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# That Certain Something!

## Focusing on Similarities Reduces Judgmental Uncertainty

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Abstract

Comparative thinking is an efficient cognitive strategy that reduces judgmental uncertainty. However, comparisons may be conducted with a focus on similarities or differences. Similarity-focused comparisons seem to facilitate information-transfer, which has been suggested to drive the uncertainty-reducing effect of comparisons. This implies that similarity-focused comparisons reduce uncertainty more than dissimilarity-focused comparisons. Two experiments examine this assumption. In Study 1, a similarity-focus (compared to a difference-focus and a neutral control condition) increased judgmental certainty when the comparison was based on confident standard-knowledge. However, when the comparison was based on vague standard-knowledge the uncertainty-reducing effect diminished. Study 2 shows that a similarity-focus increases information-transfer and that a similarity-focus particularly enhanced certainty for judgments for which a standard-to-target information-transfer had occurred. These studies suggest that similarity-focused comparisons reduce judgmental uncertainty through the mechanism of information-transfer.

*Keywords*: similarity, comparison, judgment, uncertainty

# That Certain Something!

## Focusing on Similarities Reduces Judgmental Uncertainty

Uncertainty is a faithful companion of human life (Tversky & Kahneman, 1974). We may feel uncertain about how much someone likes us, when the next train will arrive, or how much to spend on a new house. Faced with uncertainty, people diligently strive to reduce it. One may observe another person's behavior, search the web for a train schedule, or consult a realtor. Obtaining information that helps to reduce uncertainty tends to consume time, money, and other resources. Nevertheless, people are typically willing to accept these costs to reduce uncertainty (Inglis, 2000; Tiedens & Linton, 2001).

Humans have developed an arsenal of tools to cope with uncertainty. Behavioral strategies such as experiential coping (Hogg & Mullin, 1999; van Horen & Mussweiler, 2014), superstitious beliefs (Keinan, 1994), or behavioral routines (Czech, Ploszay, & Burke, 2004) constitute just few of them. Another class of strategies used to reduce uncertainty are specific cognitive information-processing mechanisms (Tiedens & Linton, 2001). One such strategy is comparative thinking, which is engaged during social as well as nonsocial judgment and decision-making (Festinger, 1954; Medin, Goldstone, & Markman, 1995; Tversky & Kahneman, 1986). Recent research demonstrated that engaging individuals in comparative thinking makes them more certain of their judgments. In one study, for example, participants merely compared two halves of a picture and afterwards completed an unrelated judgment task. The procedurally elicited comparative thinking style carried over to the subsequent task and influenced the participants' willingness to bet on their judgments (Mussweiler & Posten, 2012).

The uncertainty-reducing effects of comparative thinking have been suggested to result from comparing an unknown target with a well-known standard and transferring information from the standard to the target (Mussweiler & Epstude, 2009; Mussweiler &

Posten, 2012). Using available standard-information as a proxy to compensate for missing target-information enriches one's judgmental base. Typically, information-rich and systematic standards are preferred as comparison bases to project information to the target, which contributes to its understanding (Bowdle & Gentner, 1997). For instance, when making a judgment about a vaguely known country, one typically does so in comparison to a routine-standard, for example one's home country, about which one has plenty of information readily available (Corcoran & Mussweiler, 2009; Mussweiler & Rüter, 2003). More precisely, when thinking about how many years are between federal elections, one may rely on easily accessible information about elections in one's home country. This information may then be transferred and used to compensate for missing target-information. Mussweiler and Epstude (2009) tested this conjecture. They reasoned that transferring information from a comparison-standard to an unknown target results in the ascription of typical aspects of the standard to the target. The results showed that participants with a comparison mindset were more likely to transfer typical standard aspects to the target. This finding demonstrates that comparative thinking increases information-transfer from a comparison-standard to a target with incomplete information.

Theory and research on comparative thinking reveals that making a comparison involves judging the similarities as well as the dissimilarities of two or more entities (Navarro & Lee, 2004; Shepard & Arabie, 1979). The perception of (dis)similarity depends on the entities' overall shared and distinctive features (Markman & Gentner, 1996; Tversky, 1977) and the emphasis placed on them (Ritov, Gati, & Tversky, 1990). Furthermore, contextual cues (Wisniewski & Middleton, 2002) and prior comparisons may direct a judge's comparison focus toward similarities or dissimilarities and influence subsequent (dis)similarity perceptions (Mussweiler, 2001, 2003).

The distinction between the two fundamental comparative foci begs the question of whether they differentially affect judgmental uncertainty. Theoretical reasoning proposes that to be able to compare entities, one first needs to identify common and alignable structures. An initial focus on similarities promotes structural alignment and facilitates the identification of shared dimensions along which one may then compare (Gentner & Markman, 1994; Markman & Gentner, 1993; Mussweiler & Epstude, 2009). The notion that similarity-focused comparisons facilitate information-transfer is empirically supported: Overall, similarity-judgments are particularly helpful to understand abstract and difficult relational structures (Higgins & Ross, 2011). The more similar entities are, the more likely corresponding information will be mapped and transferred from one to the other (Wisniewski, 1996). Likewise, similarity facilitates the use of categorical information to predict unknown target features (Cannon & Hampton, 2004), and directing a judge's focus toward similarities leads to efficiency advantages that resemble those of information-transfer (Corcoran, Epstude, Damisch, & Mussweiler, 2011). This evidence suggests that a similarity-focus facilitates information-transfer.

The implications for how similarity-focused comparisons influence judgmental uncertainty are clear: If a focus on similarities facilitates information-transfer and information-transfer reduces judgmental uncertainty, then similarity-focused comparisons should reduce judgmental uncertainty more than dissimilarity-focused comparisons. The present research tests this hypothesis. In two experiments, participants engaged in similarity- versus dissimilarity-focused comparisons before making judgments about complex targets. Specifically, participants engaged in a procedural priming task and listed either similarities or dissimilarities between pictures (Mussweiler, 2001; Mussweiler & Epstude, 2009). Because such a procedurally activated thinking style carries over to subsequent tasks (Corcoran et al., 2011; Mussweiler, 2001), we expected the induced (dis)similarity-focus to influence

information-processing during a subsequent judgment task, in which we assessed judgmental (un)certainty. Furthermore, to explore the role of information-transfer, Experiment 1 differentiates between judgments that are based on either confident or vague standard-knowledge. Experiment 2 assesses whether a similarity-focus increases information-transfer and whether for transferred items a similarity-focus increases certainty in the target judgments.

## Experiment 1

Experiment 1 investigates whether a similarity-focus increases certainty compared to a dissimilarity-focus and a control condition. Additionally, the study sheds light on the hypothesized mechanism of information-transfer. Our reasoning holds that the certainty for target judgments strongly depends on the confidence associated with the respective standard-knowledge. If one has confident standard-knowledge, confident knowledge can be transferred to the target and the target judgment will increase in certainty. However, if one has vague knowledge about a standard feature, one can only transfer vague knowledge and the target judgment will remain vague. For example, when thinking about how many years are between elections in a vaguely known country, one may think about the well-known years between elections in one's home country. Transferring this confident knowledge to the target country should result in higher judgmental certainty. However, when thinking about the number of light bulb factories in the unknown country, one typically has only vague standard-information for one's home country available. Transferring this vague standard-knowledge to the target adds only vague information to the judgment. Hence, confidence should barely increase. Experiment 2 follows this underlying logic by comparing judgments for which standard-knowledge is confident with judgments for which standard-knowledge is vague. We hypothesize that a similarity-focus particularly reduces uncertainty when individuals have confident standard-knowledge available.

The participants completed a similarity-focus, a dissimilarity-focus, or a control manipulation. Subsequently, they engaged in a trivia quiz about Canada and indicated their degree of answer certainty. All recruited participants were US residents. Hence, we reasoned that the US would likely function as a natural routine-standard for the target, Canada. The judgments about Canada were designed in a way that US residents feel confident (vs. non-confident) about the respective answer for their home country, the comparison-standard.

**Method**

We recruited 123 participants (71 female; $M_{age}$ = 37.34, *SD* = 12.30) via Amazon's Mechanical Turk (MTurk)[1]. We consecutively presented three colored pictures to the participants. Participants in the similarity-focus condition compared the two vertical halves of each picture and listed three similarities between them. Participants in the dissimilarity-focus condition listed three differences. Participants in the neutral control condition named any three features of each picture (Crusius & Mussweiler, 2012).

Afterwards, all participants engaged in the critical judgment task, a trivia quiz about Canada with 20 questions. For each judgment, participants indicated their degree of certainty on an answer-slider (1 = *very uncertain*; 100 = *very uncertain*). Two types of judgments existed: One type for which confident standard-knowledge existed (e.g., years between federal elections) and one type with vague standard-knowledge (e.g., number of light bulb factories). To distinguish between these types of judgments, we conducted an independent study with 49 US residents (15 female; $M_{age}$ = 37.12, *SD* = 13.04) on MTurk. Participants answered 20 questions about their home country and indicated their degree of confidence on the same answer-slider. Identical questions asked about Canada in the main study. The study revealed five judgments for which highly confident standard-knowledge exists, i.e. when the mean degree of confidence was significantly higher than the neutral midpoint of the scale (*M* = 50.5), all *M*s $\geq$ 73.14, all *t*s(48) $\geq$ 4.69, *p*s < .0001[2].

**Results**

We entered the mean certainty indications into a 3 (Focus: Neutral vs. Similarity vs. Dissimilarity) x 2 (Standard-knowledge: Confident vs. Vague) mixed-model ANOVA, the last factor manipulated within-subjects. We expected that a similarity-focus particularly increases judgmental certainty when confident knowledge about the standard exists. A simple contrast analysis revealed that this was the case. As Figure 1 displays, for judgments with confident standard-knowledge, participants with a similarity-focus were more certain ($M$ = 26.36; $SD$ = 22.14) than participants with a dissimilarity-focus ($M$ = 16.14; $SD$ = 12.85), $t(120) = 2.65$, $p = .009$, $d = 0.56$. Also compared to the control condition ($M$ = 19.76; $SD$ = 15.10) similarity-focused participants tended to be more certain, $t(120) = 1.76$, $p = .082$, $d$ = 0.35. Control and dissimilarity-focus condition did not differ, $t(120) = 0.93$, $p = .353$.

When knowledge about the comparison-standard is vague, we expected the pattern to be less pronounced. Indeed, the pattern of means remained similar, yet, none of the contrasts reached significance. A tendency for higher certainty under a similarity-focus ($M$ = 14.18; $SD$ = 12.32) compared to a dissimilarity-focus ($M$ = 10.25; $SD$ = 8.55) remained, $t(120) = 1.67$, $p$ = .097. No difference emerged between the similarity-focus condition and the control condition ($M$ = 11.01; $SD$ = 10.24), $t(120) = 1.38$, $p = .169$, or the dissimilarity-focus and the control condition, $t(120) = 0.32$, $p = .749$.

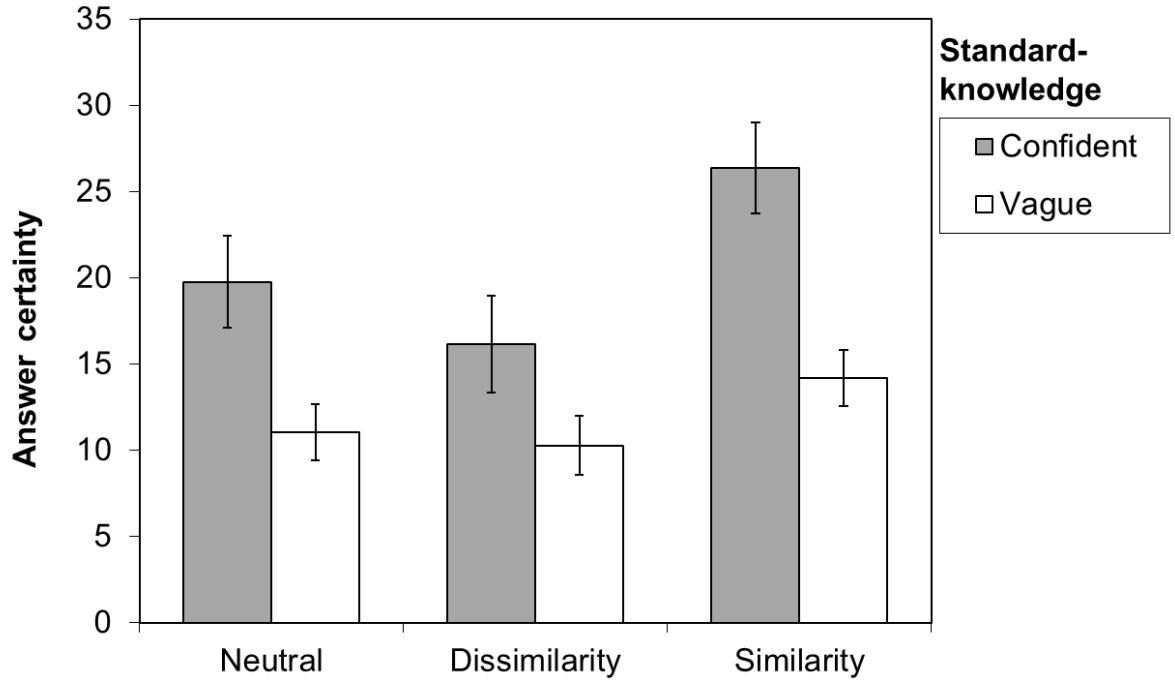


*Figure 1.* Mean answer certainty as a function of focus and standard-knowledge in Experiment 1. Error bars represent ± 1 standard error.

Overall, this pattern produced a significant interaction effect in the Focus x Standard-knowledge ANOVA, $F(2,120) = 3.59$, $p = .031$, $\eta^2 = .056$, indicating that a similarity-focus particularly increases judgmental certainty when standard-knowledge is confident (versus vague). A tendency for a main effect for Focus, $F(2,120) = 3.03$, $p = .052$, $\eta^2 = .048$ suggested that overall the uncertainty-reducing effect of a similarity-focus remained. A main effect for Standard-knowledge indicated that certainty was higher for the judgments with confident ($M = 20.95$; $SD = 17.71$) versus vague standard-knowledge ($M = 11.89$; $SD = 10.61$), $F(1,120) = 87.39$, $p < .0001$, $\eta^2 = .42$.

We also examined whether participants' judgments differed. To address the unrestrained variance that is inherent to open-ended judgments, we z-transformed answers across conditions before averaging them into one index. Answers did not differ ($M_{neutral} = -0.02$, $SD = 0.28$; $M_{similarity} = 0.17$, $SD = 0.23$; $M_{dissimilarity} = 0.01$, $SD = 0.28$), $F(2, 120) = 0.17$, $p = .842$.

## Experiment 2

Experiment 2 investigates the hypothesized mechanism of information-transfer directly. It assesses whether under a similarity-focus more information is transferred from a standard (a known bicycle) to a target (an unknown bicycle) and whether similarity-based judgments that rely on transferred information are more certain. First, to increase the likelihood of the participants to rely on a specific standard while forming the critical target judgment, we asked the participants to write about a specific comparison-standard. This was the bicycle, they had used during their last bike ride. Second, we induced a similarity- versus dissimilarity-focus in the participants, by asking them to name similarities or differences between pictures. Assuming that this directs their information-processing focus towards either similarities or differences in a subsequent task, we subsequently asked them to make judgments about features of a vaguely described target bicycle. For each judgment, they indicated their (un)certainty. Activating a specific standard in the beginning of the experiment entailed another critical advantage. In a final step, we could assess features of the standard. Particularly, participants reported the same information about the standard that they had judged for the target bicycle. This enabled us to identify transferred features by matching the ascribed target bicycle features with the reported features of the standard bicycle. We hypothesized that a similarity-focus results in more transferred features. Furthermore, we expected that a similarity-focus particularly increased certainty for judgments based on transferred information compared to non-transferred information.

### Method

We recruited 191 participants (112 female; $M_{age}$ = 22.62, $SD$ = 5.03) at the University of Cologne. First, the participants engaged in a comparison-standard activation task. They wrote about their last bike-ride (see supplementary materials for instructions). Then they engaged in a comparison-focus induction task. They compared two black-and-white drawings

of an urban square (Mussweiler & Damisch, 2008). Participants in the similarity-focus condition listed similarities between the drawings. Participants in the dissimilarity-focus condition listed differences (Mussweiler, 2001; materials accessible in Mussweiler & Ockenfels, 2013). Subsequently, participants made 12 judgments about a vaguely described target bicycle (see supplementary materials). Their task was to select one out of four given features of the target bike (e.g., "Which kind of handlebars does the bike have?"; "racing", "flat", "multifunctional", "U-shaped"). For each judgment, they indicated their degree of certainty on the same answer-slider as in Experiment 1. Finally, they answered the same questions about the standard bicycle, they had described in task 1. This enabled us to identify features that the standard bicycle possesses that were ascribed to the target bicycle.

**Results**

As expected, a similarity-focus facilitated information-transfer, leading to more standard bicycle features that were ascribed to the target bicycle ($M$ = 5.98, $SD$ = 2.40), compared to a dissimilarity-focus ($M$ = 5.10, $SD$ = 2.24), $t(189) = 2.61$, $p = .010$, $d = 0.38$.

Furthermore, we expected a similarity-focus to increase certainty only for judgments for which information-transfer had occurred. To test this hypothesis, we submitted the mean certainty indications into a 2 (Focus: Similarity vs. Dissimilarity) x 2 (Transfer-status: Transferred vs. Non-Transferred) mixed-model ANOVA, the last factor manipulated within-subjects. As Figure 2 shows, only for the transferred items a similarity-focus increased certainty ($M$ = 62.57, $SD$ = 20.87) compared to a dissimilarity-focus ($M$ = 53.96, $SD$ = 23.90), $t(189) = 2.62$, $p = .010$, $d = 0.39$. No such difference occurred for the non-transferred items ($M_{similarity}$ = 59.87, $SD$ = 19.29; $M_{dissimilarity}$ = 56.18, $SD$ = 23.09), $t(188) = 1.19$, $p = .23$. A significant interaction effect showed that certainty was differently affected by a comparison-focus depending on the information-transfer status, $F(1, 188) = 5.56$, $p = .019$, $\eta^2 = .03$.

Overall, certainty was higher under a similarity-focus ($M_{similarity}$ = 61.24, *SD* = 18.36; $M_{dissimilarity}$ = 55.34, *SD* = 22.12), $F(1, 188) = 4.20$, $p = .042$, $\eta^2 = 0.02$. [3,4]

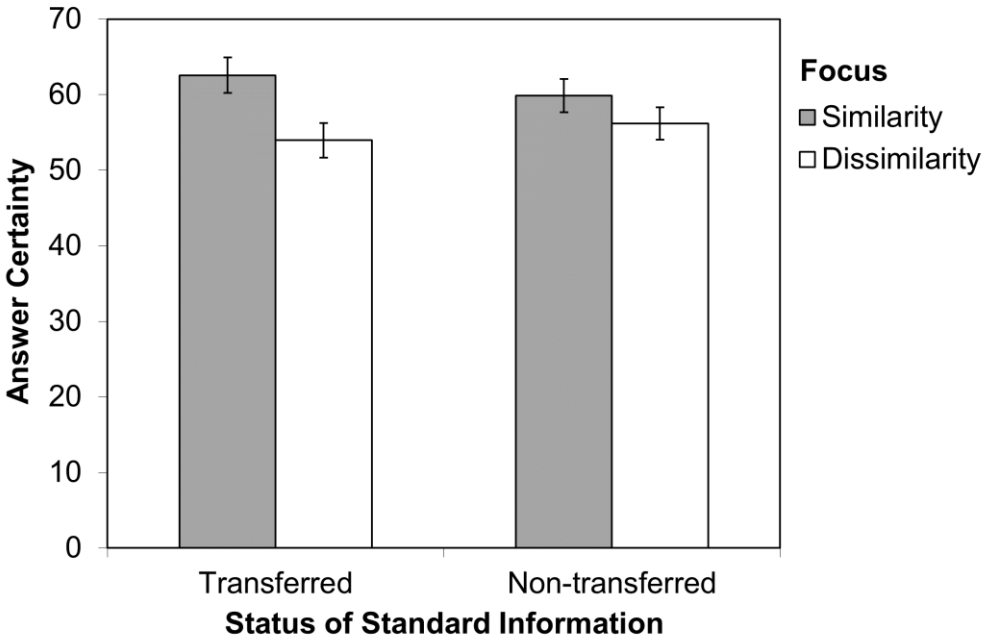


*Figure 2.* Mean answer certainty as a function of focus and the transfer status of standard-information in Experiment 2. Error bars represent ± 1 standard error.

## Discussion

Comparative thinking reduces judgmental uncertainty (Mussweiler & Posten, 2012). Our findings clarify how two alternative modes of comparative thinking relate to these uncertainty-reducing effects. Two experiments demonstrate that a similarity-focus (vs. difference-focus) reduces judgmental uncertainty by facilitating information-transfer from an information-rich standard to a target. In Experiment 1, a similarity-focus (compared to a difference-focus and a neutral control condition) increased judgmental certainty when the judgment relied on confident standard-knowledge. However, when the judgment relied on vague standard-knowledge the uncertainty-reducing effect diminished. Experiment 2 provides further evidence for the assumed underlying mechanism of information-transfer. It shows that a similarity-focus increases information-transfer and furthermore demonstrates that only for transferred information a similarity-focus increases certainty.

Interestingly, the uncertainty reduction is not necessarily accompanied by a trade-off in judgmental accuracy. At first glance, correct and incorrect information (i.e., information that is reliable for the standard but not for the target) may be transferred to the target. Thus, accuracy could be impaired. Closer inspection reveals that the accuracy of comparative thinking depends on target-standard similarity: If target and standard are highly similar to each other, transferring reliable standard-information to the target will not impair the accuracy of the resulting judgment. For highly dissimilar items, however, it may reduce accuracy. In general, people tend to use rather similar standards when engaging in comparative thinking (Festinger, 1954; Kahneman & Miller, 1986). Hence, focusing on similarities does not necessarily compromise accuracy. In line with this reasoning, the present data did not indicate a loss of accuracy. A reduction in accuracy would presuppose a difference in judgments between similarity- and dissimilarity-focused comparisons. The data obtained in Experiment 1 did not demonstrate such a difference. As a bottom line, neither theoretical reasoning nor empirical evidence suggests that the uncertainty-reducing effect of similarity-focused comparisons necessarily comes at the cost of judgmental accuracy.

Speculating about the differences between judgment and choice may reveal important boundary conditions for the uncertainty-reducing effects of similarity-focused versus dissimilarity-focused comparisons. When people have to decide between choice options, a focus on differences may be advantageous for detecting distinctive features of the given alternatives and differentiating between them (Dhar, Nowlis, & Sherman, 1999). For instance, having to decide between two cars, the features that differ (e.g., differences in mileage) may be particularly informative, whereas shared features (e.g., same color) may not help to decide. Indeed, alignable differences play a particularly important role in product evaluation (Zhang & Markman, 1998) and choice heterogeneity increases customer satisfaction (Johnson & Fornell, 1991). Currently, this conjecture remains speculative and

future research needs to address whether, for non-judgmental situations of uncertainty, a similarity-focus also constitutes ‘that certain something’.

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Footnotes

[1] Participants were eligible to engage in the MTurk study if they had a minimal approval rate of 95% in previous MTurk tasks and were located in the United States. For this and all of the subsequent studies, we report all data exclusions, all manipulations, and all measures. The sample size of each study was set in advance. We restricted our analyses a priori to native speakers who completed the experiment (Meade & Craig, 2012). This led to the exclusion of five participants in the pretest of Study 1, 39 participants in Study 1, and 33 participants in Study 2.

[2] We provide the de-individuated data for each experiment in the supplementary materials.

[3] Two independent raters counted the amount of similarities and dissimilarities listed in the focus induction task. We averaged the two ratings (interrater correlation $r$ = .971) into one index and compared the number of listed (dis)similarities in the comparison focus task. The results showed a difference between conditions ($M_{similarity}$ = 6.79, $SD$ = 2.91; $M_{dissimilarity}$ = 5.04, $SD$ = 2.19), $t(189) = 4.70$, $p < .001$. To ensure that our main study results were not driven by this difference, we submitted the number of listed (dis)similarities as a co-variate into an ANCOVA. For all results, the pattern and significance of the results remained unchanged. The experimental conditions still differentially affected the amount of information-transfer $F(1, 188) = 5.15$, $p = .024$, $\eta^2 = 0.03$. The results of the 2 (Focus: Similarity vs. Dissimilarity) x 2 (Transfer-status: Transferred vs. Non-Transferred) mixed-model ANOVA with the number of listed (dis)similarities as a co-variate also remained significant, $F(1, 187) = 4.42$, $p = .037$, $\eta^2 = 0.02$.

[4] To control for any differences regarding a generally increased feeling in certainty, we also asked the participants how certain they feel about the answers regarding their own

bicycle. There were no differences between the experimental conditions ($M_{similarity}$ = 85.28, $SD$ = 13.66; $M_{dissimilarity}$ = 85.92, $SD$ = 13.87), $t(185) = 0.32$, $p = .750$.