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Individual differences in anchoring: Traits and experience

Matthew B. Welsh [a,*], Paul H. Delfabbro [b,1], Nicholas R. Burns [b,2], Steve H. Begg [a,3]

[a] Australian School of Petroleum, University of Adelaide, North Terrace, Adelaide, SA 5005, Australia
[b] School of Psychology, University of Adelaide, North Terrace, Adelaide, SA 5005, Australia

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ABSTRACT

Anchoring is a well-known effect leading to bias in estimation in various decision-making contexts. Previous research examining the role of individual differences in anchoring susceptibility has found weak and unreliable results. In this study anchoring was examined in a simulated poker-like card game, among people with varying levels of academic achievement and using a wide variety of psychometric tests for both cognitive ability and decision style/personality factors. Overall, anchoring susceptibility was largely unrelated to demographic and cognitive measures but weakly correlated to measures of preference and aptitude for rationality. Performance generally improved during the course of the card game task, suggesting that participants became less susceptible to anchoring with experience and these improvements were weakly-to-moderately related to demographic, cognitive and decision style measures. That is, while there were few significant predictors of overall performance, cognitive ability measures and decision styles were related to decreases in anchoring susceptibility.

1. Introduction

Anchoring-and-adjustment[4] (Tversky & Kahneman, 1974) describes a robust effect in which the estimates people make are affected by other numbers that they have recently seen. This has been shown to be influenced by both relevant and irrelevant anchor values (Thorsteinson, Breier, Atwell, Hamilton, & Privette, 2008); by obviously wrong anchors (Quattrone et al., 1984); and to affect expert as well as naïve estimators — for example, altering a property's listing price changes the valuations of realtors as well as non-expert judges (Northcraft & Neale, 1987).

Mechanisms proposed to explain the effect include: Tversky and Kahneman's (1974) original suggestion that people use the anchoring value as a starting point and adjust from there until they reach a "plausible" value which, due to uncertainty regarding which values are plausible, results in values being adjusted insufficiently away from the anchor; and confirmatory hypothesis testing, whereby people examine the anchor as a possible true answer, thereby seeking evidence that might confirm this (see, e.g., Chapman & Johnson, 1999). Evidence supporting both mechanisms has been found under different circumstances (for a recent review, see Furnham & Boo, 2011).

Anchoring is also affected by metacognitive factors, with Wegener, Petty, Detweiler-Bedell, and Jarvis (2001) demonstrating that the degree to which a person's attitudes change when exposed to an anchor is influenced by the perceived plausibility of that anchor. Findings of this nature suggest that the utility of anchors is consciously assessed and that such appraisals influence which knowledge is incorporated into estimation strategies. This mirrors the dual-process theory of decision-making (see, e.g., Stanovich & West, 2000) wherein System 1 consists of fast, heuristic processes while System 2 is conscious and deliberative, often activated when a person identifies an error in their own System 1 response.

Although of theoretical interest in its own right, anchoring also has practical consequences in applied settings. For example, in oil and gas exploration, 'analog' data (i.e. data from a location judged to be analogous to the current location in some way) is regularly used as a starting point for discussions regarding the probability of making a discovery and on assessments of its likely size, value and cost to develop; therefore, anchoring can have a significant impact on decisions (Bratvold, Begg, & Campbell, 2002). For these reasons, considerable time and effort is dedicated to making people aware of anchoring in decision making courses offered at university and in industry settings, in the hope that increased meta-cognitive processes (i.e., awareness and monitoring of the bias) will reduce the probability of it occurring.

The efficacy of this in reducing susceptibility, however, is not clear. Despite the evidence provided by Wegener et al. (2001) most research into anchoring has shown the effect to be highly resistant to

* Corresponding author. Tel.: +61 8 303 8024.
E-mail addresses: matthew.welsh@adelaide.edu.au (M.B. Welsh), paul.delfabbro@adelaide.edu.au (P.H. Delfabbro), nicholas.burns@adelaide.edu.au (N.R. Burns), steve.begg@adelaide.edu.au (S.H. Begg).
[1] Tel.: +61 8 8313 4936.
[2] Tel.: +61 8313 3965.
[3] Tel.: +61 8303 8015.
[4] Hereafter referred to simply as "anchoring".

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awareness-based debiasing (Chapman & Johnson, 2002; Welsh, Begg, & Bratvold, 2006). As a result, there is increasing interest in whether people's susceptibility to anchoring might be related to individual differences in cognitive and metacognitive abilities (Bergman, Ellingsen, Johanneson, & Svensson, 2010; Oechssler, Roider, & Schmitz, 2009; Stanovich & West, 2008). If confirmed, this would indicate the possibility of being able to select decision makers based on their likely resistance to common biases such as anchoring — something that is not possible with the typical judgment and decision making approach, which averages across individuals and can, as a result, even misinterpret the nature of biases (for a recent discussion see Welsh & Navarro, 2012).

1.1. Individual differences

Plausibly, people with greater expertise in a particular area of decision-making should be less prone to biases such as anchoring. However, there is clear evidence to suggest that experts as well as novices are affected by anchors (Northcraft & Neale, 1987).

In their study, Northcraft and Neale divided participants into two groups (expert and non-expert) based upon whether or not they were employed in real-estate. Participants were then asked to value houses after being shown a 'listing price' that acted as the anchor. All participants' estimates were affected by the anchoring values. The researchers also demonstrated that less reasonable anchors had less impact on the responses provided by their non-experts than more reasonable anchors. Somewhat surprisingly, though, they did not examine whether this effect was also observed in experts. In particular, they did not consider the possibility that 'less reasonable' anchors may have had an even lesser impact on the responses of experts. Another limitation of Northcraft and Neale's (1987) study was that the division of their sample into expert and non-expert was done entirely on the basis of whether or not a participant was employed in real estate and this, potentially, failed to capture more refined differences that could have been considered. For example, it might have been possible to have used years of experience as a (poor) proxy for expertise (for a discussion of the problems in defining expertise, see Malhotra, Lee, & Khurana, 2007) or to directly measure expertise in the domain of interest via testing (see, e.g., Bruza, Welsh, Navarro, & Begg, 2011).

Accordingly, there may be value in considering an alternative approach such as that advanced by Frederick (2005) who built upon on a tradition of work established by Stanovich and West (1998, 2008) relating to the relationship between cognitive abilities and bias susceptibility. Stanovich and West (2008) showed that higher cognitive abilities did not appear to mitigate anchoring effects and this finding was replicated by Oechssler et al. (2009) and Furnham, Boo, and McClelland (2012). Despite this, other recent research found that people scoring higher on Frederick's (2005) CRT measure (a measure of 'cognitive reflection'; i.e., how likely a person is to engage rational rather than intuitive reasoning) and on a general cognitive ability test were less susceptible to anchors (Bergman et al., 2010). These inconsistent findings, combined with the earlier insights of Northcraft and Neale (1987), suggest a need for further consideration of the association between expertise, cognitive ability and anchoring effects.

One possibility is that cognitive ability, in and of itself, plays no role in reducing susceptibility to anchoring but instead acts only as a mediating factor in the development of expertise. If this is the case, then this would predict that the relationship between anchoring and cognitive ability be visible only sometimes (where expertise has been developed).

Alternately, it is possible that other factors play a larger role in determining bias susceptibility than cognitive abilities. For example, Frederick's (2005) CRT measure is claimed to reflect a person's decision making style or preference for making decisions in a reflective, logical manner and a variety of other factors could, conceivably, affect the ways in which people make decisions and thus the degree to which they are susceptible to particular biases (see, e.g., Stanovich & West, 2008). Similarly, personality traits may be implicated — for example, it has been argued that high levels of Openness predict greater susceptibility to anchoring (McElroy & Dowd, 2007) as do low levels of Extraversion (Eroglu & Croxton, 2010); although Furnham et al. (2012) failed to replicate the effect of Openness and found an effect of Extraversion on only a single question in their analyses.

A third possibility is that the general measures of cognitive ability used in previous studies are not sufficiently refined to be able to discern relationships between anchoring susceptibility and the specific intelligences that one might expect to affect decision-making. For example, researchers have commonly used self-reported SAT scores (Frederick, 2005; Stanovich & West, 2008) and general tests of ability such as the Wonderlic Personnel Test (1992) (Frederick, 2005; Furnham et al., 2012) rather than well-established, specific, cognitive abilities that one might expect to be related to anchoring susceptibility such as Quantitative (Numerical) Ability and Processing Speed — described in the Cattell–Horn–Carroll model (see, e.g., McGrew & Flanagan, 1998).

Finally, the possible role of metacognitive factors such as attention and executive functioning needs to be considered in relation to anchoring susceptibility. While often regarded as cognitive measures, attributes such as Working Memory (Baddeley & Hitch, 1974) and Sustained Attention (Robertson, Manly, Andrade, Baddeley, & Yiend, 1997) do not sit easily within the current CHC model and clearly involve metacognitive processes of attention and executive function. Given this, it seems plausible that they would relate to System 2 in Stanovich and West's (2000) dual-process model.

1.2. Research aims

The first aim of this project was to examine whether increased expertise (loosely defined here as greater experience/skill with a specific task) is associated with decreased susceptibility to bias resulting from anchoring — specifically, whether increased expertise would enable people to limit the effect of anchors by decreasing the number of anchors that they might consider plausible, in line with Wegener et al. (2001). Second, we intended to establish whether specific cognitive and metacognitive abilities were related to anchoring susceptibility, or expertise, or both. Third, we sought to determine whether other psychometric traits (e.g., personality and decision styles) predicted anchoring susceptibility. Finally, we were interested to see whether demographic measures such as educational level predicted bias susceptibility — because university courses seem the most likely place for a person to have previously encountered the concept of anchoring.

Recognizing the difficulties in defining expertise within any given field, we also wanted to create a task on which we could measure participants' actual expertise so that this could be compared with self-rated expertise. For this reason, we chose a card-game with similar rules to poker (see below). This task enabled us to run a large number of trials and calculate the exact probabilities that the participants would be estimating. It also made it possible to observe people's actual expertise (as reflected in their task performance) and whether this was related to how much prior experience they had with games of this nature. A secondary goal of this task was to enable us to calculate a measure of anchoring susceptibility that is independent of a person's degree of knowledge regarding the correct probabilities — unlike in standard anchoring tasks where the interplay between effect of the anchor and a person's knowledge remains implicit (see below for details).