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The Silver-Lining of Distrust: The Reduction of Information Distortion through Cognitive Consistency

Sophie Chaxel
Virginia Tech University
Email: schaxel@vt.edu

Yegyu Han
Virginia Tech University
Email: yegyuhan@vt.edu

ABSTRACT

Confirmatory information processing, or information distortion, is a ubiquitous bias. This work shows that distrust reduces distortion by disrupting its known driver: the motivation to maintain cognitive consistency within belief systems. Distrust drives negative hypothesis testing, thereby leading to reduced levels of consistency and less information distortion.

KEYWORDS: Information distortion, cognitive consistency, distrust, biases

INTRODUCTION

Trust is commonly believed to be a critical component of initiating and maintaining social relationships. Trust has been shown to encourage cooperation (Balliet and Van Lange 2013, Deutsch 1960, McKnight et al. 1998), to lead to greater relationship satisfaction (Wieselquist et al. 1999, Campbell et al. 2005, Righetti and Finkenauer 2011), and to help organizations thrive (Zaheer et al. 1998, Dirks and Ferrin 2001, McEvily et al. 2003). The present paper focuses on the silver lining to the presence of distrust s: less information distortion.

LITERATURE REVIEW

A Ubiquitous Bias Driven by Cognitive Consistency

Confirmatory information processing is a preference-supporting bias in which the evaluation of new information is biased in favor of one's prior beliefs. This bias is commonly labeled "information distortion" (ID) because new information is distorted in favor of the individual's emerging preference (for a review, see Russo 2014). ID has been studied in several choice settings, ranging from the presence of a single option (Bond et al. 2007), to two options (e.g., Meloy and Russo 2004; Russo et al. 1996), and even to multiple options (Blanchard et al. 2014). In the presence of a single option, the task involves a decision process in which individuals decide whether to invest in an endeavor, such as whether buying a product. In the presence of two or more options, the task involves a choice among several options such as two vacation packages (Russo 2014). The present research focuses on decision contexts with a single option, that is, a go/no go decision such as whether buying a product (Bond et al. 2007).

Nearly two decades of research on ID have shown that confirmatory information processing occurs across target categories (e.g., Russo et al. 1998), across populations (Russo et al. 2000, Carlson and Russo 2001, Kostopoulou et al. 2012) and across domains (Russo 2014, Russo et al. 2000, Russo and Chaxel 2010). For instance, Russo and Chaxel (2010) have shown that information distortion is the process by which an effective advertising influences choice.

Two reasons have been advanced to explain the ubiquity of the ID bias. The first is that it has been shown to occur without awareness (Russo et al. 2000, Russo et al. 2006). If decision makers cannot detect its presence, they cannot easily counteract its effects. The second reason is that ID has been found to result from an individual's need for cognitive consistency, which also makes ID persistent (Russo et al. 2008). Cognitive consistency is a fundamental and widespread cognitive process by which individuals naturally seek to maintain stability within their belief systems. Notably, cognitive consistency has a rich history with a demonstrated role in many judgment phenomena (Festinger 1962, Abelson 1983, Simon and Holyoak 2002, Thagard 2006, Gawronski and Strack 2012), such as the formation of belief systems (Read and Simon 2012), the maintenance of justifications for a belief (Nickerson 1998), and the reconciliation of new information with existing beliefs (Nickerson 2012). With regard to the domain of confirmatory information processing, in particular, decision makers have been shown to distort information to enhance the consistency between two competing beliefs: (a) their tentative preference and (b) their evaluation of incoming information (Russo et al. 2008).

Distrust and Cognitive Consistency

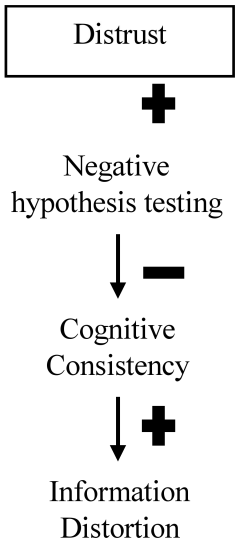
Recent research has shown that distrust – defined as a mental state caused by the threat of being deceived – can fundamentally change the manner in which individuals process information (Schul et al. 2004, Mayo 2015). Specifically, the potential threat of being deceived leads individuals to treat the validity of the information they encounter with skepticism, thereby changing their "default" information processing strategies into activating "*associations that are incongruent with the given message*" (p. 669; Schul et al. 2004). In Schul et al. (2004), participants who were exposed to a distrust (as opposed to a trust) cue were better at processing incongruent (as opposed to congruent) information, evidence that individuals tend to activate message-incongruent associations.

This particular hypothesis – that distrust leads to a preference for incongruent information – has been thoroughly tested and demonstrated in recent research (Mayo et al. 2014, Kleiman et al. 2015). In a study that is particularly noteworthy in the context of the present research, Mayo, Alfasi and Schwarz showed that distrust increases reliance on negative hypothesis testing strategies in a Wason (1960) rule discovery task. Initially, participants in the distrust (vs. trust condition) showed similar types of hypothesis generation. Nonetheless, participants in the distrust condition were more likely to propose incongruent series to test the validity of their initial hypothesis. In other words, distrust altered how participants reasoned about their initial hypothesis, making them more likely to test whether it might be wrong. Distrust thereby leads individuals to spontaneously think of alternatives to their initial hypothesis and even alternatives to their self-generated beliefs.

What is the impact of such an information-processing strategy on ID? In a sequential task in which participants confront their tentative preference for new incoming information, they strive for consistency between a) their tentative preference and b) the evaluation of new information. The "tentative" preference is the hypothesis generated by an individual that one of the options (investing or not investing or one particular alternative over another alternative) is superior to the other. If the overall set of findings from Mayo (2015) apply to such a decision making context, distrust should induce individuals to test whether their initial tentative preference is wrong. In other words, individuals should be less likely to process information in a

way that simply confirms their initial preference because they should actually test whether their initial preference is *not* correct. Thus, they should engage in negative hypothesis testing and attempt to disconfirm the self-generated belief that their preferred option is indeed superior. Empirically, this reasoning process should in turn lead to a diminished need to make the evaluation of new information fit with one's tentative preference, i.e., it should yield diminished levels of cognitive consistency. Consequently, ID should be reduced. This process is displayed in Figure 1.

Figure 1: Conceptual Model



Overview of the Studies

We ran four studies in this regard. Studies 1 and 2 show that dispositional distrust (study 1) and situated distrust (study 2) reduce ID. Study 3 tests the process explanation exhibited in Figure 1. Study 4 replicates the effects of distrust on another belief bias. If the process we propose is true – if distrust actually reduces confirmatory information processing by reducing the need for cognitive consistency – then it should also contribute to decreasing other biases that involve a cognitive process in which beliefs are matched. From a large set of possible applications to test this proposition, we chose the consequence-cause matching phenomenon (LeBoeuf and Norton 2012).

STUDY 1: DISPOSITIONAL DISTRUST AND INFORMATION DISTORTION

Study 1 adopts a correlational approach and looks at the effects of dispositional trust on ID.

Method

Participants. A total of 145 Amazon Mechanical Turk (AMT) workers (70 women) completed the study and received 50 cents as compensation.

Measurement of Dispositional Trust. Participants first answered Yamagishi and Yamagishi's (1994) six-item trust scale (e.g., "Most people are trustworthy", with answers ranging from *strongly agree* (1) to *strongly disagree* (7)). The average response to the 6 items constituted the measure of dispositional distrust for each participant (Mayo et al. 2014).

Choice Task. To track participants' preferences as the decision task progressed, we utilized the stepwise evolution of preference (SEP) method drawn from previous work on binary

choice (Russo et al. 1998) and adapted to a single-option setting (Bond et al. 2007). The SEP method consists of three main components: (1) presenting the units of information in sequence; (2) evaluating the information diagnosticity of each attribute; and (3) identifying the tentative decision in the choice process.

The task that we relied on involved a choice between committing and not committing to a new business venture. Participants were first given an introductory description of a business venture that involved a new laundry detergent component that enabled sports garments to be washed more thoroughly (see Appendix 1). Following the initial description, participants were asked on a 100-point scale whether they would commit to the business venture (0 = absolutely sure I won't commit; 100 = absolutely sure I will commit; and 50 = I could go either way). The venture was then described with four attributes that were presented sequentially: competition, market potential, product distribution, and promotion. After each attribute, participants were asked the following: a) to rate the diagnosticity of the information they had just read on a 9-point scale (where higher scores reflect a belief that the new information makes the business venture more attractive to the participant; 5 = scale mid-point) and b) to rate their tentative preference toward committing to the venture on the same 100-point scale as in the initial description. Finally, participants were asked to report their final decision (to commit or not to commit).

Importantly, every attribute was written and pretested to be neutral overall. In other words, on average, each attribute is no more attractive with respect to investing in the venture than to not investing in it. To ensure such neutrality, each attribute was pretested such that the evaluation of the attribute would not be significantly different from the scale mid-point, 5. In contrast to the actual study, no decision was required in the pretests. To prevent the spontaneous development of a preference toward investing or not investing, the pretest used a different identifying letter for each attribute (e.g., Company L in the first attribute, Company N in the second, and so forth). Changing the identifying letters prevented the emergence of a preferred position that could bias the attribute evaluations and introduce distortion into the process of creating neutral (unbiased) information in each attribute (Russo et al. 1998).

Results

Computation of Information Distortion. Prior work on ID (Russo 2014) typically subtracts the neutral midpoint of the diagnosticity scale (pretested to be 5 on the 9-point scale) from the actual evaluation of the participant provided in the choice task. This deviation from the midpoint is signed positively if it supports the current leading alternative (investing or not investing) and negatively otherwise. The average deviation across all attributes is then computed. A positive average means that the participant tended to shift his/her evaluation of the information in the direction of his/her current leading alternative. This approach has the advantage of simplifying the data analysis by providing one ID score for each participant. Obtaining one score for each participant is helpful when graphically representing data and particularly compelling when running a mediation analysis (which will be undertaken in Study 3 of this paper).Nonetheless, it also results in losing within-subject data information. Therefore, in our studies, we chose to analyze our data with regression models to account for the presence of fixed and random effects.

Specifically, we used a linear mixed model with a maximum likelihood approach in SPSS. All variables were mean-centered. The dependent variable was the information evaluation at attribute (i+1). Dispositional distrust, leaning toward investing at attribute (i), and their interaction were entered as fixed predictors. The participant's ID was specified as a random factor. The attribute number (first, second, third or fourth attribute) was specified as a within-subject factor. A positive slope between leaning at attribute (i) and information evaluation at attribute (i+1) empirically equates to the presence of ID, as an individual's leaning (i.e., being more or less likely to invest) contributes to explaining his/her evaluation of the next piece of

information (the new information makes the business venture more or less attractive to the participant).

Dispositional Distrust and Distortion. The regression yielded two significant fixed effects, leaning toward investing ($F(1, 573) = 277.49$; $p < .0001$) and the interaction of leaning and distrust ($F(1, 573) = 15.84$, $p < .0001$). The third fixed effect of distrust was not significant ($p > .15$).

Turning to the interpretation of the slope coefficients, a stronger leaning toward committing yielded more positive ratings of the information, which shows that all participants tended to show ID ($b = .05$, $t = 16.66$, $p < .0001$). In other words, participants evaluated the information about the business venture more positively if they were leaning toward investing in the project. Second, the strength of the leaning and dispositional distrust interacted such that the effect of leaning on diagnosticity was weaker when distrust was higher ($b = -.01$, $t = -3.98$, $p < .0001$). Thus, higher levels of distrust led to reduced ID.

Initial Leaning and Final Choice. The prior analysis demonstrates the presence of ID, and shows that participants who were higher in dispositional distrust showed less of this bias. However, we should investigate whether the initial leaning itself differs based on dispositional distrust. A regression showed that such was not the case ($b = -.05$, $t = -.02$, $p > .15$); thus, people with higher dispositional distrust were not less likely to commit to launch the business venture. We also examined whether dispositional distrust would explain differences in the final decision. A logit model yielded no significant effect ($\chi_2 (1) = .10$, $p > .15$).

Conclusion

Study 1A shows that dispositional distrust is correlated with lower levels of ID. Moreover, there was no effect of dispositional distrust on committing to the new business venture. As with the results reported by Mayo et al. (2014), distrust did not change the initial leaning (i.e., hypothesis) of the participants, but it did change the manner in which they subsequently processed information on the basis of this initial leaning. In particular, individuals with higher levels of dispositional distrust were less likely to be influenced by their initial leaning when processing subsequent pieces of information.

STUDY 2: SITUATED DISTRUST AND INFORMATION DISTORTION

Study 2 replicates Study 1 by priming distrust and compares the impact of this priming on confirmatory information processing. The priming of trust was undertaken using an impression task shown to successfully increase distrust in prior research (Schul et al. 2004, 2008; Mayo et al. 2014).

Method

Participants. A total of 224 Amazon Mechanical Turk (AMT) workers (130 women) completed the study. All participants received 50 cents as compensation.

Manipulation of Distrust. Participants were randomly assigned to one of three conditions: trust, distrust, or control. In both the trust and distrust conditions, participants were asked to form an impression of a person's face. The face was used as a trust or distrust cue (Schul et al. 2004, 2008; Mayo et al. 2014). At the end of the study, participants were asked to report the impression they formed using a 100 point scale (0 = "not at all like him" to 100 = "very much like him") listing descriptive adjectives ("smart," "warm," "deceptive," "happy," "shy," "trustworthy," "independent," "romantic," "competitive," "content," "sociable", "young"); the terms "deceptive" and "trustworthy" served as a manipulation check. The control group did not undergo the manipulation and began the study directly with the choice task.

Choice Task. Following the manipulation of distrust, the participants completed a choice task. As in Study 1, the task involved deciding whether to commit to a new business venture. The task was the same as in Study 1 (same types of attributes and same questions), except for the description of the business venture. Instead of a new type of laundry detergent component, the business venture involved a new type of material to make furniture (see Appendix 2).

Results

Manipulation Check. In the distrust condition, participants rated the face they saw as less trustworthy than participants in the trust condition (M_{trust} = 52.62 vs. $M_{distrust}$ = 27.62; t(145) = 6.54, $p < .0001$). They also rated the face more deceptive than participants in the trust condition (M_{trust} = 39.48 vs. $M_{distrust}$ = 64.00; t(145) = -6.72, $p < .0001$).

Situated Distrust and Distortion. A mixed linear model was used, which was similar to that used in Study 1. The one difference was that the trust variable, categorical instead of continuous. This variable was dummy coded, using the control group as the reference. As in Study 1, all continuous variables were mean-centered to facilitate the interpretation of the coefficients.

Three fixed effects reached significance. First, as in Study 1, there was a significant effect of leaning on information evaluation (F(1, 580) = 146.38, $p < .0001$). Second, the interactions between the two dummy variables and leaning reached significance levels (for trust: F(1, 406) = 9.72, $p < .005$; for distrust: F(1, 660) = 9.92, $p < .005$). No other effect was significant ($p > .15$).

Turning to the parameter estimates, the slope coefficient of leaning was significant and positive (b = .03, t = 4.27, $p < .0001$). Thereby, the higher the leaning toward investing in the control group (which was set as the reference group), the more positively that participants in this condition evaluated the next piece of information. This result amounts to a straightforward demonstration of the presence of ID in the control group. In the trust condition, the slope coefficient of leaning was significantly higher than in the reference group, as illustrated by a significant interaction effect between the trust condition and leaning (b = .02, t = 3.12, $p < .005$). Conversely, the distrust condition yielded a slope coefficient for leaning that was lower than in the control condition (b = -.02, t = -3.15, $p < .005$).

Initial Leaning and Final Choice. We checked whether the initial leaning toward committing to the new business venture would differ based on situational distrust. An ANOVA showed this not to be the case (F(2, 221) = .87, $p > .15$). We also examined whether distrust would explain the differences in the final decision. A proportion comparison showed this also not to be the case. In the control group, 66.23% of the participants made the decision to commit, while 70.27% in the trust condition and 70.27% in the distrust condition made the same decision (χ_2 (1) = .40, $p > .15$).

Conclusion

Study 2 replicated Study 1 with situated distrust. Participants' initial leanings were similar in all conditions, but leaning impacted the evaluation of the next piece of information to a lesser degree in the distrust condition than in the trust or control condition. Taken together, Studies 1 and 2 show convergent evidence that distrust contributes to decreased levels of ID. Notably, the trust condition yielded an even stronger confirmatory information processing bias than the control condition. Previous research has typically considered the "trust" condition to trigger the default process by which information is encoded (Mayo 2015). Although the focus of the present research is distrust, the present findings show that trust might have the capability to boost positive hypothesis testing to a greater extent than the control group if the control group does not reach a ceiling effect.

STUDY 3: TESTING THE PROCESS EXPLANATION

The proposed process underlying the effect of distrust on ID is assumed to be negative hypothesis testing. In other words, we expect that individuals who experience distrust will test whether their leaning is *in*correct (as opposed to correct, as in positive hypothesis testing).

Method

Participants. A total of 300 Amazon Mechanical Turk (AMT) workers (210 women) completed the study. All participants received 50 cents as compensation.

Manipulating Distrust. Participants were randomly assigned to one of three conditions: distrust, trust, or control. The manipulation was a scrambled-sentences priming task (Srull and Wyer 1979, Bargh et al. 1996, Bargh and Chartrand 2000) that replicated prior research (Mayer and Mussweiler 2011; Posten and Mussweiler 2013). Participants were instructed to build coherent sentences using four out of five listed words. There were 15 series of words. In the trust (distrust) condition, eight series of words contained one trust-related (distrust-related) word. The remaining seven word listings were trust-neutral and did not differ between conditions. In the control condition, none of the word series contained any words related to trust or distrust.

Measuring Negative Hypothesis Testing. One prominent cornerstone in our process explanation is that participants who experience distrust are more likely to reason using negative hypothesis testing. To check this assumption, we used a procedure developed by Snyder and Swann (1978) and Kleiman and Hassin (2013). Participants were first told that the task would test the hypothesis that a target person was an extrovert. They then read a short description of a typical extrovert. Subsequently, they read that to test the hypothesis, they could ask the target person 12 questions out of a list of 25 potential questions. Within these 25 questions, 10 were hypothesis-confirming (e.g., “What do you like about living situations in which there are always lots of people around?”), 10 were hypothesis-disconfirming (e.g., “What factors make it hard for you to really open up to people?”), and five were neutral. The more a participant selected hypothesis-confirming (hypothesis-disconfirming) questions, the more that participant was employing positive hypothesis (negative hypothesis) testing.

Choice Task. Following the description of the negative hypothesis testing measurement, the participants completed the same choice task as in Study 1.

Measuring the Activation Level of Cognitive Consistency. The online assessment method of cognitive consistency developed by Carlson et al. (2014) was applied. First, prior to the choice task, participants were shown descriptions of several decision-making strategies. Two distractor strategies (“memorize” and “conserve effort”) were added to the focal strategy considered in this study, cognitive consistency. The participants read the following instructions: “On the pages that follow, you will be asked to read and evaluate information that will help you make a decision between two hotels. During the choice process, you will be asked to report the strategies that you are using to actually come to a decision. To ensure that you fully understand the meaning of a question that will be asked later in the study, please take some time to read the three following definitions out loud:

- Consistency: Seeing new information as consistent with information seen earlier
- Conservation of Effort: Saving effort when examining or making judgments about options
- Memorization: Commiting the viewed information to memory

Once you have read the three definitions, you can start the second part of the study. Thanks in advance!”

Second, the participants were interrupted during the choice task, after the second and fourth attributes were presented, so that they could report – using a scale from 0 to 100 – the extent to

which they were using each of the previously described strategies while making their choices. A constant sum scale was used in which a total of 100 units of activation was partitioned across the 3 decision-making strategies.

Results

Initial Leaning and Final Choice. We checked whether initially leaning toward committing to the new business venture would differ based on situational distrust. An ANOVA showed that not to be the case ($F(2, 297) = .95$, $p > .15$). We also examined whether distrust would explain differences in the final decision. A proportion comparison showed that also not to be the case. In the control group, 61.90% of the participants made the decision to commit, whereas 52.0% in the trust condition and 54.26% in the distrust condition made the same decision ($\chi_2 (1) = 2.26$, $p > .15$).

Distrust and Distortion. We analyzed the data using a model similar to that used in Study 2. All the continuous variables were mean-centered to facilitate the interpretation of the coefficients. The distrust conditions were dummy-coded (the control group is the reference group).

Two fixed effects reached significance levels. First, as in Studies 1 and 2, there was a significant effect of leaning on information evaluation ($F(1, 1182) = 469.88$, $p < .0001$). The slope coefficient of leaning was significant and positive ($b = .05$, $t = 15.47$, $p < .0001$), which shows the presence of ID in the control group (set as the reference group). Second, the interaction between distrust and leaning reached significance ($F(1, 1184) = 7.30$, $p < .01$), and the slope coefficient of leaning was significantly lower in the distrust condition than in the control group ($b = -.015$, $t = -2.70$, $p < .01$). The interaction between leaning and the trust condition did not reach significance ($F(1, 1184) = 2.17$, $p < .15$), although the slope coefficient of leaning was marginally higher than in the control group ($b = .007$, $t = 1.47$, $p < .15$). All other effects were not significant ($p < .15$).

Positive and Negative Hypothesis Testing. We created a contrast score by subtracting the number of confirming questions selected by the participant from the number of disconfirming questions selected by the participant. The higher the contrast score, the more the participant used negative hypothesis testing than positive hypothesis testing. An ANOVA showed that participants in the distrust condition selected more disconfirming questions ($M_{contrast} = -4.24$, $SD_{contrast} = 4.09$) than participants in the trust ($M_{contrast} = -5.67$, $SD_{contrast} = 2.94$) or control ($M_{contrast} = -5.47$, $SD_{contrast} = 2.82$; $F(2, 297) = 5.30$, $p < .01$) conditions. Follow-up Dunnett tests showed that the difference between the distrust condition and the control group was significant ($t(198) = 2.80$, $p < .01$). However, the difference between the control group and the trust condition did not reach significance ($t(203) = .49$, $p > .15$).

Cognitive Consistency Measurement. Third, we examined the mean of the cognitive consistency activation scores, as measured by the online goal assessment method (Carlson et al. 2014). An ANOVA demonstrated a significant difference across the groups ($F(2, 297) = 5.89$, $p < .005$). As with the results for ID, the participants in the distrust condition reported lower activation of this goal than those in the two other conditions ($M_{control} = 51.08$, $SD_{control} = 17.65$; vs. $M_{distrust} = 44.95$, $SD_{distrust} = 13.77$; vs. $M_{trust} = 52.25$, $SD_{trust} = 15.85$). Follow-up Dunnett tests showed that the difference between the distrust condition and the control group was significant ($t(198) = -2.75$, $p < .01$). However, the activation levels of the cognitive consistency strategy again did not differ between the control and trust conditions ($t(203) = .50$, $p > .15$).

Mediation. We investigated whether negative hypothesis testing and cognitive consistency mediated the relationship between distrust and ID. Because we did not observe a significant difference between the control group and the trust condition, these two conditions were pooled and contrasted with the distrust condition (distrust = 1 and control = 0). To run the mediation, we first computed a single ID score for each participant using the multi-step approach recommended by Russo (2014). First, we subtracted 5 from the information

evaluation scores provided by the participant. This difference was signed positively if the participant leaned toward investing at the prior attribute (i.e., a leaning score above 50%) and signed negatively if the participant leaned toward not investing at the prior attribute (a leaning score below 50%). The average distortion across all attributes was then computed for each participant, resulting in one averaged score for each. First, we observed the presence of a direct effect of distrust on distortion (b = -.42, t = -3.25, $p < .001$). Second, we looked at each path between the variables displayed in Figure 1. The effect of distrust on negative hypothesis testing was significant and positive, such that distrust increased the use of negative hypothesis testing (b = 1.33, t = 3.23, $p < .001$). The effect of negative hypothesis testing decreased the activation of cognitive consistency (b = -.85, t = -3.10, $p < .005$). Higher cognitive consistency levels increased distortion (b = .01, t = 3.15, $p < .005$). A bootstrapping analysis (Preacher and Hayes 2008) with 5,000 samples was performed, and the mediation analysis yielded a bootstrapping interval of [-.03, -.002], which does not include zero and thus indicates a significant serial mediation.

Conclusion

Study 3 replicates Study 2 with one exception, i.e., the difference between the trust and the control conditions did not reach significance. Prior research has typically considered that the control condition shows high default levels of trust (Mayo 2015), which might explain why a ceiling effect may be obtained in some studies. The effect of distrust on distortion was fully replicated. In addition, Study 3 reveals the process by which distrust reduces distortion, i.e., an increase in negative hypothesis testing and reduced activation levels of cognitive consistency.

STUDY 4: EXTENDING THE RESULTS TO OTHER BIASES DRIVEN BY COGNITIVE CONSISTENCY

The objective of Study 4 was to replicate the effects of distrust on a belief bias other than confirmatory information processing. If the process we propose is true – if distrust actually reduces confirmatory information processing by reducing the need for cognitive consistency – then it should also contribute to decreasing other biases that involve cognitive processing in which beliefs are matched. From a large set of possible applications, we selected the consequence-cause matching phenomenon (LeBoeuf and Norton 2012). We chose this bias because it clearly entails the matching of two beliefs (i.e., inferring a consistent cause for the consequences of a target event, such as in terms of its size or valence). LeBoeuf and Norton (2012) posited that this particular bias may be caused by an overarching motivation to see the world as predictable. We hypothesize that this motivation of predictability may be achieved by means of a cognitive procedure aiming at consistent belief systems. If it is indeed the case, then distrust should reduce the consequence-cause matching bias in a manner similar to confirmatory information processing.

Method

Participants. A total of 120 Amazon Mechanical Turk (AMT) workers (69 women) completed the study. All participants received 50 cents as compensation.

Manipulation of Distrust. The manipulation of distrust was the same as in Study 1 and 2. There were two conditions: distrust and trust conditions.

Consequence-Cause Matching. Study 4 essentially replicated the paradigm employed in LeBoeuf and Norton (2012). There were two conditions: a small consequence condition and a large consequence condition. In both conditions, participants read a short text about the assassination of the president of a small country. The dead president was criticized by a British

newspaper, which sparked attacks against Britain. In the large-consequence condition, Britain's prime minister responded aggressively to the attacks, initiating a war. In the small-consequence condition, Britain's prime minister responded peacefully. In LeBoeuf and Norton (2012), participants chose whether the initial assassination was more likely to have been caused by a lone gunman (small cause) or by a conspiracy (large cause) within the assassinated leader's government. In our study, we asked the participants to report the likelihood of each cause on a scale from 0 (very unlikely) to 100 (very likely).

Results

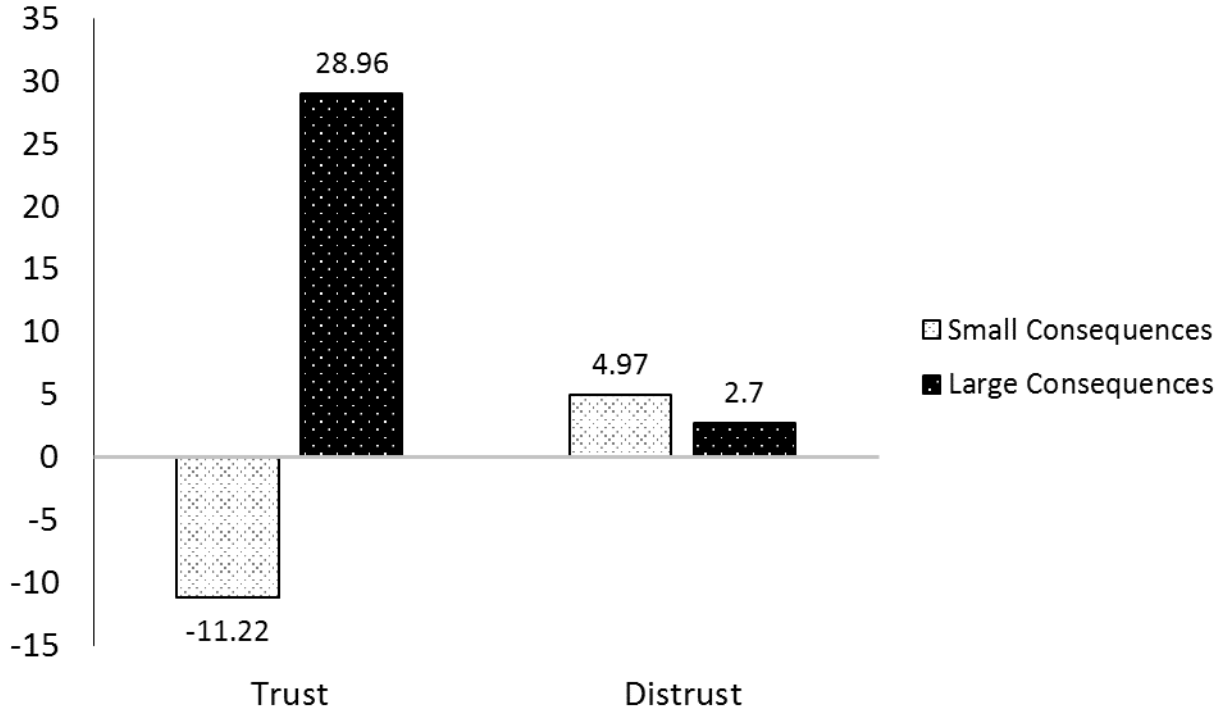
Manipulation Check. Participants in the distrust condition rated the face they saw as less trustworthy than participants in the trust condition (M_{trust} = 54.65, SD_{trust} = 21.22 vs. $M_{distrust}$ = 26.47, $SD_{distrust}$ = 22.22; t(118) = 7.11, $p < .0001$). They also rated the face more deceptive than participants in the trust condition (M_{trust} = 33.65, SD_{trust} = 25.91 vs. $M_{distrust}$ = 63.53, $SDdis_{trust}$ = 21.05; t(118) = -6.91, $p < .0001$).

Consequence-Cause Matching. A mixed linear model that is similar to those developed in Studies 1 and 2 was run. The subject ID was identified as random, and the type of cause (lone gunman or conspiracy) was specified as a within-subject factor. The dependent variable was the probability ascribed to the target cause. The predictors were the distrust condition (with trust as the reference category, coded as 0), the consequence condition (with small consequences is the reference category, coded as 0), and type of cause (with the lone gunman as the reference category, coded as 0).

The regression yielded three significant fixed effects. First, there was a significant effect of the type of cause (F(1, 240) = 5.09, $p < .05$). Examining the parameter estimates, this effect was the result of participants generally finding a conspiracy less likely than a lone gunman when trust was primed (i.e., when distrust = 0) and when the consequences were small (i.e., coded as 0; b = -11.23, t = -2.03, $p < .05$). Second, there was an interaction effect between cause and consequence (F(1, 240) = 11.34, $p < .001$). The slope coefficients show that this effect replicated the bias found by LeBoeuf and Norton, such as larger consequences (a war) tended to increase the probabilities ascribed to various conspiracy theories (b = 40.19, t = 4.96, $p < .0001$). Finally, there was also a three-way interaction between distrust, cause, and consequences (F(1, 240) = 14.22, $p < .0001$). When distrust was primed, the war (large consequences) was less likely to be attributed to a conspiracy (b = -42.46, t = -3.77, $p < .0001$). This significant slope reduction essentially reveals a reduction of the consequence-cause matching bias.

To represent the bias reduction more clearly, we computed the difference in the probability ascribed to the conspiracy theory and to the lone gunman for each participant, thereby creating a contrast score for each. A positive score means the participants believe the conspiracy to be more likely than a lone gunman. As shown in Figure 2, the existence of a consequence-cause matching bias was clearly present in the trust condition (M_{large}= 28.96, SD_{large}= 25.55 vs. M_{small}= -11.22, SD_{small}= 41.23; t(56) = -4.52, $p < .0001$), although the bias was reduced and ultimately disappeared in the distrust condition (M_{large}= 2.70, SD_{large}= 44.02 vs. M_{small}= 4.97, SD_{small}= 34.08; t(60) = .23, $p > .15$).

Figure 2: Differences between the likelihood of a conspiracy and a lone gunman in Study 5



DISCUSSION AND CONCLUSIONS

The notion that preferences impact how people process incoming information has received empirical support from scholars in a variety of domains, such as legal, medical, managerial, and consumer decision making. The present study builds on this extensive body of research but distinguishes itself from the previous literature by showing that distrust allows the impact of emerging preferences on information evaluation to be mitigated. In so doing, we also demonstrated one potential process by which distrust reduces ID.

Studies 1 and 2 showed that both dispositional and situated distrust can reduce distortion. Study 3 focused on the process through which this effect occurs. Distrust led participants to engage in negative hypothesis testing, which made them more likely to process information in a manner that would test whether their initial belief is *not* correct. Consequently, participants in the distrust condition were less likely to make new information match their prior tentative preferences, leading to reduced levels of cognitive consistency activation. This reduced activation level led to an overall reduction in ID. Study 4 investigated whether distrust could reduce other belief biases that involve the matching of two beliefs, and the results demonstrated that distrust can indeed diminish the consequence-cause matching phenomenon.

The Silver-Lining of Distrust

The capability of examining a piece of information skeptically before deciding whether to accept it or not, is a vital skill in the workplace. Past research has indeed shown that considering all alternatives, regardless of whether they are consistent with the decision maker's initial beliefs, leads to high-quality decisions (Janis and Mann 1977, Janis 1989). When distortion occurs, decision makers may not be able to recognize the value of contradictory information. In addition, reaching a conclusion quickly based on one's prior beliefs may induce individuals to favor the status quo and to exude overconfidence (Boyle, Russo and Juyong 2016). Individuals may thus fail to consider new viable options, which can lead to increased stereotyping, resistance to necessary revisions, and inhibited creativity (Staw 1981, Janis 1982, Gioia 1986, Beach 1990). Taken together, our findings show that under specific circumstances, distrust may help – rather than systematically undermine – managerial decision making.

Cognitive Consistency and the Desire for a Predictable World

LeBoeuf and Norton (2012) show that the consequence-cause matching phenomenon is associated with a desire to see the world as predictable. Our explanation through cognitive consistency fully complements this idea, although it is more embedded in cognitive than social psychology. In particular, Heine et al. (2006) showed that the desire to prefer a world that is predictable actually leads individuals to hold mental representations that consist of expected relations between elements of thoughts that are intended to imbue work with meaning. These "expected" relations are relations that are inherently consistent with one another. In such case, cognitive consistency is a means to an end – a cognitive principle by which one's desire for a predictable world is met.

Other Domains

The present work opens the possibility of examining the impact of distrust on other domains that may be influenced by cognitive consistency. We propose two such domains. First, cognitive consistency should be one driver of the process in which expectations influence experience. For instance, visual perception is influenced not only by our objective visual sensation but also by our expectations (e.g., Balcetis and Dunning 2006). On the basis of the findings of the current paper, priming distrust might induce decision makers to counteract the effects of their expectations. Second, early research on cognitive consistency was focused on consistency within social networks (Heider 1958). Social influence is an area in which there is pressure to achieve consensus. The result is often that an individual changes his/her beliefs or behavior to match the norms of his/her peer group (Borsari and Carey 2001). Instead of consistency between an emerging preference and the evaluation of incoming information, this domain involves the consistency between group norms and individual behavior. On the basis of the current findings, priming distrust might induce decision makers to become more likely to reject group norms. Although these new domains of application remain speculative, they may nonetheless open the door for future research seeking to clarify how additional biases can be mitigated.

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Appendix 1: Business Venture Decision Task in Study 1

Imagine that a new business venture opportunity facing you is the production and marketing of a special laundry product that is added in a small quantity to a regular load of laundry and detergent. The product works by going into the small areas in the super-fine synthetic fibers and chemically releasing the sweat droplets trapped there. Ordinary laundry detergents by themselves can't do this because their molecules are too large. If the sweat droplets remain in the fibers, bacteria feeds on them producing a bad smell, even though the garment is washed repeatedly with normal detergent.

With the trend toward healthier lifestyles developing all around the world, more and more people are engaging in active sports such as tennis, golf, biking and hiking. Most of the people who do these sports buy not only the equipment, like golf clubs, but the sportswear that goes along with these active sports. Usually the sportswear is made of a synthetic material that has many valuable aspects, such as being lightweight, stretchable and breathable. However, as so many people have learned, when sweat droplets get into the spaces between the super-fine fibers of the synthetic material, it is extremely hard to get the sweat odor out of the garment by ordinary washing.

The trend toward engaging in more activities, and buying and wearing more sportswear, is spreading all over the world. And the demand is growing every year. In China alone, there are millions of people who are starting to realize it is both fashionable and healthful to engage in active sports. Currently, no company in the world has exactly the same technical know-how to produce this special laundry product except you.

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100

Attribute 1
The ingredients to produce the new laundry product are not more expensive than the ingredients that the large laundry detergent companies use to produce their well-known brands. But the smaller batches that will be produced means there will not be the same kinds of economies of scale that the much larger companies have from producing vastly more of their product. Because of the higher costs of producing the new laundry product, its price will be about 17% higher than the price of the leading brands so the average laundry detergent buyer is not likely to buy the new laundry product for doing a regular wash. But there is considerable potential in the market for those consumers who have the income to indulge in buying expensive sporting gear and clothing. For them, the additional price will be small compared to the cost of their equipment.

Question: Given just the information on this page, consider the extent to which you agree with the following statement: This information makes the new venture attractive to me.
9 = strongly agree
5 = neither agree nor disagree
1 = strongly disagree

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?

Scale from 0 to 100

Attribute 2
Most large laundry detergent companies spend vast amounts of money on advertising their brands to the public. Because of this, their brands are very visible and well-known. However, as a small start up company, you will have a very limited advertising budget. One strategy is to send samples of the new laundry product to all the major sportswear manufacturers (such as Nike) for them to try out. You have heard from one sportswear manufacturer that they would be willing to endorse your product (that is, recommend it to customers of their own products) if it performs well in their own tests. Of course the sportswear manufacturer would almost certainly recommend competing detergents as well if those detergents performed well, too.

Question: Given just the information on this page, consider the extent to which you agree with the following statement: This information makes the new venture attractive to me.
9 = strongly agree
5 = neither agree nor disagree
1 = strongly disagree

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100

Attribute 3
Distribution of new products in grocery stores (which are usually key locations for major laundry detergent producers) is difficult for any new product, especially one without a large advertising budget designed to bring customers into the store. As a small start up company, you will be expected to at least pay large up-front fees to the major grocery retailers just to get on their shelves. Another strategy is to send your new laundry product to sporting goods stores that usually carry sportswear. The goal would be to establish a partnership with the smaller sporting goods stores that would be difficult to develop with the larger grocery store chains.

Question: Given just the information on this page, consider the extent to which you agree with the following statement: This information makes the new venture attractive to me.
9 = strongly agree
5 = neither agree nor disagree
1 = strongly disagree

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100

Attribute 4
The market for a specialty sportswear detergent is limited in scope, at least compared to the overall market for laundry detergent. That is one of the reasons the major detergent brand producers have not gotten involved in producing a specialty product like yours. However, the number of people engaging in sports and buying sportswear is increasing every year. And of course, the new laundry product works fine to wash regular clothing as well, so its market may actually extend beyond merely sportswear laundry. If the market for the new laundry product gets large enough, a serious concern is that it will become an attractive opportunity for the large

laundry detergent manufacturers, who might then decide to enter the sportswear market with their own well-known established brands to compete against your product.

Question: Given just the information on this page, consider the extent to which you agree with the following statement: This information makes the new venture attractive to me.
9 = strongly agree
5 = neither agree nor disagree
1 = strongly disagree

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100

Appendix 2: Business Venture Decision Task in Study 2

The new business venture opportunity facing you is the production and marketing of a new type of material for making furniture. The special thing about the new material is that it would be a new bio-product made out of corn.

Traditionally, furniture (for example, desks, shelves, and cabinets) has been made out of solid wood. But as the world's natural wood resources have decreased, manufacturers have turned to producing furniture products out of a material known as fiberboard. Fiberboard is basically a sheet of small wood chips held together by strong glues. The sheets, which are about 2 centimeters thick, can be used to make furniture just like real wood. As you can imagine, given the demand for furniture throughout the world, the quantity of fiberboard that is needed is huge.

However, fiberboard by itself is not durable or attractive enough to use in furniture. Instead, it is usually covered by a smooth, hard, plastic-like substance known as plastic-laminate. Plastic laminate is a thin sheet made from petroleum products and it is glued to the surface of the thicker sheets of fiberboard (in other words, the fiberboard is sandwiched between the two sheets of plastic laminate). Once applied, the combined sheets of fiberboard and laminate can be cut, shaped, and assembled into all manner of attractive furniture products.

Your new bio-product made out of corn would replace the plastic laminate. In most ways the new bio-product would be virtually identical to plastic laminate. It would have the same thickness, appearance, durability, and ease of application. However, it would be different from, and better than, plastic laminate in one important way: it would be an all-natural, bio-safe product.

Compared to regular plastic-laminate, there would be several advantages to your new Bio-laminate product. First, it would be produced from a renewable source of material, corn, unlike traditional plastic laminate, which is made from depletable petroleum reserves. Second, it would be all-natural, which would appeal to a large and growing market of consumers around the globe who prefer to have natural-products in their homes. Another important difference is that because your product is made from an all natural product, corn, it is biodegradable. Unlike regular plastic-laminate, which takes more than 100 years to biodegrade, your Bio-laminate product would begin to biodegrade just 2 years after being buried in the ground. Currently, no company in the world has the exactly the same technical know-how to produce this bio-safe replacement for plastic-laminate except you.

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100

Attribute 1
One limitation of the new Bio-laminate product is that it is less flexible, so it cannot be applied to highly curved surfaces. However, the new product can be produced in many different colors and patterns. Almost any pattern that can be created in plastic-laminate can also be created in the Bio-laminate. In terms of wear, the Bio-laminate is just about as durable as plastic-laminate. It also resists moisture and sunlight as well as plastic-laminate.

Question: Given just the information on this page, consider the extent to which you agree with the following statement: This information makes the new venture attractive to me.
9 = strongly agree
5 = neither agree nor disagree
1 = strongly disagree

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100

Attribute 2
New furniture products have to pass what is known as a "burn-test." In a burn test, a flame is held to the furniture material to see how long it takes to ignite. There is also another test that examines the smoke created by the burning material. All products must pass the tests. Products that ignite too quickly, or that create too much smoke, will fail the test. One of the unique features of your new Bio-laminate product is that, unlike plastic-laminate fiberboard products, it burns with very little smoke. From a safety point of view, that is a very desirable feature in a furniture product. However, Bio-laminate ignites more quickly—but this is less of a concern partly because people have more time to escape from a fire if the fire is not a smoky one.

Question: Given just the information on this page, consider the extent to which you agree with the following statement: This information makes the new venture attractive to me.
9 = strongly agree
5 = neither agree nor disagree
1 = strongly disagree

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100

Attribute 3
There is a demand for all-natural, bio-safe products to be used in the construction of new homes. In U.S. alone, there are more than 5,000,000 new housing units built per year. Each one of these new housing units is a potential customer for Bio-laminate to be used for the construction of built-in shelving, closets and kitchen cupboards. Therefore the potential demand

is large for this market. One of things that makes it challenging for Bio-laminate to access this market is that usually the construction companies make the decision as to what materials will be used in construction of the housing units. The construction companies usually prefer to use the products that are the cheapest. But Bio-laminate is about 22% more expensive than regular plastic-laminate fiberboard, so contractors are understandably reluctant to pay the extra cost. However, there is good reason to believe that some home buyers would be willing to pay a price premium for a housing unit that included bio-safe products, especially if the buyers have children. That means the contractors could possibly make more profit if they built with Bio-laminate, even though it is more expensive to install. But educating the contractors about these potential profit opportunities will require substantial effort on your part.

Question: Given just the information on this page, consider the extent to which you agree with the following statement: This information makes the new venture attractive to me.
9 = strongly agree
5 = neither agree nor disagree
1 = strongly disagree

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100

Attribute 4
You can produce your new Bio-laminate anywhere in the world, and shipped to the locations where other companies apply laminate to fiberboard. Bio-laminate can be applied to fiberboard using exactly the same machinery as is used to apply plastic-laminate, so it is completely compatible with existing production facilities around the world. Producing Bio-laminate requires special machinery that would cost $3.4 million to purchase. It would also require a site of approximately 2 acres for the production facility. However, the sheets of Bio-laminate are compact and can be economically shipped around the world to any company that produces fiberboard to be covered in any kind of laminate.

Question: Given just the information on this page, consider the extent to which you agree with the following statement: This information makes the new venture attractive to me.
9 = strongly agree
5 = neither agree nor disagree
1 = strongly disagree

Question: Based on all the information you've seen so far, and recognizing that more information may be available in the future, what are the chances that you will commit to the new business venture?
Scale from 0 to 100