Article

Are Big Five Traits and Facets Associated With Anchoring Susceptibility?

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Abstract

Anchoring, the assimilation of judgments to previously considered values, is one of the most robust findings in psychology, and researchers have been increasingly interested in finding individual difference moderators of anchoring effects. Several investigations have examined the relation between Big Five traits and anchoring susceptibility, but previous studies have produced a confusing and contradictory pattern of results. We identify limitations of previous work and report a large preregistered study ($N = 945$) to test whether Big Five traits and facets relate to anchoring. We find no significant relations between any traits or facets and anchoring susceptibility. We discuss the implications of our results and future directions for research on individual differences in anchoring susceptibility.

Keywords

One of the most consistent findings in psychology is that people's judgments under uncertainty assimilate to *anchors*—numerical values or information to which they have been exposed. Tversky and Kahneman (1974) introduced the standard anchoring paradigm, in which participants first answer a comparative question containing an anchor (e.g., "Do you think the population of Chicago is more or less than 100,000 people?") and then make an absolute estimate of a target value (e.g., "What do you think the population of Chicago is?"). Using this paradigm, hundreds of studies have shown that people exposed to high anchor values make higher estimates than people exposed to low-anchor values (for a review, see Furnham & Boo, 2011).

Anchoring effects are theoretically interesting because they violate the assumption of normative theories of reasoning that people's judgments are uncontaminated by irrelevant contextual information, but they also have important practical implications. Indeed, anchors can influence the outcomes of negotiations (Galinsky & Mussweiler, 2001), salary offers (Thorsteinson, 2011), the awarding of legal damages (Chapman & Bornstein, 1996), and purchasing decisions (Wansink, Kent, & Hoch, 1998). Moreover, knowledge does not prevent anchoring; even the judgments of experts are vulnerable to anchors (e.g., Brewer, Chapman, Schwartz, & Bergus, 2007; Cheek, Coe-Odess, & Schwartz, 2015; Englich, Mussweiler, & Strack, 2006). Thus, understanding how anchoring works, who is affected by it, and how it can be attenuated are important goals from both a theoretical and an applied perspective.

Based on an analysis of the development of anchoring research, Epley and Gilovich (2010) delineated three waves of research over the past four decades. First, researchers investigated anchoring effects with reference to normative theories of judgment, ultimately determining that no normative theory could account for the wide range of studies in which apparently irrelevant anchors affect participants' judgments. Given the surprising strength and breadth of anchoring effects, a second wave of research grew in the 1990s designed to understand the underlying psychological mechanisms that cause anchoring. Although this wave is still active (e.g., Dowd, Petrocelli, & Wood, 2014; Bahník & Strack, 2016), substantial progress has been made in the development of different, mutually compatible theories of anchoring (see Chapman & Johnson, 2002; Furnham & Boo, 2011). Building on this progress, a third, more recent wave of research has begun to explore the bounds of anchoring effects, examining limits of anchoring by adopting new experimental paradigms or testing the potential influence of moderator variables. In the present research, we join this latter wave by investigating the role of Big Five traits and facets in the susceptibility to anchoring effects.

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Table 1. Summary of Existing Big Five Anchoring Studies.

Trait	Study		
	Found to Predict *Stronger* Anchoring	Found to Predict *Weaker* Anchoring	Found to be *Unrelated* to Anchoring
Openness	McElroy and Dowd (2007) Teovanović, Knežević, and Stankov (2015) Perry and Sibley (2013)[a]	Caputo (2014)	Eroglu and Croxton (2010) Furnham, Boo, and McClelland (2012) Perry and Sibley (2013)[b] Jasper and Ortner (2014)
Conscientiousness	Eroglu and Croxton (2010) Perry and Sibley (2013)[b]		McElroy and Dowd (2007) Furnham et al. (2012) Perry and Sibley (2013)[a] Caputo (2014) Jasper and Ortner (2014)
Extroversion		Eroglu and Croxton (2010) Furnham et al. (2012)	McElroy and Dowd (2007) Perry and Sibley (2013)[a,b] Caputo (2014) Jasper and Ortner (2014)
Agreeableness	Eroglu and Croxton (2010)	Caputo (2014)	McElroy and Dowd (2007) Furnham et al. (2012) Perry and Sibley (2013)[a,b] Jasper and Ortner (2014)
Neuroticism	Jasper and Ortner (2014)		McElroy and Dowd (2007) Eroglu and Croxton (2010) Furnham et al. (2012) Perry and Sibley (2013)[a,b] Caputo (2014)

[a]In Study 1a. [b]In Study 1b. Teovanović et al. (2015) only included openness.

The Big Five and Anchoring Susceptibility

In the past decade, there has been a growing interest in individual differences in anchoring, with studies exploring a range of variables, such as political extremity (Brandt, Evans, & Crawford, 2015), knowledge (Smith, Windschitl, & Bruchmann, 2013), and cognitive abilities and styles (Stanovich & West, 2008; Welsh, Delfabbro, Burns, & Begg, 2014). The most commonly investigated predictor of anchoring susceptibility, however, has been the Big Five trait dimensions (e.g., Eroglu & Croxton, 2010; Furnham, Boo, & McClelland, 2012; McElroy & Dowd, 2007; Perry & Sibley, 2013; Teovanović, Knežević, & Stankov, 2015).

The Big Five is a taxonomy of personality traits, developed primarily through factor analyses of self and other personality ratings from hundreds of large and diverse samples (Saucier & Goldberg, 1996). It has become the most widely used and well-known trait taxonomy in personality psychology, in part because of its comprehensiveness with respect to personality traits and in part because of its utility in predicting important real-world outcomes (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Ozer & Benet-Martinez, 2006). Each dimension of the Big Five describes a broad domain of personality: Extroversion, Neuroticism, Agreeableness, Conscientiousness, and Openness to Experience. Each of these broad trait dimensions, in turn, is composed of "facets," which describe narrower domains of more specific and more strongly intercorrelated items (Costa & McCrae, 1995). Thus, for example, Extroversion is made up of facets describing traits related to

Friendliness, Gregariousness, Assertiveness, Activity Level, Excitement Seeking, and Cheerfulness. Generally, facets within a trait domain relate more strongly to one another than they do to facets in another domain, and facets provide more measurement precision and descriptive specificity, while the broad dimensions provide more inclusive coverage of a given domain.

The Big Five taxonomy is an obvious initial candidate for exploring potential individual differences across a variety of phenomena, simply because of its ubiquity. Unfortunately, despite substantial interest in the Big Five dimensions as predictors of anchoring susceptibility, little progress has been made in the identification of reliable relations. In Table 1, we summarize the existing literature on the Big Five and anchoring, which reveals a confusing pattern of inconsistent results. For both Agreeableness and Openness to Experience, studies have found positive, negative, and null relations with anchoring susceptibility; and for the other three dimensions, at least one study has found either positive or negative relations, while many studies have found null effects. Before discussing possible reasons for these inconsistencies, we briefly summarize the predictions that previous researchers have made about anchoring susceptibility and the Big Five.

McElroy and Dowd (2007) first hypothesized that people higher in Openness to Experience (hereafter, Openness) would be more susceptible to anchoring because they would be more willing to consider new information (i.e., the anchor) and update their prior beliefs based on this new information

(e.g., McCrae & Costa, 1997). Consistent with their predictions, they found in two studies that Openness predicted anchoring susceptibility. This finding was replicated by Teovanović, Knežević, and Stankov (2015), but Caputo (2014) found the opposite pattern, and several authors have failed to find any relation between Openness and anchoring susceptibility (Eroglu & Croxton, 2010; Furnham et al., 2012; Jasper & Ortner, 2014). Perry and Sibley (2013) found that Openness predicted anchoring when the anchor involved information that signaled a dangerous worldview—consistent with predictions derived from the dual-process model of ideology and prejudice (Duckitt, 2001)—but not when anchoring stimuli were unrelated to threatening information. Perry and Sibley argued that Openness does not reliably predict anchoring susceptibility per se, but rather reactions to threatening anchoring stimuli, and that the inadvertently threatening stimuli in McElroy and Dowd's studies may partially explain the effects they found.

Furnham and Boo (2011) theorized that Agreeableness and Conscientiousness may lead people to pay more attention to anchors and process them more deeply (leading to larger anchoring effects; Bodenhausen, Gabriel, & Lineberger, 2000) either because they are more invested in the interpersonal context in which anchors are presented (in the case of Agreeableness) or because they think more carefully and deeply (in the case of Conscientiousness). Caputo (2014) attempted to test these predictions but found no relation between Conscientiousness and anchoring susceptibility and found that more agreeable people actually exhibited weaker rather than stronger anchoring effects. Furnham and Boo (2011) and Caputo (2014) also hypothesized that Neuroticism would predict stronger anchoring because it is associated with negative affect, and negative mood has been found to increase anchoring (Bodenhausen et al., 2000; Englich & Soder, 2009), but this pattern has only emerged in one study (Jasper & Ortner, 2014). Other authors included the Big Five for exploratory purposes and argued that there were no clear theoretical reasons to predict that they would relate to anchoring susceptibility (Furnham et al., 2012; Jasper & Ortner, 2014; Teovanović et al., 2015).

In summary, many contradictory findings have emerged in the research on the Big Five dimensions and anchoring. Although thus far more confusing than informative, research on personality and anchoring susceptibility is important for both basic and applied research. First, exploring individual differences can help identify boundary conditions in which anchoring effects are not as strong, a primary effort of the ongoing third wave of anchoring research (Epley & Gilovich, 2010). Second, individual differences in anchoring can inform theories that seek to explain anchoring effects. For instance, the lack of a relation between need for cognition and anchoring effects was interpreted by Epley and Gilovich (2006; see also Stanovich & West, 2008) as evidence favoring a theory of externally provided anchors that posited only implicit, effortless processing (though see Simmons, LeBoeuf, & Nelson, 2010). Third, individual differences may potentially guide researchers toward interventions or policies that reduce

anchoring effects when they are undesirable. For example, Lammers and Burgmer's (2017) finding that power increases anchoring effects may suggest that negotiators should temper the extent to which they attempt to feel more powerful before a negotiation. Finally, individual differences may reveal weaknesses in policy interventions designed to use anchoring for positive effects—such as smaller portion sizes on food packaging (Marchiori, Papies, & Klein, 2014)—by highlighting that they are ineffective for some consumers. Given the value of exploring individual differences in (and moderators of) the effects of anchors, we sought to clarify and advance research on the Big Five and anchoring by identifying and overcoming limitations of existing research.

Limitations of Previous Work

In our view, there have been at least four serious limitations of existing research on anchoring and the Big Five, which could potentially produce both false positives and false negatives in previous studies. These limitations include (1) low statistical power, (2) suboptimal measures of the Big Five, (3) inconsistent anchoring paradigms, and (4) flawed analytic approaches to moderation analyses.

Statistical power. As with many areas of psychology, the literature on anchoring and personality suffers from a lack of statistical power, due to both small sample sizes and low measurement quality. Low statistical power can result in both false positives and false negatives (e.g., Button et al., 2013; Vadillo, Konstantinidis, & Shanks, 2016) and thus compromises the contribution of a given study. Low power is an especially important problem in research on individual differences in anchoring susceptibility because any real effects are likely to be relatively small. A large body of work has established several, mutually compatible theoretical explanations of anchoring, and the many different mechanisms work together to make anchoring effects large and reliable (Chapman & Johnson, 2002; Epley, 2004). This same combination of many different routes to the same phenomenon, however, also means that any one predictor, whether an individual difference or a contextual variable, is likely to explain only a relatively small portion of the variance. For instance, conscientious people might think more closely about an anchor value, increasing their susceptibility to anchoring, but even subliminal presentation of anchors influences judgments through numerical priming (Mussweiler & Englich, 2005), such that even people low in Conscientiousness are likely to exhibit at least moderate anchoring effects (see also Furnham & Boo, 2011, p. 41). The average sample size of previous studies investigating anchoring susceptibility and the Big Five is fewer than 200 participants, limiting the ability to detect the small effects expected given the many mechanisms underlying anchoring.

Measures of the Big Five. Previous studies on the Big Five and anchoring have used a wide range of measures of the Big Five including very short measures (e.g., Caputo, 2014; McElroy &

Dowd, 2007). Some researchers have argued that in situations in which brief survey administration is a priority, 1- or 2-item measures of the Big Five can still provide useful information despite psychometric limitations (cf. Gosling, Rentfrow, & Swann, 2003; Soto & John, 2017). Credé, Harms, Niehorster, and Gaye-Valentine (2012), however, showed that short measures of the Big Five can produce both Type I and Type II errors, which may partially explain the confusing pattern of results in the existing anchoring and Big Five literature.

Inconsistent anchoring paradigms. The most widely used anchoring paradigm is the original paradigm developed by Tversky and Kahneman (1974) in which participants are first asked whether a target value is larger or smaller than an anchor value and then make an absolute estimate of the target value. Some previous research on anchoring and the Big Five has used this paradigm (Furham et al., 2012; McElroy & Dowd, 2007; Perry & Sibley, 2013), but other studies have employed novel paradigms that may not best operationalize anchoring effects. For instance, Eroglu and Croxton (2010) created an anchoring index that only considered judgments made in the correct direction relative to the anchor to be indicative of anchoring. That is, if a participant was exposed to an anchor greater than the true value and made an estimate above that anchor, no anchoring was judged to have occurred. It is not clear that novel paradigms and scoring methods such as the one used by Eroglu and Croxton are the most appropriate to measure anchoring susceptibility. More generally, the different paradigms used (see also Caputo, 2014; Teovanović et al., 2015) may explain why studies have found different effects—the Big Five dimensions may predict different anchoring effects in different paradigms. The standard paradigm developed by Tversky and Kahneman (1974) is likely the best place to begin exploring individual differences, given that it is well understood and has been used in hundreds of studies.

Flawed moderator analyses. A fourth limitation of previous studies has been potentially flawed moderator analyses when researchers have used the standard anchoring paradigm developed by Tversky and Kahneman (1974). When using this paradigm, participants answer a comparative question and then make an absolute estimate, and researchers typically test whether there is a significant interaction between the moderator of interest and anchoring condition (i.e., high vs. low anchor). Although widely used, this approach can be flawed because it fails to take into account the direction of participants' estimates relative to the anchor value. Participants can make an estimate in the *inner* direction (lower than the high anchor in the high-anchor condition or higher than the lower anchor in low-anchor condition) or the *outer* direction (higher than the high anchor in the high-anchor condition or lower than the low anchor in the low-anchor condition). Cheek and Norem (2018) argued that ignoring estimate direction can be problematic because it can lead to Type II errors in the presence of a true predictor of anchoring susceptibility. For example, if Openness predicts stronger anchoring effects, as argued

by McElroy and Dowd (2007), then more open participants in the high-anchor condition who make estimates in the inner direction should make *higher* estimates, whereas more open participants in the high-anchor condition who make estimates in the outer direction should make *lower* estimates. That is, the estimates of participants higher in Openness should be closer to the anchor value whether they answer in the inner or outer direction. This pattern means that pooling estimates from participants who provide estimates in different directions can lead potential effects to cancel out. In this example, ignoring estimate direction could mean that Openness falsely appears unrelated to anchoring because the effect of Openness on participants' estimates when participants made estimates in the inner direction is canceled out by its effect on participants' estimates when participants made estimates in the outer direction. The risk of a false negative is higher in cases of relatively low statistical power, as many previous moderator studies in the anchoring research have been (Cheek & Norem, 2018).

The Present Research

In the present research, we sought to clarify and advance the contradictory literature on the Big Five and anchoring. To increase statistical power, we aimed to collect data from a large enough sample of participants that even relatively small effects could be reliably detected. We also measured the Big Five traits with the IPIP-NEO-120 (Johnson, 2014), a well-validated measure out of which broad dimensions and more specific facets can be scored, and which has improved psychometric properties relative to very short scales. We used the standard anchoring paradigm to investigate the role of the Big Five in a well-understood and established context. Finally, we followed Cheek and Norem's (2018) advice for moderator analyses in the standard anchoring paradigm and examined the relation between Big Five traits and facets and anchor-estimate gaps (Epley & Gilovich, 2001; Simmons et al., 2010). To do so, we calculated the absolute value of the difference between participants' estimates and the anchor values to which they were exposed, which provides a measure of the degree to which participants anchored on provided values. This study was preregistered through AsPredicted.org (https://aspredicted.org/h7qi4.pdf), and materials, data, and code are available through the Open Science Framework (https://osf.io/cbf3t/).

Method

Participants

In our preregistration, we planned to recruit at least 1,000 participants in order to have a final sample of at least 840, which would provide a 90% chance of detecting an effect of $r = .15$ with an α of .002. We calculated this α as a correction for 25 correlational analyses; however, we actually planned 35 (the Big Five trait dimensions and all 30 facets). Thus, the α level should have been .001, for which 919 participants are required to achieve 90% power. In total, we recruited 1,002

Table 2. Descriptive Statistics and Analyses of Basic Anchoring Effects.

Anchoring Question	Low-Anchor Condition				High-Anchor Condition					
	Anchor Value	n	M	SD	Anchor Value	n	M	SD	t	r [95% CI]
Meat eaten per year by American family (pounds)	30	476	97.25	255.39	500	461	506.09	1,231.21	6.99***	.23 [.16, .29]
Population of Chicago (millions)	2	463	4.00	4.69	15	474	11.42	10.66	13.84***	.41 [.35, .46]
Year telephone invented	1830	458	1873.35	31.26	1915	477	1898.81	22.56	14.23***	.42 [.37, .48]
Maximum speed of house cat (mph)	8	474	11.38	6.43	30	468	20.24	9.86	16.32***	.47 [.42, .52]
Gas used per month by American (gallons)	28	479	48.96	44.65	200	454	157.50	147.63	15.03***	.45 [.40, .50]
Average winter temperature of Antarctica (Fahrenheit)	−50	469	−35.44	36.23	10	471	−6.21	20.00	15.31***	.45 [.39, .50]

Note. We report Welch's *t* tests because of unequal variances between conditions. CI = confidence interval.
***p < .001.

participants from Amazon's Mechanical Turk (MTurk), of whom 945 (409 male, 523 female, and 13 who did not choose either) met our preregistered inclusion criteria (described below) for analyses; accordingly, our study was adequately powered to detect the effect size of interest with .90 probability (additional participant demographic details are available in Supplemental Material).

Materials and Procedure

Participants completed six anchoring tasks comprising a comparative question (e.g., "Do you think the telephone was invented before or after 1830?") and an absolute estimate (e.g., "What year do you think the telephone was invented?"). Anchoring questions were taken from previous studies (e.g., Cheek & Norem, 2017; Furnham et al., 2012; Jacowitz & Kahneman, 1995) and are presented in Table 2. We used the anchor values from Cheek and Norem (2017), which were chosen by taking the 15th and 85th percentiles of estimates made by MTurkers without exposure to an anchor, per the recommendation of Jacowitz and Kahneman (1995). Participants were randomly assigned to either the high- or low-anchor condition for each of the six tasks and completed the tasks in a random order. We calculated anchor-estimate gap scores by first calculating the absolute difference between each estimate and its respective anchor value, then standardizing each absolute difference within each question and condition, and finally averaging each standardized difference to create a composite anchor-estimate gap score for each participant (Epley & Gilovich, 2001; Simmons et al., 2010). Larger anchor-estimate gap scores indicate *weaker* anchoring because estimates are farther away from anchor values.

After completing the anchoring tasks, participants completed the IPIP-NEO-120, with items ordered as indicated by Johnson (2014). Participants then completed an instructional manipulation check (Oppenheimer, Meyvis, & Davidenko, 2009), a demographic questionnaire, and two questions asking if they (1) looked up information online and (2) answered randomly at any point in the study.

Results

Data Exclusions and Preliminary Analyses

To be included in analyses, participants had to meet four preregistered criteria: They had to (1) pass an instructional manipulation check, (2) indicate that they did not respond randomly, (3) indicate that they did not look up information online, and (4) provide at least four valid answers to the anchoring tasks. Fifty-seven participants did not meet at least one of these criteria, leaving 945 participants. Individual estimates were excluded if they met three criteria: (1) appeared discontinuous on a histogram, (2) were more than five standard deviations away from the mean, and (3) were implausible. We exclude 18 estimates based on these criteria (see Supplemental Material for details on all exclusions). As a preliminary analysis, we examined whether anchoring effects emerged for each of the six tasks. As can be seen in Table 2, robust anchoring effects emerged in every task.

Primary Analyses

To examine whether any of the Big Five traits or facets predicted the strength of anchoring, we conducted correlational analyses between the Big Five traits, their 30 facets, and anchoring scores. Table 3 presents these correlations, along with 95% confidence intervals (CIs) and *p* values. With our α of .001, none of the 35 correlations was significant. Although Conscientiousness and its facets may appear marginally significantly correlated with anchoring scores, this does not constitute particularly strong evidence for the role of Conscientiousness in anchoring given the large sample size and many comparisons in this study.

Discussion

Results from previous research on the relations between the Big Five trait dimensions and anchoring susceptibility are inconsistent, even conflicting. The goal of our study was to improve on past research in hopes of clarifying whether and how the Big Five relate to anchoring. Our study was preregistered and

Table 3. Correlations Among the Big Five Traits and Facets and Anchor-Estimate Gap Scores.

Measure	n	r [95% CI]	p	Measure	n	r [95% CI]	p
Openness	943	.03 [−.04, .09]	.397	**Conscientiousness**	944	.09 [.03, .16]	.004
Imagination	945	.00 [−.06, .07]	.881	Self-efficacy	945	.06 [.00, .13]	.049
Artistic interests	945	.03 [−.03, .10]	.291	Orderliness	944	.06 [.00, .13]	.050
Emotionality	944	.02 [−.05, .08]	.589	Dutifulness	945	.05 [−.01, .12]	.095
Adventurousness	945	.02 [−.05, .08]	.640	Achievement striving	945	.09 [.03, .16]	.004
Intellect	944	.02 [−.04, .09]	.453	Self-discipline	945	.09 [.02, .15]	.007
Liberalism	945	.01 [−.06, .07]	.800	Cautiousness	945	.05 [−.01, .12]	.093
Extroversion	945	.02 [−.04, .09]	.497	**Agreeableness**	943	.03 [−.04, .09]	.383
Friendliness	945	.01 [−.05, .07]	.771	Trust others	944	.00 [−.06, .07]	.880
Gregariousness	945	.03 [−.04, .09]	.399	Morality	945	.04 [−.02, .11]	.199
Assertiveness	945	.05 [−.01, .11]	.121	Altruism	944	.02 [−.05, .08]	.589
Activity level	945	.09 [.02, .15]	.008	Cooperation	945	.01 [−.05, .08]	.658
Excitement seeking	945	−.07 [−.14, −.01]	.027	Modesty	945	.02 [−.04, .08]	.543
Cheerfulness	945	−.01 [−.07, .05]	.764	Sympathy	945	.02 [−.04, .08]	.532
Neuroticism	945	.00 [−.07, .06]	.940				
Anxiety	945	.00 [−.06, .06]	.974				
Anger	945	−.01 [−.07, .06]	.876				
Depression	945	−.01 [−.07, .06]	.853				
Self-consciousness	945	.00 [−.06, .07]	.882				
Immoderation	945	.01 [−.05, .08]	.693				
Vulnerability	945	−.02 [−.08, .05]	.592				

Note. Because all participants did not complete all measures, sample sizes for correlations vary slightly. CI = confidence interval.

well-powered, used a highly reliable, and well-validated measure of the Big Five that includes facets for each dimension (Johnson, 2014), employed the standard anchoring paradigm (Tversky & Kahneman, 1974), and used a sensitive measure—anchor-estimate gap scores (Cheek & Norem, 2018)—of anchoring susceptibility. Using an α value corrected for multiple comparisons, none of the correlations between any of the Big Five traits or their facets and anchoring scores was statistically significant, and none exceeded .09. All but four of the 95% CIs for the correlations include zero. Thus, the conservative conclusion from our data is that there is no direct relation between Big Five traits or facets and anchoring susceptibility, at least in the standard anchoring paradigm.

Many of the previous studies of the Big Five and anchoring were exploratory, without theoretical rationales for predicting specific results, and the hypotheses that were proposed in previous research were not confirmed in our study. We should note, however, that our study does not test one existing theoretical prediction: Perry and Sibley (2013) argued that Openness may predict anchoring susceptibility, but only when the stimuli involved are threatening to an individual's worldview. Our data do not preclude the possibility that Openness moderates anchoring under the conditions Perry and Sibley discuss, and experimental research that manipulates how threatening anchoring stimuli are could replicate that effect. Similarly, there might be other theoretically justifiable predictions concerning interactions between the context and content of anchoring stimuli and personality traits. For example, one might predict that the Achievement Striving facet of Conscientiousness might influence effortful processing more when

individuals are given feedback about their accuracy and a goal or standard against which to compare their scores.

An interesting feature of previous theorizing on possible associations between the Big Five and anchoring susceptibility is that most predictions were actually based on hypothesized indirect associations mediated by thinking styles (in the case of Conscientiousness), social motivation (in the case of Agreeableness), or individual differences in mood or affect (in the case of Neuroticism). For example, researchers hypothesized that Conscientiousness may be associated with stronger anchoring because highly conscientious individuals may process anchors more deeply and that Neuroticism may be associated with stronger anchoring because highly neurotic individuals experience more negative moods, which predicts stronger anchoring effects. The question of whether the depth and nature of cognitive and affective processing can moderate anchoring effects is important both practically and theoretically, but our view is that research on personality traits is an indirect way of addressing questions of such mechanisms. Given conflicting past results and our current results, further research on specific potential mechanisms that get at mediating cognitive, social, and affective processes more directly seems more likely to increase our understanding of individual differences in anchoring susceptibility, as compared to simply showing associations with broad Big Five traits.

Indeed, the Big Five and other trait constructs may not be intrinsically strong candidates for moderators of anchoring because they are relatively broad and distal constructs, whereas anchoring is a more specific, immediate cognitive process. There are other aspects of personality, and other individual

differences, that might be more likely to moderate anchoring susceptibility (Norem, 2010). In particular, constructs that relate more directly to goals, motivations, or cognitive styles in particular situations may influence both the depth and nature of processing of anchoring information in ways that either dilute or accentuate its effects. For example, Lammers and Burgmer (2017) predicted and found that people who felt more powerful were more susceptible to anchoring effects because power increases reliance on accessible (anchor-consistent) information. From a motivational perspective, Joel, Spielman, and McDonald (2017) found that people often ignore personally threatening anchors.

Constraints on Generalizability

Our research relied on MTurk workers, and to the extent that those workers are nonrepresentative in the ways they respond to anchoring questions, in personality characteristics, or in their specific motivation for our study, our results may not be broadly representative. Some previous research suggests, for example, that MTurk workers are higher in Openness and Conscientiousness, and lower in Extroversion and Agreeableness than in-person student samples (e.g., Colman, Vinyard, & Letzring, 2018; Goodman, Cryder, & Cheema, 2013). It is possible that different mean levels of traits in a sample could influence correlations with other measures, but this is most likely to be an issue if a sample represents restricted ranges on particular traits. Large MTurk samples have broader ranges for both demographic variables and the Big Five traits than traditional student samples, so while our results may not be universally generalizable, they are likely to be more broadly representative than age-restricted or otherwise demographically limited convenience samples.

Previous research on the Big Five and anchoring has included procedures ranging from online administration of study materials to recruiting participants for in-person studies. Those samples were primarily drawn from undergraduate populations, although two studies relied on older samples: Eroglu and Croxton, (2010) recruited store managers, while Caputo (2014) used LinkedIn to recruit managers and other professionals. Across the extant studies, however, neither mode of administration nor type of sample (student vs. professional) systematically differentiates the effects found, for example, from the two earlier studies using nonstudent samples, one found that Agreeableness predicted stronger anchoring (Eroglu & Corxton, 2010), and one found that Agreeableness predicted weaker anchoring (Caputo, 2014). The overall anchoring effects themselves were reliably and comparably large, as they typically are, in both our studies and previous Big Five studies, which suggests that basic anchoring processes are similar across samples.

Our use of standard, reliable, and well-validated measures for both the Big Five and anchoring help us to be confident that our results are not due to some idiosyncratic aspect of measurement or study design (see also Klein et al., 2014). Nevertheless, it is possible that different specific samples, materials, or contexts might produce different results. For example, participants in our study provided judgments in only six domains, and thus our results may not generalize to other judgment domains or to different stimuli (Wells & Windschitl, 1999). Furthermore, it is possible that the Big Five traits are related to anchoring susceptibility outside of the standard anchoring paradigm—for example, more subtle forms of anchoring such as "incidental environmental anchors" (Critcher & Gilovich, 2008) or more intentional forms of anchoring such as consciously adjusting from self-generated anchors (Epley & Gilovich, 2001) may differ from anchoring in the standard paradigm in their associations with personality traits.

Our study also provides no information about potential cultural differences in the relationship between the Big Five and anchoring, and though, to our knowledge, there has been no theorizing in the anchoring literature about any such differences, there are some reasons to consider the possibility that culture might influence anchoring susceptibility. For example, Cheek and Norem (2017) found a small correlation between thinking style and anchoring susceptibility. To the extent that thinking styles are related to culture (de Oliveira & Nisbett, 2017), we might expect that the aspects of culture that influence thinking styles might also influence anchoring susceptibility. Support for this suggestion comes from negotiation research showing that early first offers produce anchoring effects that hinder joint gains in the United States but lead to information sharing and greater joint gains in Japan (Adair, Weingart, & Brett, 2007). Research has also demonstrated cultural differences in other judgment biases (e.g., Choi & Nisbett, 1998), which gives at least a *prima facie* basis for exploring culture as a moderator of anchoring worth studying further.

Conclusion

Anchoring is a large and robust phenomenon that results from several different complementary cognitive mechanisms, so large moderator effects, whether from situations or individual differences, are relatively unlikely. Researchers interested in those potential effects, therefore, will need to pay more attention to methodological approaches, sample size considerations, and other influences on statistical power than has been typical in past research. Our hope is that future exploration of potential moderators will be based on theoretical considerations of the ways in which context (including specific characteristics of participants, the nature of the sample as a whole, the content of the task, and the context of administration) might be expected to influence anchoring susceptibility.

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Supplemental Material

The supplemental material is available in the online version of the article.

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