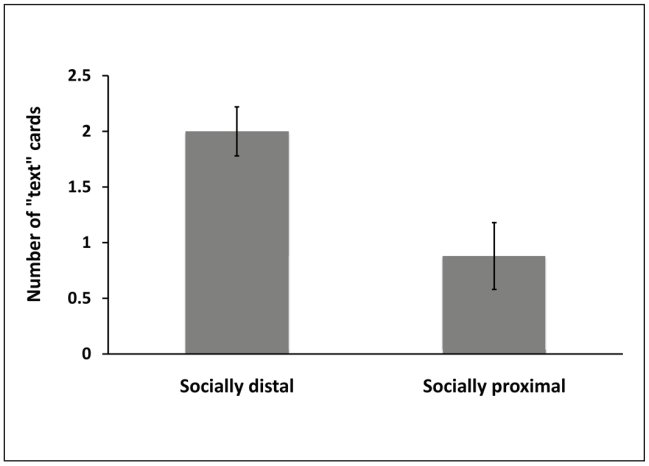

Figure 2. Number of "text" cards that were sent to socially proximal and socially distal guests

Results

Figure 1 presents the results. A chi-square analysis revealed that there was a main effect for medium, such that words were preferred over pictures ($n = 59$ vs. 24, respectively), $\chi^2 = 14.7$, $p < .001$. Consistent with our prediction, chi-square analysis showed that verbal signs were preferred for the restaurant that is to be opened in the distant versus the near future ($n = 35$ vs. 24, respectively). In contrast, visual signs were preferred for the restaurant that is to be opened in the near versus the distant future ($n = 19$ vs. 5 respectively), $\chi^2 = 10.12$, $p = .001$.

Experiment 2

Experiment 1 showed that people change their preferences for medium of communication as a function of distance. Strikingly, this change occurred even though the visual representation was an impoverished, iconic symbol. Experiment 2 sought to find converging evidence by varying the way information is represented visually and verbally. Specifically, here we built on the participant's *internal representations* of the visual and verbal information. Participants were asked to select party invitations to send to socially proximal and socially distal recipients, choosing between invitations dominated by pictures or text. We predicted that people would be more likely to send the text (rather than picture) card to socially distal (vs. proximal) others.

Method

Participants. A total of 16 New York University undergraduates (75% women) participated in the experiment in partial fulfillment of course requirement.

Stimuli and procedure. Participants were asked to imagine they were conducting a housewarming party. They were presented with two optional invitation cards to the party, presented side by side. One invitation contained a small box (2.6 × 3 cm), which had the word "text" written within it, and a big box (6 × 3.3 cm), which contained a small figure of a mountain (a generic symbol of a picture in Microsoft PPT). The second invitation had a small box with the mountain figure and a big box with the word "text" written in it. The participants were asked to imagine that the text is "humoristic" and the picture is "funny" (again, no information was actually presented).

Participants were then presented with a guest list. Three guests from the list were socially proximal to the participant (e.g., "my best friend") and three were socially distal (e.g., "an acquaintance from the sport club"). Perceived distance was determined by a pretest, in which a separate sample of 10 individuals indicated how socially/personally close they considered each of 14 target individuals to be, on a scale that ranged from 1 (*very far away*) to 7 (*very close*). The mean rating of social distance of the targets was 4.46 ($SD = 1.03$). We selected the 3 target individuals who were rated the most proximal ($M = 6.3$, $SD = .55$) and the 3 target individuals who were rated most distal ($M = 1.8$, $SD = .15$) as stimuli. The difference between social closeness ratings of the selected proximal and the distal targets was significant, $t(9) = 13.67$, $p < .001$. The participants were asked to choose which guest would get which invitation, having been told to use both types of cards, each as many times as they liked.

Results and Discussion

We computed the mean number of "text cards" that were chosen as a function of type of guest (proximal, distal; see Figure 2). As the number of choices of the pictorial cards

and the verbal cards sum to 100%, we report only preference for the text cards. As predicted, a paired sample t test showed that participants chose the text cards more for distal than for proximal guests (Ms = 2 and 0.88, respectively), $t(15) = 2.33$, $p < .05$, $\eta_p^2 = .26$. Notably, the information that was presented in the "pictorial" versus the "verbal" invitation was the same across conditions, as both conditions included space for the text and for the picture. The picture and words differed only in their relative salience. Therefore, the effect of distance is not due to differences in the content of the pictorial and verbal representations, but rather due to a differential preference for a communication medium.

Experiment 3

The goals of Experiment 3 were to use a more ecological setting of choice of medium, while using a similar internal representation technique that was used in Experiment 2. Participants were asked to design a generic member profile page in a blind-date website (i.e., the place where a member would communicate information about him or herself) that would serve themselves and their peers at their university. The template for the card contained a "text box" and a "picture box." Participants were informed that the site was going to be launched either in 1 week or in 6 months. We predicted that people would increasingly prefer to devote space for pictures in the near future and would increasingly prefer to devote space for words in the distal future.

Method

Participants. A total of 40 undergraduate students of The Open University in Israel (70% women) participated in the experiment in partial fulfillment of course requirement.

Stimuli. A power-point slide that contained two boxes comprised the main stimulus material. One box had the words "insert text" written within it, and the other box contained the words "insert picture." The size of each box was 4.50 × 5.80 cm. On the top of the slide, there was a title, which stated in one condition "the site will be launched in 1 week." In the second condition, "1 week" was replaced by "6 months from now."

Procedure. As a cover story, participants were told that the student association of the participant's university would like to create a new service for students, a blind-date Internet site, which is "under construction." In one condition, they were told that the site was supposed to launch in 1 week, whereas in the other condition, the site was supposed to launch in 6 months from now. Participants were told that the current experiment is a survey testing the graphic design of the generic member profile page of the site. Participants were shown a slide, which contained two boxes, one labeled "insert picture" and the other labeled "insert text." The participants were asked to change the relative size of the boxes, using a computer mouse. Finally, participants were thanked and debriefed.

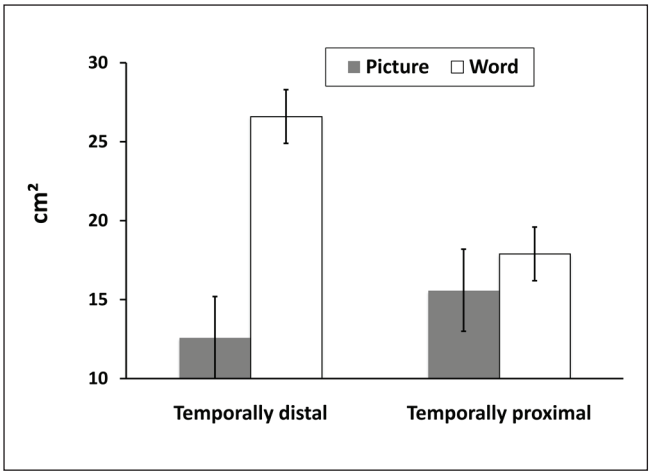

Figure 3. Space devoted for picture box and text box, as a function of launching date of the website

Results and Discussion

We measured the size (in cm^2) that was devoted to the text box and to the picture box. Figure 3 displays the results. A 2 (medium: pictures, words) × 2 (distance: near, far) mixed design analysis on the size of the picture and text boxes, with medium as a within-subjects variable and distance as a between-subjects variable, showed a main effect for medium, such that words, overall, were preferred over pictures (Ms = 22.3 cm^2 and 14.1 cm^2, respectively), $F(1, 38) = 9.4$, $p < .01$, $\eta_p^2 = .19$. This, however, was qualified by a significant interaction between medium and distance, $F(1, 38) = 4.7$, $p < .05$, $\eta_p^2 = .11$. For distant communication, participants exhibited a preference for words over pictures (Ms = 26.6 cm^2 and 12.6 cm^2, respectively), $F(38) = 13.8$, $p < .001$. In contrast, for near communication, there was no difference in the preference for pictures and words (Ms = 15.6 cm^2 and 17.9 cm^2, respectively), $F < 1$.

These results provide converging evidence in support of our primary prediction that words and pictures are differentially preferred for communication with distal and near others. Because, as in Experiment 2, participants did not see any actual picture or word, the effect of distance on medium preferences could not be attributed to differences in the content of the pictures versus the text. Furthermore, the fact that there was no preference for words in the near future is remarkable, considering the dominance of language in our modern society. Finally, note that in this experiment, participants were not asked to communicate a message, but rather to create a means of communication for themselves and their group (i.e., students from their university) to use for communication in either the near or distant future. Yet, and consistent with our predictions, the means of communication that people designed

increasingly incorporated words (vs. pictures) when it was going to be used for more distant communication.

Experiment 4

In Experiments 1 to 3, participants indicated their preferences for pictorial versus verbal representations while looking either at impoverished stimuli or without actually seeing any picture or text. This is important because it allowed us to have a tight control over any differences in the stimuli that were presented to the participants. However, it led to a set of rather impoverished stimuli. In Experiment 4, participants were therefore presented with a variety of actual pictures and words. In addition, in Experiment 4, participants were led to believe that they were taking part in an actual interpersonal interaction with real people, which strengthens the ecological validity of the study.

Participants were asked to present themselves via the Internet to another participant, by selecting objects that they like from a given list. Half of the items came in pictures and the other half in words. In addition, half of the participants were told that the self-presentation would be followed by an interaction that would take place in just a few minutes, whereas the other half were told that it would take place in 3 months from now. We predicted that people's relative preferences for items presented in pictures versus words would be greater when communicating with a proximal rather than distal other.

Method

Participants. A total of 193 University of California, San Diego, undergraduate students (42% women) participated in partial fulfillment of a course requirement. The mean age was 22.2 (SD = 2.3).

Procedure. Participants were told that the experiment was about how people communicate with others. They were told that they are going to interact with another participant. Before the interaction takes place, they were asked to introduce themselves to the other participant, by selecting items that they like from a given list. A total of 24 items were presented to participants, half in pictures and half in words. The items were spread randomly on the page. Items were selected based on their high familiarity (e.g., fish, bike, book). Half of the participants were told that the interaction (including the self-presentation) with the other participant will take place in a few minutes, whereas the other half were told that the interaction will take place in 3 months from now. Participants were asked to select as many items as they wanted according to their personal preferences from the presented list. The items in the near and far conditions were identical. In addition, we counterbalanced the presentation of items as pictures or words across participants. Pictures were color photographs found on the Internet; picture width varied between 3 and 5 cm and height varied between 4 and 6 cm. For words, font size was 36, Times New Roman. As a manipulation check, after choosing the items, participants were asked when the interaction with the other participants would take place. Finally, participants completed a few demographic questions.

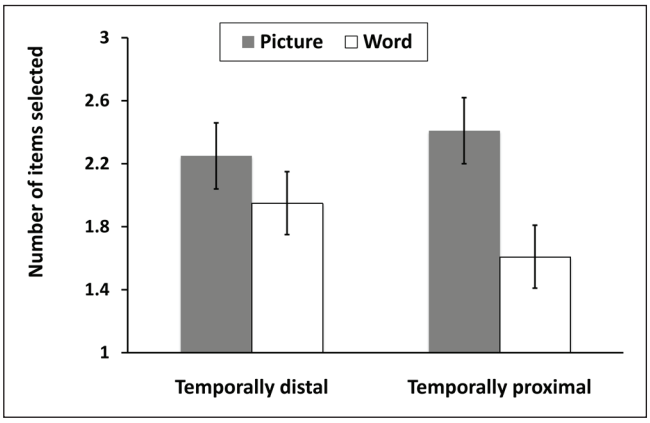

Figure 4. Number of pictures and words chosen for communication with temporally distal and proximal other

Results and Discussion

There was no main or interaction effect for the presentation of the item as a picture or a word. We therefore excluded the counterbalancing variable from any further analysis. Based on the manipulation check, we omitted from the analysis 23 participants who did not provide an accurate answer about the interaction's temporal distance. Thus, the analysis was conducted on the remaining 170 participants.

Figure 4 presents the results. A 2 (medium: pictures, words) × 2 (distance: near, far) mixed design analysis on the number of selected items, with medium as a within-subjects variable and distance as a between-subjects variable, showed a main effect for medium, such that pictures, overall, were preferred over words (Ms = 2.3 and 1.78, respectively), $F(1, 168) = 20$, $p < .001$, $\eta_p^2 = .1$. This main effect, however, was qualified by a two-way interaction between medium and distance, $F(1, 168) = 4.05$, $p < .05$, $\eta_p^2 = .024$. When the communication with the other participant was temporally proximal, there was a strong preference for pictures over words (Ms = 2.4 and 1.6, respectively), $F(1, 168) = 20.7$, $p < .001$, $\eta_p^2 = .11$. In contrast, when the other participant was temporally distal, there was only a marginal difference in the preference for pictures and words (Ms = 2.2 and 1.95, respectively), $F(1, 168) = 3$, $p = .08$, $\eta_p^2 = .01$.

In sum, the results of Experiment 4 provide converging evidence in support of the prediction that words and pictures are differentially preferred for communication with distal and near others. This pattern was obtained when actual pictures and words were used.

Experiment 5

The purpose of Experiment 5 was to provide converging evidence to Experiments 1 to 4 by using a different distance

dimension: geographical distance. Participants were presented with partners of communication who were either geographically proximal or geographically distal. As means of communication, participants were provided with verbal and pictorial items. We predicted that when communicating with geographically distal others, people's preference for words over pictures would increase. In contrast, when communicating with geographically proximal other, people would increasingly prefer to use pictures over words.

Method

Participants. A total of 25 New York University undergraduates (52% women) participated in the experiment in partial fulfillment of course requirement. Two subjects qualified as outliers (1.5 +/- the interquartile range) and were therefore excluded from subsequent analysis. Finally, due to the nature of our manipulation, which entailed geographical distance that was anchored in real places (East-coast vs. West coast), we excluded 3 subjects that were not from the East coast.

Procedure. Participants were told that the experiment was about how people communicate with others. Specifically, participants were asked to present themselves via the Internet to the other person, by pointing to objects that they like from a given list. There were 40 trials. On each trial, the participant was provided first with a screen that presented a name and a location of a target individual (see Figure 5A). On half of the trials, the target individual was in a city located on the East coast (e.g., Philadelphia, Pennsylvania), and in the other half in a demographically similar city located on the West coast (e.g., Los Angeles, California). Order of trials was random across participants. Subsequently, the participant was presented with a pair of objects, one of which was in a picture format and the other in a word format. Items in each pair were presented side by side (see Figure 5B), and the participant was asked to choose one of the items according to her or his personal preferences, by pressing one of two keys on the keyboard. The verbal and visual items on each trial were different from one another (e.g., a picture of an elephant, the word "giraffe "). On half of the trials, the pictures appeared on the right and the words on the left, whereas on the other half of the trials, the pictures appeared on the left and the words on the right. We also counterbalanced the presentation of items as pictures or words across participants. The pictures were color photographs found on the Internet; picture width varied between 3 and 5 cm and height varied between 4 and 6 cm. For words, font size was 36, Times New Roman. Finally, order of the pairs of items was random across participants.

Results and Discussion

There was no main or interaction effect for the presentation of the item as a picture or word, and therefore, we excluded the counterbalancing variable from any further analysis. We dummy coded the choice of pictures versus words (0 = picture, 1 = word) for each trial. As the number of choices of the pictures and the words sum to 100%, we computed an average of the dummy variable as an overall index of preference for words versus pictures (with higher numbers indicating higher preference to use words and lower numbers indicating higher preference to use pictures). As predicted, preference for using pictures or words was influenced by message recipients' distance (see Figure 6): When communicating with a distal person, participants increasingly preferred to use words (vs. pictures), as compared with when they communicated with a proximal person (*M*s = 0.52 and 0.44, respectively), $t(19) = 2.1$, $p < .05$, $\eta_p^2 = 0.2$.

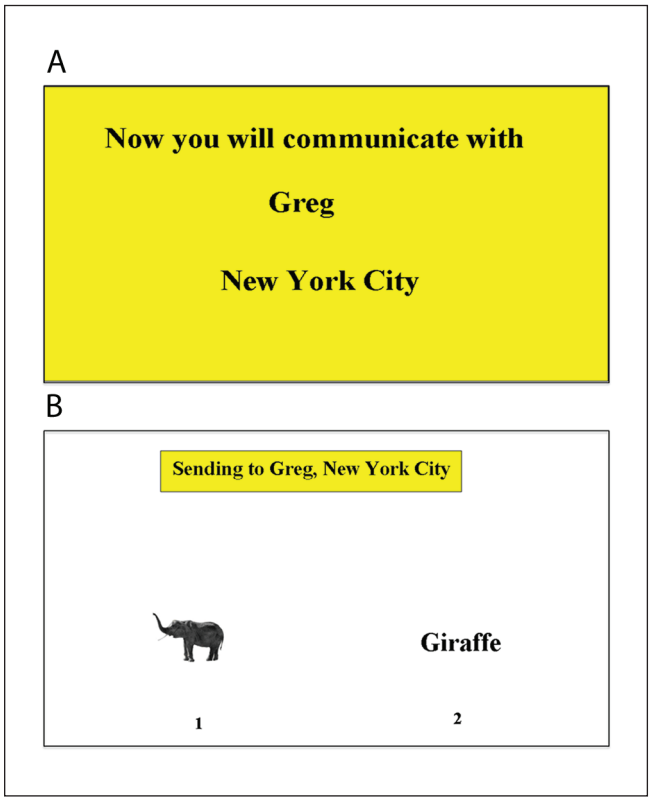

Figure 5. Examples of stimuli used in Experiment 5

It is worth pointing out that the findings of Experiments 4 and 5 demonstrate that the medium/distance relationship can actually shift the *content* of what people choose to communicate. In other words, because people preferred to use relatively more words to communicate with distant others, when the target was distal, their communication was biased toward whichever of the options was presented as a word, overriding any content preferences. In contrast, because people preferred to use relatively more pictures to communicate with proximal others, when the target was proximal, their communication was biased toward whichever of the options was presented as a picture, again overriding content preferences.

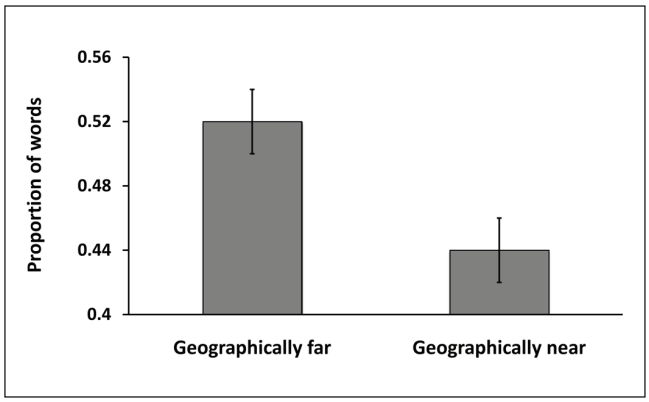

Figure 6. Proportion of items represented in words that were sent to geographically near and far recipient

Experiment 6

Experiments 1 to 5 suggest that the distance between a communicator and the recipient of her message affects the communicator's preference for medium of communication. Given this association, is it possible that a message's medium of communication (i.e., whether the message contains pictures or words) can influence whether a communicator decides to communicate the message to either a proximal versus a distal target? The purpose of Experiment 6 was to investigate this question. Participants were presented with items in either pictorial or verbal format, and were asked to choose whether to use these items to communicate with a geographically proximal versus a geographically distal other. We predicted that participants would increasingly prefer to communicate with distal (vs. proximal) others when words serve as the medium of communication, as compared with when pictures serve as the communication medium.

Method

Participants. A total of 16 New York University undergraduates (11 women) participated in the experiment in partial fulfillment of course requirement. Here we did not ask the participants for location demographic information, and therefore were not able to exclude participants based on their location.

Procedure. Participants were tested individually. After entering the experimental room, each participant was told that they are going to communicate with various people from different places in the United States. As in Experiments 4 and 5, they were asked to present themselves via the Internet to the other person, by pointing to objects that they like from a given list. There were 10 trials in the experiment. In half of the trials, the participant saw a pair of two pictures and in the other half a pair of two words; in both cases, the two items were presented side by side (see Figure 7A for an example). Pictures were color photographs found on the Internet; picture width was 3 cm and height was 2.5 cm. For words, font size was 16. The participant was asked to choose one item from the pair according to his or her personal taste, by pressing a corresponding key. Subsequently, the participant was provided with a slide that presented two people, one from a city on the East coast and the other from a city from a demographically similar city on the West coast (e.g., John [Boston, Massachusetts] and Alex [San-Francisco, California] presented as a pair of target recipients), and was asked to indicate to whom she or he would like to send the information about her or his choice of the item (see Figure 7B). Geographical location of the person (East coast, West coast) was counterbalanced across trials to appear on the left versus right side of computer screen. Order of trials was random between participants. In addition, we counterbalanced the medium of presentation of each item as a picture or a word across participants. After completing the experiment, participants were debriefed and thanked.

Results and Discussion

Figure 8 displays the results. There was no main or interaction effect for the presentation of the item as a picture or a word, and we therefore excluded the counterbalancing variable from any further analysis. Responses for each trial were coded as "1" if participants chose a distal target and "0" if they chose a proximal target. They were then averaged within medium of communication condition to create within-participant indices of the proportion of distal targets chosen for picture trials and the proportion of distal targets chosen for word trials.

As predicted, participants increasingly preferred to communicate with distal (vs. proximal) others when words served as the medium of communication, as compared with when pictures served as the communication medium (Ms = 0.65 and 0.50, respectively), $t(15) = 2.22$, $p < .05$, $\eta_p^2 = .25$. That is, the relative preference for communicating with distal others increased when communication involved words rather than pictures. This study thus presents a complement to Experiments 1 to 5, which found that people's choice of communication medium is influenced by distance of the message recipient; here, choice of message recipient was influenced by communication medium.

Experiment 7

Experiments 1 to 6 focused on senders' preferences for visual or verbal representations as a function of distance. Do these differential preferences correspond to the preferences of the receivers of the messages? Do distal (proximal) receivers find verbal (pictorial) messages more useful? Does the congruency between medium and distance influence their decision to act upon the message? These questions were the goal of Experiment 7. Specifically, participants were asked to consider a pasta recipe that was sent by a locally based chef or a chef from a distal location. In one condition, the recipe was given as a series of images, whereas in the other condition, it consisted of verbal instructions. If word-based

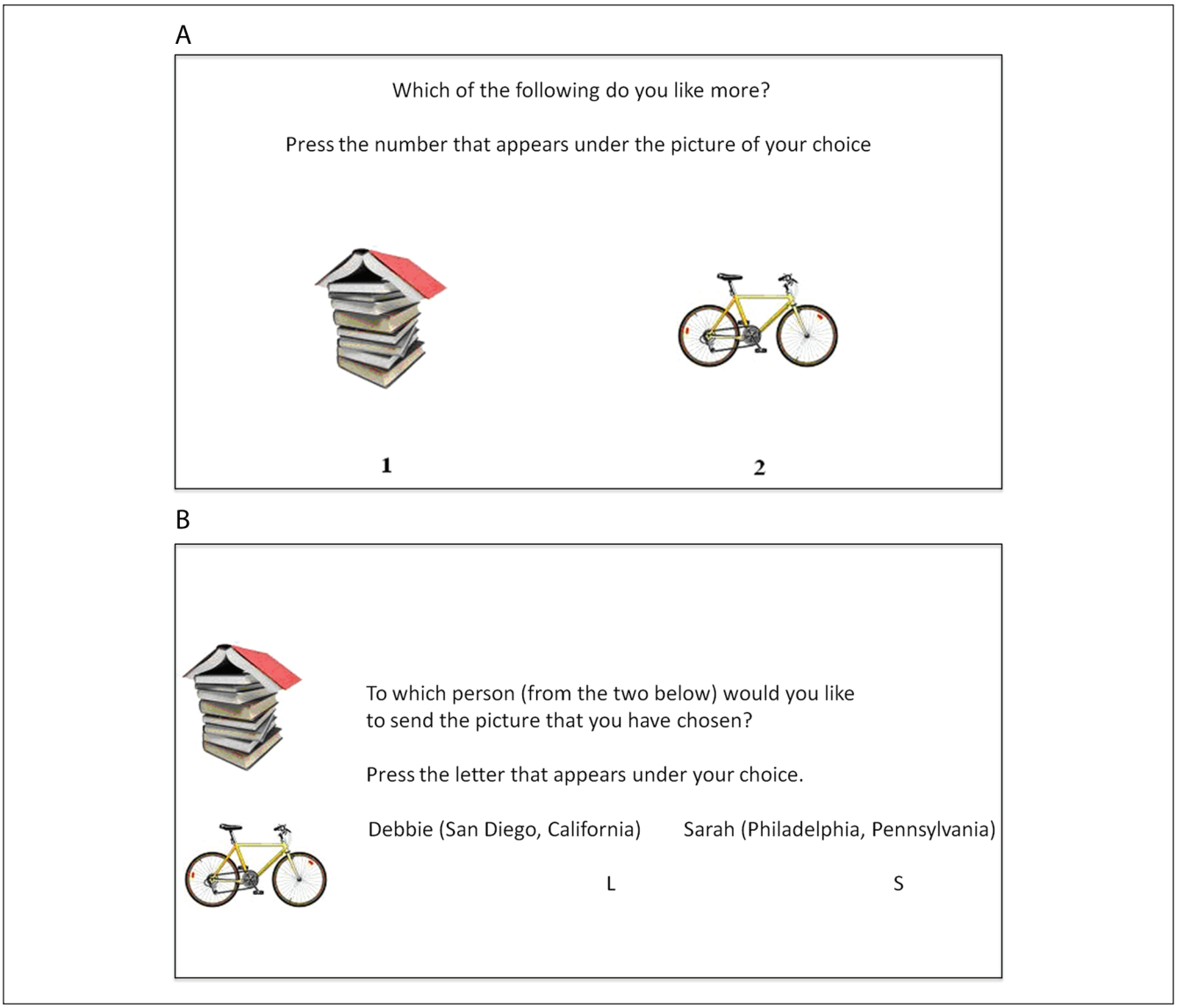

Figure 7. Examples of stimuli used in Experiment 6

communication is indeed more functional across distance (and pictures more functional with proximity), this might lead message recipients to favor verbal recipes from distant sources and visual recipes from near sources.

Method

Participants. We recruited 145 participants through social networks and the Harvard paid psychology subject pool to participate in an online survey (71% female; M_{age} = 22.15 years; SD_{age} = 6.5). The manipulation we employed entailed geographical distance that was anchored in real places (Cambridge, MA, for near, and LA, California for far); we therefore excluded subjects who reported that they were not currently living in Cambridge or nearby locations (n=61). As in many of our previous studies, we also employed attentiveness checks based on recommendations of Oppenheimer et al. (2009). Nine participants were excluded based on this attentiveness check and an additional 28 responses from subjects who responded more than once were also excluded. Finally, as participants were asked about the likelihood of trying a cooking recipe, we excluded participants who reported currently living in a dormitory, as those participants have no kitchen and hence are not likely to cook. Based on all these criteria together, 99 participants were excluded from the analysis.

Stimuli and procedure. Participants were asked to consider a pasta recipe. In one condition, they were told that the recipe was sent by a chef from Los Angeles, California (i.e., geographically far). In another condition, they were told that the chef is from Cambridge, Massachusetts (i.e., geographically near). In addition, we manipulated the medium

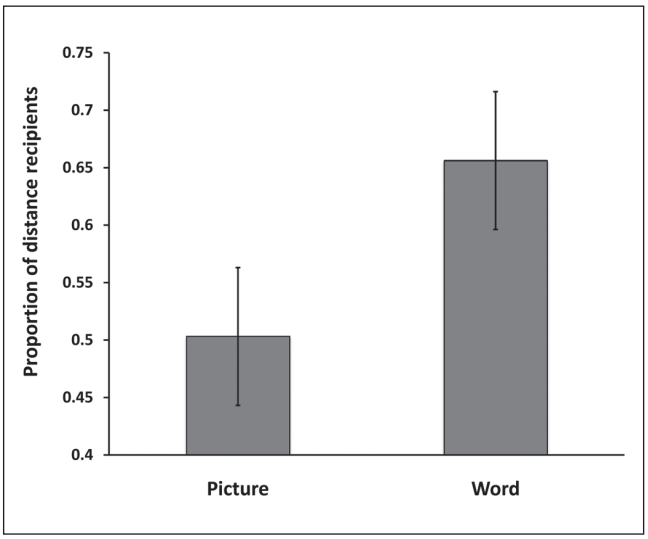

Figure 8. Proportion of distal partner that got items represented in pictures versus words

of presentation of the recipe. In one condition, the recipe was presented as a series of pictures, whereas in another condition, the recipe was a series of verbal bullet points (e.g., "dice two tomatoes"; see Figure 9). Participants were asked how much they enjoyed learning the recipe, how clear it was, and the likelihood that they will try this recipe at home sometime soon, all on 7-point scales.

Results

Figure 10 presents the results. There was an effect of distance on enjoyment from the recipe, $F(1,42) = 4.4$, $p < .05$ such that people enjoyed the recipe more if it came from a proximal chef than a distal chef (*Ms* = 4.82 and 3.92, respectively). There was also an effect for distance on clarity, such that a recipe that was sent by a local chef was perceived as more clear than a recipe from a distal chef (*M*s = 5.6 and 4.67, respectively), $F(1, 43) = 5.8$, $p < .05$. There were no other effects on clarity and enjoyment. After controlling for enjoyment and clarity, and as predicted, there was an interaction effect of medium and distance on the likelihood of trying the recipe, $F(1, 40) = 5.5$, $p < .05$ $\tau^2 = .12$. Thus, when the recipe was presented visually, participants were more likely to try the recipe if the chef was local rather than distal (*Ms* = 3.4 and 2, respectively), $F(1, 40) = 4.3$, $p < .05$. In contrast, when the recipe was presented verbally, there was a trend to try more the recipe if the chef was distal rather than proximal (*Ms* = 2.55 and 2.18, respectively), $F(1, 40) = 1.2$, $p = .26$.

General Discussion

The present research examines the effect of psychological distance and medium of communication on interpersonal communication. The results of six experiments provide converging evidence for the idea that for various distance dimensions, people increasingly prefer pictures for communication with those who are proximal, whereas words are increasingly preferred for communication with distal others. Furthermore, we found that the congruency between medium and distance has a facilitating impact on the recipient's behavior, and thus suggest that representational choices made by the sender are functional. These findings provide strong converging evidence to the medium/distance hypothesis.

Alternative Explanations

We argue that pictures comprise a lower level of construal than do words, and that pictures are therefore more relevant for proximal communication and words more relevant for distal communication. However, one might argue that selecting a picture takes more effort than describing it in words, and that people are more lazy in communicating with distant others and therefore turn to the less effortful, verbal option. This is an unlikely possibility for a number of reasons. First, because pictures simply present 'what is' and words involve capturing and translating 'what is' into language, it is possible to argue that words are actually more taxing a communication mode than pictures. Second, in the current studies, participants were not required to generate either pictures *or* words; they were asked to select one of these media as the primary medium of communication (Studies 2-3) or to communicate information presented in one or the other form (Studies 1, 4, and 5). Given the low level of effort required across condition, this does not seem a strong alternative explanation of the results.

A second alternative is whether there are social norms not to reveal too much to distant others, something that pictures might do. Although it is indeed likely that people do not want to divulge too much personal information to distant others (e.g., Fitzgerald, 1963; Laurenceau, Feldman Barrett, & Pietromonaco, 1998; Reis & Shaver, 1988), we 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 in the studies. For example, in Study 2, both cards that participants considered would contain the same picture (and therefore the same degree of personal information would be transmitted in each case); the decision participants made was only a matter of the size that picture would take up within the entire invitation. Furthermore, self-disclosure norms are not a strong alternative explanation in our consistent findings of a distance/medium relationship across different distance dimensions: Although self-disclosure issues are relevant to some of these (e.g., social distance), they are decidedly less relevant to others (e.g., temporal distance).

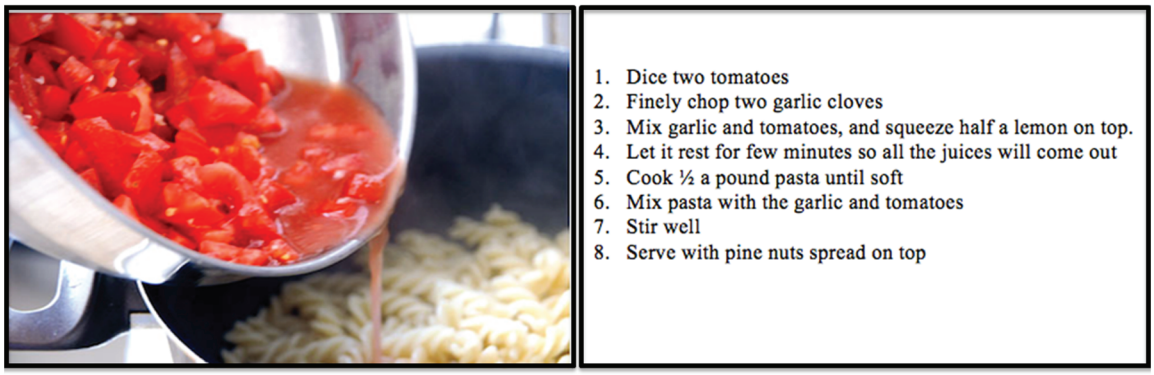

Figure 9. Examples of stimuli used in Experiment 7
Note: On the left: one (out of a series) of the pictures that consisted the visual pasta recipe; on the right: the verbal recipe.

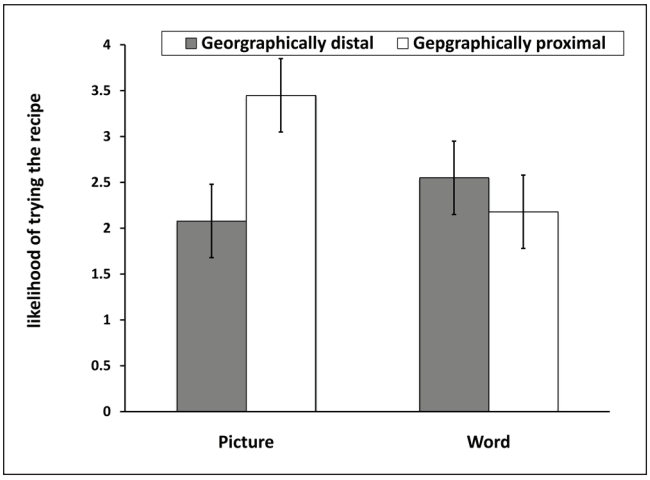

Figure 10. Likelihood of trying a pasta recipe that is presented visually or verbally, as a function of the geographical location of the chef

Theoretical Integration and Implications

The current results are broadly consistent with the communication literature, which suggests that people use more signs (e.g., facial expressions, which provide information about the person's internal emotional state) when communicating with proximal others, and symbols (e.g., textual emails) when communicating with distal others (e.g., Baym et al., 2004; Derks, Bos, & von Grumbkow, 2007). The current research makes several contributions to this literature. First, it demonstrates causal relationships between medium and distance, and thus goes beyond the previous correlational findings. Furthermore, it demonstrates that the causal relationship between medium and distance is bidirectional. Thus, not only do people elect different media as a function of distance, as the past literature suggests, but they also elect communication partners that are proximal or distal as a function of the mean of communication that is accessible. Third, by holding the content of communication constant across medium conditions and distance conditions, the current studies demonstrate that it is not a difference in content of communication that accounts for the differential preferences of medium as a function of distance. Finally, the current research provides a systematic test of the relationship between distance and the use of pictorial versus verbal communication by examining this relationship across several different distance dimensions.

From a theoretical perspective, the present results are consistent with the rationale underlying construal level theory, which states that people increasingly use more abstract representations to represent targets that are psychologically distant (e.g., Trope & Liberman, 2010). The current study extends this rationale to an interpersonal context, showing that when communicating with others, people take into account the *other person's* distance and then select a medium of communication accordingly. Specifically, our results implicitly suggest that people have a sense that for a distant recipient, the manifestation and meaning of incidental details may change and that they should therefore convey the central and defining aspects of the object.

The idea that people take into account other's perspective raises the question: Are people aware of the functional relationships between medium and distance? We ran two simple experiments to gain more insight into this question. In the first experiment, participants were presented with a colored picture of an apple and the word APPLE, and were asked which one of the following representations gives more concrete details about the object. In all, 15 out of 15 participants picked the picture as more concrete. In the next experiment, participants were asked whether they think it would be more useful to communicate with someone who lives in a far place or belongs to a different culture (vs. a near place and belongs to the same culture), using more particular versus general information. It was found that people

considered general information as more appropriate for communication with distal others, and more particular information with proximal others, $t(44) = 2.4$, $p < .05$. Together, these two experiments provide initial support to the idea that people might be conscious to the suitability of medium of representation for communication with proximal and distal others. Note, however, that this finding does not mean that people are necessarily aware of the functional relationship all the time, or even that this functional relationship exists all the time. Arguably, the functional relationship between medium and distance is overgeneralized, something that our experiments demonstrate well. Further research is needed to map the exact causal role of awareness in affecting the relationship between medium and distance in the context of communication.

The present analysis is also consistent with research conducted within the framework of perspective-taking models of communication (Fussell & Krauss, 1989; Kogan & Jordan, 1989; Krauss & Fussell, 1996). These models focus on the shared context that communicators need to create, to produce and understand messages, and which is constructed through a process of reciprocal perspective taking. Indeed, in line with the idea that abstract decontextualized representations are more suitable for communication with distal others, whereas concrete, contextualized representation are more suitable for communication with proximal others, Fussell and Krauss (1989) found that self–other distance affected the way messages were construed. Specifically, messages formulated for the person's own use were idiosyncratic and contextualized, and characterized stimuli in terms of the objects they resembled (X is like . . .). In contrast, messages designed for others were characterized based on the stimulus's generic geometric elements, which are not specific to the person's experiences and more abstract in nature. The current studies suggest that this self–other effect is a special case of psychologically proximal versus psychologically distal targets, respectively, and that different distance dimensions have similar effects on communication preferences.

The present framework is also relevant to the mutual development of language and relational scope in children. Newborns communicate using signs, such as facial expressions, crying, and laughing. During the prelinguistic period, the newborn's interpersonal interactions are usually restricted to people who are close to the child—in terms of space, time, and social connections. As the child grows older, she or he acquires linguistic skills, and, over time, these become increasingly relevant to her or his interpersonal interactions. Simultaneously, the child's social circles grows significantly and her or his interactions are not confined anymore to people who are "here and now," but occur with distal others. Although there could be many reasons for the simultaneous development of language and social networks (e.g., Astington & Jenkins, 1999; Nelson, 1981; Phillips, McCartney, & Scarr, 1987), it is intriguing to consider the connection between language and distance illustrated by the current studies in terms of their potential developmental roots. During development, language's emergence allows a child to communicate with a wider range of people than she or he previously could; the ability to form an unambiguous message such as "Can I play with that toy?" allows the developing child to communicate efficiently with strangers with whom she or he does not have any shared history and to whom nonverbal communications might be ambiguous. It also allows her or him to communicate with those not in the "here and now," to leave a message for someone to read at a later time point or when in a different location. Furthermore, the child's expanding world, which increasingly includes more distant others, creates a need to develop increased linguistic skills so as to communicate in a medium that does not heavily rely on shared experience and that can be used to summarize the gist of a thought, feeling, or request. Thus, it is possible that linguistic development and expanding relationships are interwoven, mutually reinforcing processes that are linked through the developmental process. This possibility awaits further study.

Another intriguing possibility is a relation between the current findings and the general notion of embodied cognition (Barsalou, 1999; Winkielman, Niedenthal, & Oberman, 2008). The current findings suggest that while words are preferred when communicating with a distant others, pictures are preferred when communicating with a proximal others. Given that pictures are grounded in physicality to a greater extent than are words (in that they are physically accurate representations of items), this pattern may be reflective of a larger one in which proximity leads to representations that are increasingly grounded in physicality. Such a pattern would be further consistent with the idea that cognition in general is increasingly disembodied when it concerns distant objects. This might suggest, for example, that cognitions related to near events or proximal others resemble the kind of analogical representation identified by embodied cognition researchers, but that cognitions related to distant events or others more closely relate to amodal symbolic representations. For example, a representation of grabbing a coffee with a friend in the distant future may refer more to semantic knowledge about the friend and coffee shops in general and include less detail related to perceptual properties, such as the tone of her voice or the smell of the coffee. Consistent with this ideas, recent research has found that contextual bodily states tend to influence responses to psychologically near objects, but not to psychologically distant ones (Maglio & Trope, 2012), suggesting that distance may guide the extent to which people rely on embodied representations grounded in their current state. Thus, whereas proximity cues people to use visual, imagery-based, embodied representations, distance cues the use of disembodied, amodal, linguistic representations.

In a related point, the idea that proximal communication is more physically grounded than distal communication has implications beyond the distinctions between pictures and

words. For example, research distinguishes communication in terms of whether it occurs face to face, via telephone, or is computer mediated. While in the current study we made a point to keep such mode of communication constant, if proximal communication is more physically grounded, people may prefer such communication to be face to face; indeed, they may even be better at communicating with proximal others through a physically grounded channel.

It is intriguing to speculate regarding the main effect of medium in Experiments 1 to 5. Notably, there was no consistent pattern for this main effect. Thus, pictures were, overall, preferred over words in Experiments 2, 4, and 5. In contrast, in Experiments 1 and 3, there was an overall preference for words versus pictures. The fact that we obtained main effects for medium (regardless of the main effect's direction) suggests that distance may modify preference for medium, but it is not its only predictor; this may be why we rarely get a reverse effect between pictures and words for both near and far conditions. The specific direction of the main effect is also of interest. Although it is easier to account for the preference of words over pictures in Experiments 1 and 3, considering the dominance of language in our modern culture, the general preference for pictures over words in Studies 2, 4, and 5 is somewhat surprising. However, this result might reflect the perceived relevance of pictures to the particular contexts we used, such as the party invitation context used in Experiment 2, as well as the attractiveness of the pictures and the ease of using the pictures in these experiments. That is, as the participants were not required to draw or otherwise create the pictures in these studies (which might be somewhat challenging and time-consuming), it was easier to use the pictures in these studies than it might be in everyday life. If more effort or a more complicated message were required, we might expect that words would be the preferred medium of communication rather than pictures. Importantly, however, regardless of whether the overall preference was for pictures (as in Experiments 2, 4, and 5) or for words (as in Experiments 1 and 3), distance has a consistent moderating effect on picture versus word preference.

In a related point, one limitation of the current studies is the constrained stimuli that we used. Although we used such stripped-down stimuli to tightly control the experiments and isolate variables of interest, this leaves open the question of how people would choose to communicate when given the opportunity to communicate a meaningful message using richer stimuli (e.g., rich phrases and rich photographs) or a combination of both text and pictures in a noncompetitive way. While studies examining this might be less controlled and more difficult to design, future research should nevertheless tackle this problem so as to complete the picture drawn in the current study.

It is also important to note that the differences we discuss between different media of communication do not preclude differences within each of these media. Thus, we would expect language used to communicate with distal others to be more abstract than language used to communicate with proximal others. Indeed, Stephan, Liberman, and Trope (2010) showed that polite language is more abstract and is indeed used more often when communicating with distal rather than proximal people. Furthermore, we would expect pictures used in distal communication to be more abstract in nature than those used for communicating with proximal recipients (e.g., schematic, outline drawings vs. representational colored photographs). Future studies exploring these possibilities would further our understanding of the differences in communication styles across distance highlighted by the current research.

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Notes

1. The idea that people can choose between different medium applies only in cases in which there is a shared language between the communicators. When no shared language exists, such as the case in airports, then visual signs that communicate a message without the need for language would be preferred.
2. Exceptions include abstract art.
3. Exceptions include onomatopoeia.

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