

We Readily Anchor Upon Others, But it is Easier to Anchor on the Self

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Abstract

Research on social inferences demonstrates that when thinking about minds similar to our own, we anchor and adjust away from ourselves (Tamir & Mitchell, 2013). However, research on relational self theory (Andersen & Chen, 2002) suggests the possibility of using knowledge about others as an anchor when they are more similar to a target than ourselves. We investigated whether social inferences are made on the basis of significant other knowledge through an anchor and adjustment process, and whether this ability would be reduced under load. Participants answered questions about their likes and habits, as well as the likes and habits of a significant other, a target similar to their significant other, and a yoked control. We found that differences between the significant other and similar target were related to participants' reaction time, and found the opposite effect for self and target differences, suggesting anchoring and adjustment from the significant other rather than the self. However, inferences about the others tended to be more similar to the self under load, suggesting that the self serves as the primary source of information about others.

Keywords: anchoring and adjustment, social cognition, self, mentalizing, cognitive resources

Introduction

Successful navigation of the human social arena requires keeping in mind more than one's own thoughts, desires, and habits. While we possess a reliable reference about what other minds are like (i.e. our own mind), it is not generally advisable to assume the whole of humanity is viewed through our single lens. And it seems that, in general, we don't. We finish close friends sentences, avoid touchy subjects with friends who don't share the same political or religious beliefs as us, and we purchase gifts for our loved ones that (hopefully) they are fond of. While under normal circumstances these tasks are accomplished with relative ease, there are times of stress when it feels much harder to care about, indeed, to even consider, the properties of other minds. Making inferences about others' preferences is something that comes with time. The better we get to know someone, the quicker we are to come to a conclusion about what they are thinking and feeling.

The cognitive instantiation of social inference is not entirely understood, but advancements are shedding more light on the phenomena. Recent research suggests that social inferences about people similar to ourselves are achieved through the process of anchoring on ourselves and serially

adjusting away (Tamir & Mitchell, 2013). While this is a promising step forward in understanding social inferences, it is unclear if anchoring and adjustment can only be done for similar others, and whether stress affects these judgments. This paper aims to investigate anchoring upon those other than ourselves, and how cognitive load affects the process' engagement.

Anchoring and Adjustment

When creating mental estimates of an unknown quantity, people have been shown to use readily available sources of information (anchors) and serially adjust away. Thus, these estimates will tend to assimilate closer to the anchor value, as adjustment ends once a satisfactory estimate has been found (Epley and Gilovich, 2006). Since Tversky and Kahneman's (1974) introduction of the phenomena, research has demonstrated that this tendency emerges in diverse domains like monetary appraisal (Northcraft & Neale, 1987), probability estimates (Einhorn & Hogarth, 1985), and mock legal verdicts (Chapman & Bornstein, 1996).

While some procedures involve providing a source anchor to participants, other procedures allow participants to self-generate anchor values themselves. Related research on egocentric bias has found that people routinely assume that their beliefs about the state of the world are more common to others than they truly are (Allport, 1924; Kruger, 1999; Epley et al., 2004). Tamir and Mitchell (2013) recently consolidated these findings by demonstrating in a series of studies that social inferences about the mental states of others appear to unfold via the process of anchoring upon the self, and adjusting away serially. Participants were asked questions about their own likes, habits, and attitudes, using a scale ranging from "very unlikely" to be applicable to themselves, to "very likely" to be applicable to them. They found that when making inferences about a novel, ostensibly unknown person, the response differences between participants and the strangers shared a positive linear relationship with the amount of time it took participants to respond, implicating serial adjustment from a self-knowledge anchor. Importantly, however, this effect was only true for stranger profiles that were described to participants as being similar in many ways to themselves. Profiles described as dissimilar to participants shared no linear relationship between reaction time and response differences. This finding demonstrates that similarity

between the self and other provides a boundary to egocentricity, but it remains unclear how judgments about dissimilar others unfold. The authors suggest a number of possibilities including stereotype heuristics, rejection of self-knowledge validity, and use of self-as-anchor without adjustment. While these are all plausible explanations for the differences between similar and dissimilar other judgments, herein we explore the idea that people may, under certain circumstances, anchor upon knowledge about well known, significant others (SO's).

Chronic Access to Significant Other Information

While the concept of self-knowledge being the primary, or at least most easily accessible set of mental information is likely not controversial, conceptualizing immediate access to information about others is not quite as obvious. In recent decades, however, social cognitive research has provided evidence that understanding the conceptual self requires the acknowledgement that it is fundamentally interpersonal (Aron et al., 1991; Baldwin, 1992). Indeed, research on the relational self theory (Andersen & Chen, 2002) suggests that people readily access information about SO's in their lives even without conscious knowledge of having done so.

The theory states that the concept of the self is fundamentally relational in the sense that it is connected to other people in our lives. Information about SO's in our lives is intrinsically linked with our own knowledge, and activation of these relationships serves to guide interpersonal encounters. Critically, this knowledge is used extensively in the process of transference, where past assumptions and experiences with SO's guide our behavior and expectations when engaging with new people. For example, when meeting someone new, transient cues (contextual features of the person/current environment) activate the chronically accessible information about similar SO's (Chen et al., 1999). This information is then used as a guide for how to engage with the new person, as information about the relevant SO can be used in the interim period of actually learning about the person's idiosyncratic traits. This has been demonstrated in various domains like creating false memories about new people (Andersen, Glassman & Chen, 1995), subliminally changing self-worth based on SO relationships (Horberg & Chen, 2010), and activating a specific relational view of the self when engaging with the SO (Andersen & Chen, 2002).

The Present Research

The present research is intended to consolidate and extend research on social inferences about others in two domains; namely, to explore whether the ability to anchor and adjust from a social knowledge model applies exclusively to the self for similar others, and to understand the effect of cognitive load upon applying these models.

Research on anchoring in social inferences indicates that self-knowledge is both readily accessible and a useful

source of information in guiding inferences about people we meet when they bear some resemblance to ourselves, allowing us to adjust away based on contextual or perceived idiosyncrasies. However, evidence from relational self theory suggests that social inferences about new acquaintances are strongly tied to the readily accessible information we have about those important to us, SO's. Together, this suggests that when meeting someone that is more similar to an SO than they are to the self, our knowledge of the SO serves as a better basis to anchor and adjust from. However, despite the ease with which this information is accessed under normal conditions, inhibiting self-knowledge in favor of SO knowledge may be mentally taxing, and adjustment from the SO may be incomplete or impossible altogether under conditions of cognitive load.

We asked participants to describe someone in their life that is significant to them, and to answer questions about their own preferences as well as the preferences of their significant others. In a follow-up session, we introduced participants to two novel profiles, one of which was designed using the descriptions of participants' own SO's, and one that was a yoked control. Participants answered the same questions about the preferences of the similar target and the yoke under conditions of cognitive load and no cognitive load.

If perceivers are able to anchor and adjust from a SO anchor, we expected to see the same positive linear relationship between SO and novel social target judgment differences and reaction times as observed in Tamir & Mitchell (2013) only when participants judged others that are similar to SO's. No such relationship for self-other differences was predicted. However, when compared to yoked control profiles, we expected a linear relationship for self-yoke differences with reaction times. As we suspected that the implementation of SO knowledge as anchors is effortful, we predicted that under cognitive load participants would resort to the self as the primary source of information when making social inferences. This effect was expected to be particularly pronounced in the yoked controls, as the profiles were not expected to be as similar to participant selves or SO's.

Method

Participants

Forty-eight students at the University of Texas at Austin completed the experiment for course credit. Informed consent was obtained in accordance with procedures approved by the UT Austin Human Subjects and Institutional Review Board.

Procedure

Day One. In the first part of the study, participants were given informed consent and told they were completing a study on personality similarities in social networks. First, participants completed a brief version of the feature listing

procedure used in Andersen, Glassman & Chen (1995). Participants were asked to describe a significant other, defined as someone known very well, for a long time, who has had a major impact on the person's life, and is evaluated positively on the whole. Thus, a significant other could be a parent, friend, romantic partner, etc. Participants were asked to provide 14 descriptive statements about their significant other, 7 positive and 7 negative, that were relatively unique to them (e.g. "always puts others first," or "can be overprotective") and numerically rank them from "most descriptive" to "least descriptive". After completing the descriptions, participants were asked to check off at least 12 traits from a list of 95 traits such as "sentimental" and "disciplined."

Once participants completed the description materials, they were seated in front of computers to complete what they were told was a personality questionnaire for both themselves and the significant other they had described. The task used is a variant of that used in Tamir & Mitchell (2013). In the "self" part of the task, participants answered 80 questions about their own personal attitudes and habits. On each trial, participants were shown a statement (e.g. "fears speaking in public," "supports affirmative action") and instructed to provide a numerical response as to how applicable that statement is to them using the keyboard. Responses could be made using the 1-9 keys, where extremely low values were labeled as "extremely unlikely" and extremely high values were labeled as "extremely likely." Participants had 10 seconds to respond on each trial. In the "other" part of the task, participants completed the same exact set of questions, this time answering for their significant others.

Once participants completed this task, they were given credit and told that a graduate student in the lab was having a difficult time recruiting subjects for a similar project, and asked if they would be willing to come back in to complete the other study for credit. If they agreed, participants were scheduled to come back to the lab at least one week later from the original study date. The second study was actually a follow-up to the original, in which they would be asked to make inferences about profiles constructed from materials gathered on Day One.¹

Day Two. Upon returning to the lab, participants were told they were completing a study about how people make personality inferences about others based on little information. Participants were seated in front of computers to complete a variant of the personality task they had

¹ The 48 participants run on both Day One and Two protocols were a minority subset of 125 participants run on Day One. After being asked to participate in the follow-up portion of the study, most participants stated that they had already completed all of their course credits for experiments, based on the time of testing late in the semester. Although many volunteered to help despite having credit, IRB guidelines did not allow running participants without providing experimental credit. Though this artificial selection of participants may impact results, it is difficult to infer a systematic impact aside from, perhaps, high engagement with the experiment amongst those who continued into Day Two.

completed in their last session, but for two different people. In each of the two blocks, participants first read fake online profiles and then answered the same 80 questions about their likes, dislikes, and habits. Unbeknownst to the participants, one of these profiles was created using the descriptive traits and statements they had provided about their significant other in their first session (heretofore called the "target" profile).² Participants also completed the questions for a yoked profile constructed for a different participant's significant other, thus there was no relationship between participants and the yoked profile. Only one participant surmised the origin of the profiles, and was subsequently excluded from analysis.

In addition to answering the questions about others, on half of the trials participants were given a manipulation designed to induce cognitive load, previously used in Otto et al. (2013). Before each statement about the target on a load trial, two single-digit numbers appeared for two seconds in the top left and top right corners of the screen. The numbers, from 0 to 9, varied along three dimensions: brightness, size, and value. These numbers would disappear, participants would be given 10 seconds to answer the statement about the respective profile, and finally they were asked which of the two previously seen numbers were of either greater brightness, size, or value. Participants were given 3 seconds to respond to this question, and were given feedback as to whether their response was correct or incorrect. "No load" trials appeared exactly as those in the Day One task. Upon completing the task, participants were debriefed and given credit.

Analysis

Using responses from each of the statement trials, we created a measure of similarity for participants between each person asked about (self, SO, target, and yoke), creating item-by-item discrepancy scores. As adjustment from an anchor is a serial process, we used absolute value differences, since the direction of the adjustment should not affect reaction time.

We tested only trials where the absolute difference between the self and SO were greater than 2 so that we could observe adjustment without items where strong similarities existed between the self and the SO. As responses between the two were frequently similar, this dropped the number of trials tested from a total of 3,827 to a total of 1,310. If participants anchored on their SOs during the target profile questions, we would expect a positive relationship between judgment difference and reaction time for the SO and the target, but not for the self and the target. The condition of cognitive load was predicted to make

² Participants were told that target profiles were created from descriptive information taken from online social media profiles from people named "Terry" and "Pat." In reality, they were created by lifting the statements ranked by participants as "most descriptive" in feature listing procedure to fill in blanks in a profile template. A sentence in the profiles used the participant selected traits in a statement of how others describe the target.

judgment differences between the self and the target and yoke profiles smaller, but not for the SO.

As such, eight hierarchical linear models were tested. Four models tested the hypothesis of anchoring and adjustment from a significant other, and four models tested the hypothesis that cognitive load reduces differences between the self and the target profile.

The dependent variables in the models testing the first hypothesis were judgment differences between the 1. Self and target profile, 2. Self and yoke profile, 3. SO and target profile, and 4. SO and yoke profile. Logged reaction times on the Day Two profile task for the respective profiles was entered as a continuous predictor and load was entered as a binary predictor variable. Each model was compared to its respective null model for comparison.

The four models testing the effect of cognitive load used the same dependent and independent variables, and included an additional predictor variable of the self-SO judgment differences. This additional predictor controlled for variance accounted for by both self and SO in trial to trial differences between the self and SO such that it would be clear which of the two dependent people were being mentally anchored upon. We predicted that the binary cognitive load variable would predict smaller differences between the self and target and yoke profiles, but not between the SO and target and yoke profiles. Finally, subject number was included as a nested variable in these models. Each of these models were also compared to their respective null models.

Results

There were 196 trials in which participants failed to respond to the statement trials in the given response interval. These trials were excluded from the relevant analysis.

The hierarchical models testing the role of a well-known significant other in anchoring and adjustment during social inferences revealed the predicted results. First, the model testing reaction time and load upon SO-target judgment differences revealed a positive linear relationship between discrepancy between the SO and the target, $b = .456$, $t(1,244) = 2.32$, $p = .02$, such that as reaction times increased, so too did differences between the SO and the target (load non-significant, $b = -.038$, $t(1,244) = -.348$, $p = .73$). Secondly, the model testing the same independent variables against self-target judgment differences revealed a negative relationship between reaction time and discrepancy, $b = -.428$, $t(1,244) = -2.05$, $p = .04$, such that increases in reaction time were associated with lower differences between the self and the target (load non-significant, $b = -.153$, $t(1,244) = -1.3$, $p = .193$). Though not predicted, this is even stronger evidence that the self was not being anchored upon in target profile judgments. Further support for this hypothesis is found analyzing yoked profile differences. Similar to the self-target analysis, a negative relationship between SO-yoke differences and reaction time was found, $b = -.683$, $t(1,242) = -3.48$, $p = .0005$, (load non-significant, $b = -.05$, $t(1,242) = -.412$, $p = .68$), demonstrating that to reduce differences between the SO

and the yoke, reaction time increased. No relationship was found between self-yoke differences and reaction time, $b = .04$, $t(1,242) = .245$, $p = .8$, but there was a negative trend of cognitive load on self-yoke differences, $b = -.224$, $t(1,242) = -1.89$, $p = .06$. Compared to a null model, however, this model was both higher in AIC (5661.721 vs. 5663.659, respectively) and no more explanatory (deviance = .062, $p = .803$). All other models had lower AIC values and significantly higher deviances than their respective null models (all deviances > 4.2 , $p < .05$).

The hierarchical models testing the effect of cognitive load upon adjustment from self and SO anchors revealed results consistent with the prediction that cognitive load reduces adjustment, but only away from the self anchor. In all four subsequent models, since differences with between the self and the SO were entered as predictors into the models, these differences were all highly significant, as the correlation amongst judgments for all profiles was high (all p 's $< .0000$). The model testing the effect of cognitive load upon self-target differences revealed a negative trend of load, $b = -.177$, $t(1,243) = -1.83$, $p = .067$, such that cognitive load tended to reduce the differences between the target and the self (reaction time non-significant, $b = -.15$, $t(1,243) = -.84$, $p = .4$). This model also had a lower AIC, but only marginally outpredicted the null model (deviance = 3.364, $p = .067$). The model examining the effect of load on SO-target differences revealed no effects of either load, $b = -.12$, $t(1,243) = -1.31$, $p = .19$, or reaction time, $b = -.119$, $t(1,243) = 1.48$, $p = .13$. This model was also did had a higher AIC (4965.219 vs. 4964.957) and did not predict more variance than a null model (deviance = 1.73, $p = .18$). In examining the analysis of load upon self-yoke differences, a negative effect of load was again found, $b = -.25$, $t(1,243) = -2.45$, $p = .014$, and a negative trend of reaction time was found, $b = -.303$, $t(1,243) = -1.8$, $p = .07$. Finally, the analysis of SO-yoke differences revealed no effect of load, $b = -.167$, $t(1,241) = -1.61$, $p = .11$, but a negative relationship between reaction time and SO-yoke differences, $b = -.653$, $t(1,241) = -3.87$, $p = .0001$. Additionally while this model had a slightly lower AIC, it did not outpredict its null model (deviance = 2.61, $p = .1$). These last two analyses are intriguing as they reveal not only that cognitive load appears to make inferences of others more similar to the self, but also that an anchor other than the self or the SO appears to be taking place, despite not having asked any questions about a significant other similar to the yoke.

Discussion

The present study revealed that social inferences can be made using a process of anchoring and adjustment when targets are dissimilar from ourselves, as long as we have a significant other knowledge base that resembles the target. Specifically, we found a positive linear relationship between SO-target differences and reaction time and a negative relationship between self-target differences and reaction

time. Although this self-target relationship was not predicted, it is even stronger evidence that participants had anchored upon their SO's, rather than themselves. To adjust away from an anchor takes time, and as this adjustment takes place serially, the linear relationship between the SO and the target is in line with this phenomena. The negative relationship between self-target differences suggests that, in order to make judgments about the target that are more similar to the self, one must serially adjust away from their SO anchor, taking time. Thus, the smaller the difference between the self and the target, the longer the reaction time. The inverse of this pattern was found for the yoked profiles, in that the positive relationship existed between self and yoke, and the negative relationship between SO and yoke. Again, this demonstrates that the self served as a better model for making social inferences than the SO, further clarifying the tendency to anchor on SO's as being specific to the profiles designed to be similar to the SO, not someone else's SO.

Further, we showed initial evidence that mentalizing about others using SO knowledge as an anchor is a cognitively demanding process, such that when under cognitive load, responses tended to be more similar to the self (and not the SO) for both the target and yoke profiles.

The self is a critically important part of social cognition, and serves as a fundamental way to understand others. These results indicate that, in line with previous findings, the self seems to serve as a default model to make social inferences, as in the cognitive load conditions and yoked profile comparisons. However, given the presence of a more applicable social knowledge base, people seem to be capable of using the process of anchoring and adjusting upon their knowledge of another, so long as they are well known to them.

Here we see an elaboration of social cognitive processes such that several research domains are consolidated, and expanded upon. As anchoring and adjustment from the self in social inferences of similar others naturally proceeded from research on similarity and basic cognition, so too does the concept of using knowledge about well known SO's to inform inferences about those similar to a SO, given the research on chronic access to SO information and the relational self theory.

There are several ways this process could be instantiated. The most parsimonious theory appears to us in the use of SO knowledge as an exemplar. Previous research on anchoring and adjustment by Mussweiler and Strack (2000) has demonstrated that easily accessible exemplar knowledge is regularly used to make estimates about anchor-consistent, but not anchor-inconsistent information. Similarly, Epley et al. (2004) found that the egocentric bias was enhanced when under conditions resembling cognitive load. In this way, one could think of the relational self theory as an extension of categorization and exemplar representation into the field of social cognition.

Further, the finding that cognitive load seems to cause people to default back to their own preferences provides

evidence that this process is cognitively effortful, and that, lacking resources, we default back to the most readily available source- ourselves. This is in line with the theory of model-based reinforcement learning and decision-making put forth by Daw and Doya (2006). Specifically, when we are trying to navigate an environment that is not well known, cognitive resources are required to mentally explore the environment to better understand it. However, a lack of resources leads people to behave as they do in other, already well-learned settings. Our results indicate that one might be able to perceive novel social targets as novel environments unto themselves, and that understanding them can be made easier by looking for similarities with those we know well. We assume that traits of our close friends and family must be shared with this person who seems somewhat similar to them. Upon employing cognitive resources for other tasks, however, we end up resorting to the easiest model we have, our own self knowledge. Thus, we simply assume that others are more like ourselves and adjust for idiosyncrasies from there, rather than using the better, more cognitively expensive model.

While the current findings demonstrate novel features about social cognitive functions (and shortcomings thereof), it is important to note features of the study that leave further questions to be addressed. First, it is unclear if people are actually anchoring upon themselves when making yoke inferences, or on someone else. As a result, it is unclear just how similar a social target has to be to a SO in order to initiate the process of SO anchoring and adjustment. It would be useful to know if certain types of information about others or certain amounts of information can enhance or dampen this effect. Second, the finding that cognitive load makes judgment differences more similar to the self is only strongly indicated in yoke judgments, and is marginally significant in target judgments. It is possible that the process of adjusting away from a self anchor vs. adjusting from a SO anchor can be traded off, resulting in either a combination of the two, or a trial by trial instantiation of one process or the other. Further research is required to determine the specific impact of cognitive load in these types of social judgments, as well as other judgments of new preferences for our selves and others.

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