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Report

Differential information use for near and distant decisions

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ABSTRACT

Whether choosing a cell phone, a senator, or a kitchen appliance, consumers today quickly find themselves awash in information from commercials, magazines, and websites. Whereas some of this information is broad, decontextualized, and abstracted across multiple individuals and instances, other information is more closely tied to a single experience within one specific context. The present research asks: under what circumstances do people rely on abstracted averages, and when are they swayed by another individual's particular experience? Across three studies, we show that temporal distance increases the relative weight placed on aggregate vs. individualized information when participants are asked to choose between two sleeping pills, migraine medications, or kitchen appliances, and that this process impacts not only evaluation but also willingness to pay and choice. Potential implications for evaluation, decision-making, and base-rate utilization are discussed.

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Introduction

In today's increasingly digital world, we are bombarded with an overabundance of information about an ever-growing number of potential decisions. Whereas some of this information is broad, decontextualized, and abstracted across multiple individuals and instances, other information is more closely tied to a single experience within one specific context. A patient, for example, might consider both aggregate information about a drug's effectiveness across many clinical trials, as well as individualized information such as a single person's particular experience with the drug. The present research asks: what determines the relative weight that decision-makers place on these different types of information?

Recent research suggests that psychological distance (e.g., distance in time or space) regulates the evaluative system to draw on context-dependent vs. invariant sources of information (Ledgerwood & Trope, *in press*; Ledgerwood, Trope, & Chaiken, *in press*).¹ For instance, when contemplating a policy that will commence in the near vs. distant future, participants' attitudes and voting decisions tend to be more susceptible to incidental social influence (which is context-specific) and less influenced by their own ideological values (which are broad and invariant). Construal

level theory (Liberman & Trope, 2008; Wakslak, Trope, Liberman, & Alony, 2006) suggests that this is because psychological distance influences mental representation. When an object is psychologically distant, we focus on its essential, abstract, and stable characteristics; with proximity, our representations become increasingly detailed and concrete, incorporating secondary object characteristics.

Indeed, past research on construal level has primarily focused on how distance changes the weight placed on central vs. peripheral features of an object itself (see e.g., Trope & Liberman, 2003, for a review). In the present research, however, we go beyond this to suggest that distance should influence the use of global information that aggregates across multiple encounters with an attitude object vs. local information about a single experience with that object. Specifically, we propose that because aggregate information is broad and generalized across contexts, whereas individuated information is context-specific, distance should change the weight people place on these two types of information when evaluating and choosing between novel attitude objects. Individualized information should be relatively influential for psychologically close decisions (e.g., a choice for next week), whereas aggregate or statistical information should be relatively influential for psychologically distant decisions (e.g., a choice for next year).

Other perspectives make different predictions. For example, insofar as aggregate information resembles base-rate information, research on base-rate neglect would suggest that individuals will underutilize base-rates, regardless of distance (Bar-Hillel, 1980; Kahneman & Tversky, 1973; Nisbett & Borgida, 1975). Similarly, despite considerable evidence documenting that statistical, or actuarial, prediction is more accurate than clinical prediction, even scientifically-trained individuals often rely on their individualized clinical experiences rather than aggregated statistical evidence

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¹ Such a relationship might develop because it tends to be functional: in the here-and-now, individuals typically need evaluative guides for action that incorporate unique details of the current context. However, when planning behavior in the distant future or making decisions about a faraway location, it is useful to abstract across the particularities of any one experience to extract evaluation-relevant information that is consistent across time and contexts see Ledgerwood, Trope, & Liberman (*in press*).

(see e.g., Dawes, Faust, & Meehl, 1989; Grove & Meehl, 1996; Swets, Dawes, & Monahan, 2000), again suggesting a general tendency to underutilize aggregated information. Moreover, one could argue that individualized information is sometimes (but in our studies, not always) more vivid than statistical information, and psychologists have long argued that vivid information should be more persuasive (e.g., Nisbett & Ross, 1980; but see Taylor & Thompson, 1982). Researchers have also suggested that specific cases are often more emotionally involving than abstract statistics (Small & Loewenstein, 2003). Again, these perspectives would predict a main effect of information type, such that individualized (and presumably more vivid or involving) information would be more influential than aggregate information.

Here, we test our unique interactive prediction that distance changes the relative weight placed on aggregate vs. individualized information. Participants in each study imagined choosing between two products – one favored by aggregate information, the other by individualized information – in the distant or near future, and then evaluated each product.

Study 1a

Method

Sixty-six undergraduates (47 female, 13 male, and 6 unreported) at New York University imagined a scenario occurring either 1 day from today (near future) or 1 year from today (distant future). The scenario suggested they had been having trouble sleeping, and were trying to decide which of two relatively new sleeping pills to ask their doctor to prescribe.

Participants then saw both aggregate and individualized information about each drug. Drug X was clearly favored by aggregate information: research showed it was effective for 85% of people who tried it, compared to a 70% effectiveness rate for Drug Y. Drug Y, in contrast, was clearly favored by individualized information: a casual acquaintance who tried both medications said Drug Y worked for her, whereas Drug X had not. Information order (aggregate vs. individualized first) and the drug names (X vs. Y) were counterbalanced across conditions and had no effects.

Next, participants rated how interested, happy, and optimistic they would be about trying each drug, from 1 (not at all) to 7 (extremely). These were averaged to form evaluation scores for the aggregate-favored ($\alpha = .91$) and individual-favored ($\alpha = .92$) drugs.

Results

A 2 (distance: near vs. distant future) \times 2 (information type: favored by aggregate vs. individual) mixed-design ANOVA yielded a main effect of information type, $F(1, 64) = 7.31, p < .01, \eta^2 = .10$: people showed a general preference for the drug that was favored by individualized (vs. aggregate) information. This was qualified by the expected two-way interaction between distance and information type, $F(1, 64) = 3.97, p = .05, \eta^2 = .06$, confirming our central prediction that distance would modify the relative weight accorded to aggregate vs. individualized information (see Fig. 1). Follow-up t -tests suggested that in this study, the interaction was driven by a decrease in the evaluation of the individual-favored drug in the distant (vs. near) future condition, $t(64) = 2.09, p < .05$; evaluation of the statistically-favored drug did not change, $t < 1$.

Study 1b

Our next study explored the generalizability of this effect beyond the specific product, population, and statistical details used in Study 1a.

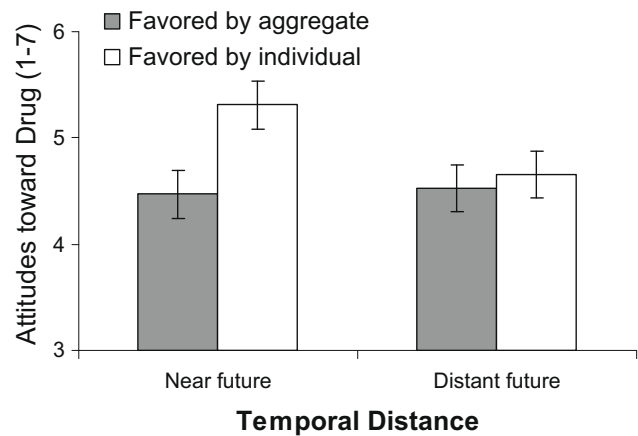


Fig. 1. Attitudes toward the sleeping pill favored by aggregate information and the sleeping pill favored by individualized information as a function of temporal distance condition (Study 1a). Error bars indicate one standard error above and below the mean.

Method

Forty-eight UC Davis undergraduates (38 female, 10 male) imagined a scenario taking place either next week (near future) or next year (distant future). In the scenario, they were suffering from migraine headaches and were choosing between two medications. As in Study 1a, one medication was favored by aggregate information but disfavored by individualized information, whereas the other was favored by individualized and disfavored by aggregate information.² Participants then rated how interested, happy, and optimistic they would be about trying each drug ($\alpha = .90$ and $.88$ for the aggregate-favored and individual-favored drugs, respectively).

Results

A 2 (temporal distance) \times 2 (information type) mixed-design ANOVA yielded only the predicted two-way interaction, $F(1, 46) = 4.23, p < .05, \eta^2 = .08$. Replicating Study 1a, distance moderated the impact of aggregate vs. individualized information on evaluations of the two medications (see Fig. 2). Perhaps because of the larger disparity between the effectiveness rates for the two drugs in this study (see Footnote 2), there seemed to be a slight trend such that temporal distance increased evaluations of the drug favored by aggregate information, *ns*. As in Study 1a, however, the interaction was primarily driven by the decreased evaluation of the individual-favored drug in the distant (vs. near) future condition, $t(46) = 1.98, p = .05$.

Study 2

Thus far, these results support our central hypothesis that distance moderates the weight placed on aggregate vs. individualized information. However, given that the interactions obtained in Studies 1a and b were primarily driven by a decrease in the weight placed on individualized information for temporally distant decisions, we do not yet know whether distance can also increase the

² To explore the potential impact of a wider disparity in effectiveness rates for the two drugs we increased the disparity from 70% vs. 85% (in Study 1a) to either 65% vs. 85% or 60% vs. 90% in this study. Disparity size did not moderate our results; the reported analyses therefore collapse across version.

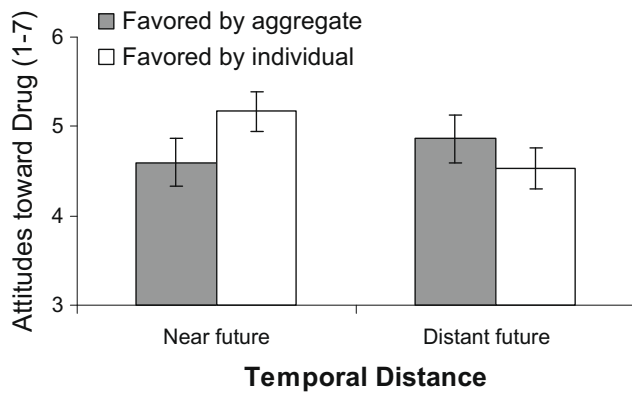


Fig. 2. Attitudes toward the migraine medication favored by aggregate information and the medication favored by individualized information as a function of temporal distance condition (Study 1b). Error bars indicate one standard error above and below the mean.

weight placed on aggregate information. This prediction is important both to show the full impact of temporal distance on information use, and also to rule out a potential alternative explanation for our results: namely, that distance leads to discounting (Green & Myerson, 2004) and thus decreases the weight placed on any information encountered.³

In Studies 1a and b, participants seemed to place relatively little weight on statistical evidence, focusing instead on the individualized information provided. Thus, to test our more specific prediction, we needed to identify a domain in which people would generally trust and utilize aggregated data. According to research on base-rate neglect, one reason why individuals sometimes fail to use aggregated base-rate information is a lack of familiarity with the context: for instance, Gigerenzer, Hell, and Blank (1988) showed that people are more likely to utilize base-rate information for a familiar problem (e.g., predicting whether a soccer team will win the current game based on their performance thus far this season) than for an unfamiliar problem (e.g., predicting the profession of a person in the classic engineer–lawyer paradigm). For Study 2, we therefore chose a situation involving aggregate information that our participants were likely to have experienced and used in the past: a typical online shopping setting in which consumers often encounter and consider average customer reviews as well as single reviews written by particular customers. We expected that in this setting, participants would generally trust and use the average review more than a single review. However, as before, we expected that temporal distance would increase the relative weight placed on aggregate vs. individualized evidence.

Method

Fifty-nine UC Davis undergraduates (48 female, 11 male) imagined a scenario taking place either 1 week (near future) or 1 year (distant future) from today, in which they needed to purchase a toaster on Amazon.com. They saw two options: Toaster A (favored by aggregate information) had an average rating of 4.5 out of 5

³ Of course, a straightforward discounting explanation should predict a main effect of temporal distance on preferences for the aggregate- and individual-favored drugs, which we did not find. Still, one could plausibly argue that perhaps participants were never very swayed by the aggregate information provided in the first place, and that if they had been, distance might have decreased its impact rather than increasing it. We therefore thought it important to test whether distance could actually increase preferences for an object favored by aggregate information.

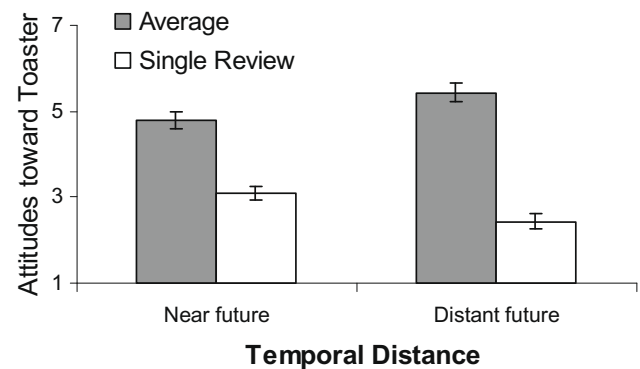


Fig. 3. Attitudes toward the toaster favored by aggregate information and the toaster favored by individualized information as a function of temporal distance condition (Study 2). Error bars indicate one standard error above and below the mean.

stars across 204 customer reviews, although the first review stated that the “toaster does not work very well and is not recommended.” Toaster B (favored by individualized information) had an average rating of only 2.5 of 5 stars, but the first review said the “toaster works as advertised and is a wonderful addition to the kitchen.” Pretesting confirmed that the individualized information in this study (a pallid report from an individual customer) was not more vivid than the aggregate information (number of stars): if anything, pilot participants showed a nonsignificant tendency to rate the aggregate (vs. individualized) descriptions used as slightly more vivid and easy to picture, $t(39) = 1.24$, $p = .22$.⁴

Next, participants rated how interested, likely, confident, and happy they would be about buying each toaster and how they generally felt about each toaster from 1 (Not at All/Very Negative) to 7 (Extremely/Very Positive). Responses were averaged to form evaluation scores for the aggregate-favored ($\alpha = .93$) and individual-favored ($\alpha = .89$) toasters. Participants also indicated how much they would be willing to pay for each toaster. Finally, they chose which toaster they would buy, assuming they were equally priced.⁵

Results

Evaluation

A 2 (temporal distance) \times 2 (information type) mixed-design ANOVA confirmed the anticipated main effect of information type, $F(1, 57) = 113.16$, $p < .001$, $\eta^2 = .67$. Clearly, we were successful in finding a setting in which students would attend to and utilize aggregate information: participants preferred the toaster with the favorable (vs. unfavorable) customer average. More importantly, a significant interaction again emerged between distance and information type, $F(1, 57) = 9.35$, $p < .01$, $\eta^2 = .14$. As in the previous studies, distance moderated the weight placed on aggregate vs. individualized information (Fig. 3). Just as before, participants

⁴ Moreover, participants later rated visual information as significantly more vivid and easy to picture than non-visual information, $t(39) = 3.42$, $p = .001$, confirming that our measure was sensitive enough to detect differences when they did exist.

⁵ Previous research has established that construal or distance manipulations like those used here do not change how effortfully people process information (Fujita, Eyal, Chaiken, Trope, & Liberman, 2008; Ledgerwood et al., in press). Still, to confirm that our distance manipulation did not inadvertently influence extent of systematic processing, we included measures of involvement (importance, interest, perceived personal consequences of decision; $\alpha = .90$) and self-reported elaboration (extent of thinking, attention paid; $\alpha = .86$) in this study (see Briñol & Petty, 2003; Darke & Chaiken, 2005, for items). Distance had no effect on either involvement or elaboration, $t_s < 1$.

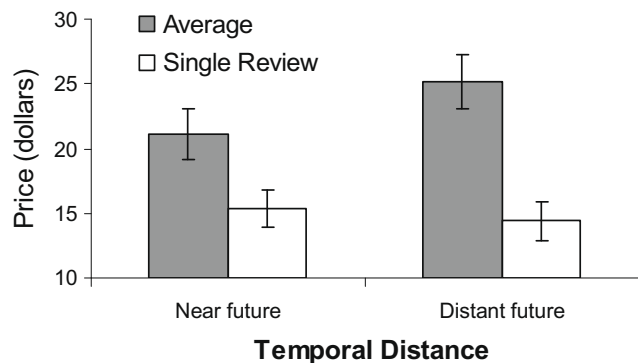


Fig. 4. Willingness to pay for the toaster favored by aggregate information and the toaster favored by individualized information as a function of temporal distance condition (Study 2). Error bars indicate one standard error above and below the mean.

in the distant (vs. near) future condition evaluated the individually-favored object more negatively, $t(57) = 2.88, p < .01$. This time, however, those in the distant (vs. near) future condition also evaluated the statistically-favored object more positively, $t(57) = 2.20, p < .05$. Thus, temporal distance both increased the weight placed on aggregate information and decreased the weight placed on individualized information in evaluating the two toasters.

Willingness to pay

A similar two-way interaction emerged for participants' willingness to pay for each toaster, $F(1, 56) = 6.58, p = .01, \eta^2 = .11$ (Fig. 4), confirming that our unique interactive prediction about the moderating impact of distance on aggregate vs. individualized information extends to perceived monetary value. In the near future, participants were willing to pay an average of \$5.73 more for the toaster favored by the customer average (vs. the single review) – a relatively small price difference. In the distant future, however, this price difference almost doubled, widening to \$10.79. Follow-up tests suggested this pattern may have been driven more by an effect of distance on willingness to pay for the statistically-favored toaster, $t(57) = 1.47, p = .14$, whereas willingness to pay for the individually-favored toaster did not differ significantly by condition, $t < 1$.

Choice

A chi-square test was conducted to assess whether temporal distance increased the likelihood of choosing the toaster favored by statistical (vs. individualized) information. As predicted, participants were more likely to choose the statistically-favored toaster in the distant vs. near future, $\chi^2(1, 59) = 5.64, p < .05$.

Discussion

When confronted with a mixture of aggregate and individualized information, which will people use when forming evaluations and making decisions? Across three studies, our results suggest that the relative weight accorded to aggregate and individualized evidence varies as a function of distance, with greater relative weight placed on aggregate vs. individualized information in psychologically distal (vs. proximal) situations. This complements recent evidence suggesting that distant objects are increasingly represented in general and global (vs. specific and local) terms (Liberman & Förster, in press), and that this can have important implications for evaluative responding (Ledgerwood et al., in press). It also moves beyond previous work (e.g., Fujita et al., 2008) to suggest that distance influences not only the weight

placed on abstract vs. concrete qualities of an object, but also on aggregated vs. individualized social influences.⁶

Importantly, these results join others in illustrating a critical caveat to the general notion that temporal distance can lead to discounting and decreased information processing (e.g., Frederick, Loewenstein, & O'Donoghue, 2002; Green & Myerson, 2004; Petty & Cacioppo, 1984; see also Ledgerwood et al., in press; Trope & Liberman, 2003). For instance, other research on distance and abstraction suggests that individuals do place less weight on information that relates to the secondary and peripheral features of a distant-future (vs. near-future) attitude object, but they also place greater weight on information that relates to the central features of the distant-future object (e.g., Fujita et al., 2008; Trope & Liberman, 2000). Likewise, the results of Study 2 suggest that although individuals "discount" individualized information in the distant (vs. near) future, they actually rely more on aggregate information – which in fact represents a greater total quantity of information than does a single experience.

Although we focused here on temporal distance, a sizeable literature now shows that different distance dimensions can similarly impact subjective mental representation (see Liberman & Trope, 2008; Trope & Liberman, in press, for reviews). Thus, we would predict that individuals should increasingly consider aggregate (vs. individualized) information when a decision will occur in a distant (vs. near) location, when it is hypothetical (vs. certain), or when it affects a socially distant (vs. close) other.

One interesting question concerns the relation between the current findings and the literature on base-rates. The current studies and classic base-rate studies juxtapose somewhat different types of individualized and aggregate information. Research on base-rates typically contrasts the use of specific information about one case with the use of base-rate information across an entire population of cases, whereas the current studies focus on one particular object (e.g., a specific toaster), and provide information about one person's opinion vs. many people's aggregated opinions about that specific object. We suspect, however, that our findings reflect a broader tendency for distance to shift focus to aggregate-level information over individual-level information (a tendency not limited to the particular type of individual vs. aggregate contrast that we examine here). If so, this suggests that base-rate neglect might be less common under conditions that foster more abstract construals. Indeed, scholars studying base-rate usage have proposed a number of different conditions that increase the likelihood that people utilize this particular form of aggregate information, including distance to the target (e.g.,

⁶ One could argue that the results of Study 2 might also be explained by an impact of distance on the weighting of abstract and central (vs. concrete and peripheral) features of the attitude object. To do so, one would have to assume that participants perceived the aggregate and individualized information as providing information about the central features of the toaster (e.g., its quality). If so, then distance could lead individuals to place greater weight on the central features, and to therefore attend more to information that they perceive as providing more reliable evidence about them. In Study 2, our main effect suggests that participants did generally think the aggregate information was more reliable, and thus this alternative account could explain the greater weight placed on aggregate information in the distant (vs. near) future conditions (we thank an anonymous reviewer for this astute observation). However, one important strength of this research is that we find the same moderating impact of distance in Study 1, where participants generally trusted individualized information more than aggregate information, and in Study 2, where participants generally trusted aggregate information more than individualized information. Thus, given the main effect in Study 1a showing that participants generally placed greater weight on an acquaintance's opinion (vs. aggregated scientific evidence), it is difficult to argue that these participants somehow perceived the aggregate information as more reliable. Likewise, research on the base-rate fallacy and clinical vs. actuarial judgment converge in suggesting that people often trust individualized information more than aggregate base-rates or statistics (see e.g., Dawes et al., 1989; Kahneman & Tversky, 1973; Nisbett & Borgida, 1975), indicating that it may in fact be relatively rare for individuals to perceive aggregate information as more reliable.

judging a hypothetical vs. familiar person), considering a bracketed set of repeatable events (rather than one event in isolation), and focusing on groups rather than individuals (Bar-Hillel, 1990; Klar, Medding, & Sarel, 1996; Reeves & Lockhart, 1993). Given research suggesting that these various conditions are each related to degree of abstraction (Fujita, 2008; Fujita & Roberts, 2009; Liviatan, Trope, & Liberman, 2008) the present findings suggest the intriguing possibility that construal level might provide a common mechanism by which diverse variables can influence the use of base-rates.

Finally, although the results obtained in these studies were robust enough to affect not only general evaluations but also willingness to pay and intentions about which object to choose, future research should confirm that these effects extend to real and consequential actions. Such studies could also explore whether these results extend beyond consumer behavior to other domains, including voting, physician decision-making, and even policy-making as legislators weigh scientific evidence against constituents' personal anecdotes.

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