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The Better-Than-Average Effect in Comparative Self-Evaluation:

A Comprehensive Review and Meta-Analysis

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Abstract

The better-than-average-effect (BTAE) is the tendency for people to perceive their abilities, attributes, and personality traits as superior compared to their average peer. This article offers a comprehensive review of the BTAE and the first quantitative synthesis of the BTAE literature. We define the effect, differentiate it from related phenomena, and describe relevant methodological approaches, theories, and psychological mechanisms. Next, we present a comprehensive meta-analysis of BTAE studies, including data from 124 published articles, 291 independent samples, and over 950,000 participants. Results indicated that the BTAE is robust across studies (*dz* = 0.78, *CI* [0.71, 0.84]), with little evidence of publication bias. Further, moderation tests suggested that the BTAE is larger in the case of personality traits than abilities, positive as opposed to negative dimensions, and in studies that (1) use the direct rather than the indirect method, (2) involve many rather than few dimensions, (3) sample European-Americans rather than East-Asians (especially for individualistic traits), and (4) counterbalance self and average peer judgments. Finally, the BTAE is moderately associated with self-esteem (*r* = .34) and life satisfaction (*r* = .33). Discussion highlights theoretical and empirical implications.

*Keywords*: better-than-average effect, self-enhancement, positive illusions, self-evaluation, social comparison

*Public Significance Statement*: This meta-analysis reveals a robust tendency for people to perceive themselves as superior compared to their average peer. This effect is more pronounced when examining personality traits than abilities and is associated with higher self-esteem.

The Better-Than-Average Effect in Comparative Self-Evaluation:

A Comprehensive Review and Meta-Analysis

When you look in the mirror, do you see a face that is above average or below average in attractiveness? When you reflect upon your intelligence or sociability, do you think that you are generally superior or inferior to others? Answers to such questions are not trivial. People with above average attractiveness, intelligence, and sociability are wealthier than those who rank lower on these dimensions (Judge, Hurst, & Simon, 2009; Sutin, Costa, Miech, & Eaton, 2009). Nonetheless, evidence indicates that self-evaluations are often distorted in a positive direction (Alicke & Sedikides, 2011; Dunning, 2005). Specifically, although only half the population can be above average on a characteristic (except in the rare circumstances in which distributions are negatively skewed), a majority of people believe that they are above average. This phenomenon, termed the *better-than-average effect* (BTAE), has been documented across many socially-valued dimensions (Alicke & Govorun, 2005; Sedikides & Alicke, 2012). Although early research on the BTAE primarily focused on testing its viability (e.g., Brown, 1986), subsequent work has examined the motivational and cognitive mechanisms that contribute to it (Chambers & Windschitl, 2004; Moore & Healy, 2008), the degree to which it generalizes across demographic groups (Brown, 2010; Sedikides, Gaertner, & Toguchi, 2003), its implications for psychological well-being and adjustment (Sedikides, & Gregg, 2008; Taylor & Brown, 1989), and the domains in which it might be curtailed or even reversed (Dunning, Myerowitz, & Holzberg, 1989; Kruger, 1999).

The objective of the present article was to quantitatively aggregate the vast BTAE literature in an effort to determine the effect’s robustness and moderators. Despite several qualitative reviews of the BTAE and related phenomena (Alicke & Govorun, 2005; Chambers & Windschitl, 2004; Moore & Healy, 2008; Sedikides, Gaertner, & Cai, 2015), no quantitative review of the BTAE literature has been published. The lack of major research syntheses on the BTAE is surprising, given its fundamental link to self-related theories (Alicke & Sedikides, 2009; Sedikides & Alicke, 2019), and its prominence in social psychology textbooks (Kassin, Fein, & Markus, 2017; Myers & Twenge, 2016). By synthesizing the BTAE literature, this article seeks to provide an up-to-date summary of what is known about the effect, in addition to identifying gaps that may spark future inquiry. Along these lines, we first offer a conceptual overview of the BTAE, then present results of a relevant meta-analysis, and finally, conclude by noting unresolved issues that may stimulate future research.

**Better-Than-Average Effect in Self-Evaluation**

Researchers in various disciplines, including social, personality, clinical, health, industrial-organizational, and educational psychology, as well as philosophers and neuroscientists, have long questioned the degree to which self-evaluations are biased, that is, skewed in an overly positive or negative direction (Dunning, Heath, & Suls, 2004; Ferris, Johnson, & Sedikides, 2018; Taylor & Brown, 1988). Sometimes, self-evaluations can be compared to objective criteria such as behavioral data, test scores, or expert-appraisals (Mabe & West, 1982; Preuss & Alicke, 2009; Zell & Krizan, 2014). However, many of the traits on which people evaluate themselves, such as attractiveness, extraversion, or honesty lack an established, objective criterion. Moreover, even when such objective measures exist, people may not have access to them, may not appreciate their evidentiary value, or may outright avoid them (Gramzow, 2011; Howell & Shepperd, 2012; Sedikides, Green, Saunders, Skowronski, & Zengel, 2016). Thus, rather than comparing self-judgments to results of objective tests, researchers began to assess how people evaluate themselves in relation to an average peer (Weinstein, 1980, 1982). By definition, the average person in a given sample should believe that they rank average, barring unusual circumstances (i.e., a skewed distribution). If, however, the average person thinks that they are above average, one can argue that a directional bias exists such that people generally evaluate themselves in an unrealistically favorable manner.

**Definitions and Distinctions**

We define the BTAE as the proclivity to rate one’s current abilities, attributes, or personality traits more favorably than those of the average peer. Broadly, the BTAE is considered a prominent manifestation of self-evaluation bias (Kwan, John, Kenny, Bond, & Robins, 2004; Moore & Healy, 2008). Related research on *unrealistic optimism* indicates that people believe positive outcomes are more likely and negative outcomes are less likely to happen to them (vs. others) or than objective base-rates would attest (Shepperd, Klein, Waters, & Weinstein, 2013). Unrealistic optimism studies overlap methodologically with the BTAE in that they often examine self-evaluations in relation to an average other. However, whereas unrealistic optimism research focuses on judgments of what may happen in the future, BTAE research focuses on judgments regarding one’s current abilities, attributes, or traits. Thus, unrealistic optimism is distinguishable from the BTAE in that the former addresses the perceived likelihood of future events, whereas the latter addresses present self-perceptions, which may be key correlates of future behavior and life choices (Swann, Chang-Schneider, & McClarty, 2004).

The BTAE can also be distinguished from other self-evaluation biases. For example, individuals sometimes exhibit *illusions of control*, where they believe they can control random outcomes (Thompson, 1999). Additionally, research has found robust support for a *holier than thou effect*, where the percentage of individuals who estimate they would engage in a moral behavior is significantly higher than the percentage of those who actually behave morally when confronted with the same situation in real life (Epley & Dunning, 2000). Although these findings suggest that people over-estimate their control over random events and moral behavior, they do not directly test perceptions of self in relation to others as does BTAE research. Finally, several studies on the *Dunning-Kruger effect* show that people overestimate the rank of their performance, especially when they occupy an inferior position in the performance distribution (Dunning, 2011). These findings are consistent with the BTAE, but, whereas Dunning-Kruger effect studies compare self-perceptions of performance on a specific test (e.g., a math test) to objective test scores, BTAE studies compare self-perceptions on attribute, ability, or trait dimensions (e.g., math ability or competence) to perceptions of the average person. In summary, although the BTAE can be considered one of several manifestations of self-evaluation bias, the effect is unique in its emphasis on comparative evaluations of the present self on relatively enduring attribute, ability, or trait dimensions.

Finally, the BTAE can be distinguished from research on self-esteem, which is defined as the degree to which people have positive versus negative evaluations of themselves, both in specific domains and as a whole (Leary & Baumeister, 2000). Consistent with the BTAE, large multi-national studies have found that European-Americans typically evaluate themselves favorably on self-esteem measures (Diener & Diener, 1995). However, whereas self-esteem research assesses self-evaluation, BTAE research examines how people evaluate themselves *in comparison to* their average peer. A popular measure of trait self-esteem, the Rosenberg (1965) Self-Esteem Scale, does include 2 items in which people evaluate themselves comparatively (i.e., *I am able to do things as well as most other people* and *I feel that I’m a person of worth, at least on an equal plane with others*). Nonetheless, these items assess whether people perceive themselves as equal to others (i.e., adequate) and not whether people perceive themselves as superior.

**Theoretical Perspectives**

**Truth and Bias Model**. Psychologists have long been interested in the degree to which accuracy and bias characterize social perception (Brunswik, 1955; Fletcher & Kerr, 2010). Along these lines, the Truth and Bias Model (West & Kenny, 2011) proposes that social perception is influenced by a truth force that pulls judgments toward reality and a bias force that pull judgments away from reality. Many variables may contribute to truth and bias forces, with some having a relatively strong and others a relatively weak influence. In addition, bias variables may have either a high or low bias value, in which they pull judgments toward the positive or negative pole of the judgment scale, respectively. Critically, the Truth and Bias Model specifies that the relation between accuracy (i.e., the degree to which social perceptions are correlated with or track reality) and bias (i.e., mean-level differences between social perceptions and reality) is complex. Sometimes bias and accuracy are inversely related, as was previously assumed in the social perception literature, but there are also situations in which accuracy and bias are unrelated or even positively related. Thus, the presence of an overall directional bias in social judgment does not necessarily imply that these judgments are inaccurate; that is, bias can occur alongside near-perfect rank order accuracy.

Although most research inspired by the Truth and Bias Model pertains to the perception of other people, such as one’s romantic partner (Stern & West, 2018), the model also delineates how the BTAE may occur in self-judgment. Presumably, people desire realistic views of themselves, as highly distorted self-beliefs could lead to maladaptive decisions or behaviors. However, several motivational and non-motivational variables, described in greater detail below, may substantially bias self-views, often in a positive direction (i.e., have a high bias value). The end result of these competing forces is an overall directional bias, whereby people evaluate themselves somewhat more favorably than is objectively warranted. Taken together, the Truth and Bias Model provides a framework for understanding the cumulative influence of truth and bias forces on self-judgment, and suggests that biased self-beliefs can in some contexts reflect reasonably accurate self-views.

**Self-enhancement**. Self-enhancement theories propose that people have positively-distorted, but not grandiose, perceptions of self across judgment domains, and engage in various strategies to promote or maintain these beliefs (Alicke & Sedikides, 2009; Sedikides & Alicke, 2019). Evidence for self-enhancement has been obtained in many contexts. For example, people perceive themselves more favorably than do dispassionate observers, more often discount negative than positive feedback about themselves, better remember positive than negative information about their past, and prefer to interact with others who view them favorably as opposed to unfavorably (Hepper, Gramzow, & Sedikides, 2010; Hepper, Sedikides, & Cai, 2013; Zell & Alicke, 2010). The BTAE is fundamental to self-enhancement theories, given that it is perhaps the longest and most frequently studied manifestation of self-enhancement in the literature. Thus, understanding the size and consistency of the BTAE across studies is critical in evaluating the degree to which extant findings broadly support self-enhancement theories.

**Self-verification**. Self-verification theory assets that people prefer feedback and relationship partners who affirm rather than challenge their self-views (Swann, 2012; Swann & Buhrmester, 2013), and clarifies how the BTAE may emerge in development. Specifically, secure attachment figures may provide messages that instill positive self-beliefs in childhood (Cassidy, 1988). Then, selective socialization with people who affirm positive self-views may polarize and strengthen such views, thus leading people to view themselves as superior. Moreover, social norms pressure people to refrain from communicating negative feedback to both acquaintances and close others, which may further strengthen self-superiority beliefs (Fay, Jordan, & Ehrlinger, 2012; Tesser & Rosen, 1975). Therefore, self-verification theory suggests that biased self-views arise not only from self-enhancement processes, but also from selective exposure to information that creates and ultimately strengthens these beliefs. Consistent with this argument, the BTAE is more pronounced among those with high versus low self-esteem (e.g., Bosson, Swann, & Pennebaker, 2000; Chung, Schriber, & Robins, 2016), presumably because high (low) self-esteem engages people to seek information that confirms unrealistically positive (negative) self-views.

**Social comparison**. Social comparison theories posit that people consider their standing in relation to relevant peers during self-evaluation, especially for traits that lack objective definition (Festinger, 1954; Suls & Wheeler, 2017; Wood, 1989). Early social comparison research focused primarily on comparisons with discrete individuals, but later work recognized that comparisons may also occur with abstract targets such as the average person in one’s school or country (Buckingham & Alicke, 2002). A key question in the social comparison literature is whether and when people tend to focus on upward comparisons with superior others or downward comparisons with inferior others. A meta-analytic review of the social comparison literature demonstrated that people more often choose upward than downward comparison standards for the purposes of self-appraisal (Gerber, Wheeler, & Suls, 2018), but these data do not address whether people generally evaluate themselves as superior, inferior, or comparable to their peers. The BTAE literature addresses this gap. If people typically view themselves as above average, this would suggest that downward comparisons are more dominant in perceptions of self than upward comparisons. Thus, research on the BTAE may be used to address a key question in social comparison theory regarding the salience of upward versus downward comparisons in self-evaluation.

**Self-knowledge**. Theoretical perspectives on self-knowledge posit that self-evaluations are prone to error and bias (Dunning, 2005; Wilson, 2002). Along these lines, hundreds of accuracy studies have examined the correlation between self-evaluations of ability and objective ability measures, such as standardized tests and supervisor ratings (Freund & Kasten, 2012; Mabe & West, 1982). A quantitative synthesis of 22 meta-analyses, spanning a variety of domains such as academic ability, intelligence, medical skills, sports ability, and vocational skills, found that the average association between self-evaluations of ability and objective performance measures is only moderate (*r* = .29; Zell & Krizan, 2014). Further, evidence has established that self-ratings of personality are moderately to strongly correlated with, but not identical to, peer-ratings of personality (Vazire, 2010; Vazire & Carlson, 2010). Nonetheless, it remains unclear from these correlational studies whether self-evaluations are typically more positive or more negative than other indices suggest they should be. Unlike research on accuracy, research on the BTAE is focused on identifying whether and to what extent self-evaluations are generally *biased* in a positive or negative direction. Therefore, the BTAE literature is crucial in addressing the general question of how well people know their abilities, attributes, and personalities (Dunning et al., 2004).

**Methodological Approaches**

Research evaluating the BTAE in comparative self-evaluation has used one of four methods (Figure 1). First, research using the *direct method* has participants evaluate themselves in comparison to the average person on a rating scale. Given that the scale midpoint represents the average person, mean responses that differ from the midpoint in a favorable direction indicate a BTAE. In a representative study, for example, college students evaluated themselves relative to the average same-gender college student on 20 positive (e.g., dependable, considerate) and 20 negative (e.g., meddlesome, insecure) personality traits using 7-point scales that ranged from *much less* to *much more*, with a midpoint of *about the same* (Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995, Study 1). Consistent with the BTAE, participants rated positive traits as more descriptive and negative traits as less descriptive of themselves than the average student. In a similar study, high school students rated positive traits as more descriptive and negative traits as less descriptive of themselves than the average student at their school of the same age and gender (Hoorens, 1995). Beyond personality, other studies using the direct method have found a BTAE for a variety of attributes and abilities, including intelligence, leadership, physical attractiveness, and morality (Pelham & Swann, 1989; Sedikides, Meek, Alicke, & Taylor, 2014; Van Lange & Sedikides, 1998).

Second, research using the *indirect method* has participants evaluate themselves and the average person on separate scales. Mean differences between self-ratings and average-ratings are then calculated across participants to determine whether participants generally rated themselves as above or below average. In a pioneering study, college students evaluated themselves and the average peer on 154 personality traits using 7-point scales that ranged from *not at all characteristic* to *very characteristic* (Alicke, 1985). Consistent with the BTAE, participants rated desirable personality traits as more characteristic and undesirable personality traits as less characteristic of themselves than the average student. In a related study, college students rated positive trait adjectives as more representative and negative trait adjectives as less representative of themselves than of most others (Brown, 1986). Moreover, later studies found that people rate their abilities, such as intelligence (Kruger, 1999, Study 2) and driving skill (Walton, 1999), more favorably than the average person’s abilities.

Third, research using the *forced choice method* has participants indicate whether they rank above or below average on a given dimension. Assuming a normal distribution, about 50% of respondents should rank above average and about 50% should rank below average. Thus, if significantly more than 50% of respondents think they rank above average, a BTAE is said to have occurred. Along these lines, an oft-cited study found that, among a sample of one-million SAT test takers, most students believed that they were above average in athleticism (60%), leadership (70%), and the ability to get along with others (85%; College Board, 1976-1977; as described in Alicke & Govorun, 2005). Moreover, a survey of faculty at the University of Nebraska found that 94% rated themselves as above average teachers (Cross, 1977).

Fourth, research using the *percentile method* has participants indicate the percentage of people who rank as good as or worse than them on a given dimension. Given that the scale midpoint (i.e., the 50th percentile) represents the median rank, as well as the average rank in a normal distribution, mean responses that are significantly higher than the 50th percentile are interpreted as support for the BTAE. A classic study using this method found that American and Swedish college students rated their driving safety and skill as significantly higher than the 50th percentile relative to other students at their university (Svenson, 1981). In addition, later work found that college students rated their personality traits (e.g., neat, sensitive) as above the 50th percentile relative to other students at their university (Dunning et al., 1989, Study 1). Of the four methods, results from the percentile method most unambiguously indicate a self-evaluation bias, as only 50% of people can be above the median. Conversely, with methods that invoke comparisons with an average peer, more than 50% can be above average in a skewed distribution.

Taken together, research using direct, indirect, forced-choice, and percentile methods have provided consistent support for the BTAE and inspired dozens of studies that further explored the nature and robustness of the effect. Having established key methods used to assess the BTAE, we next discuss explanations for the effect.

**Underlying Mechanisms**

The BTAE derives from motivational factors such as a motive to perceive or present the self favorably. Nonetheless, the BTAE is more than merely a motivational phenomenon. Indeed, like many robust social psychological phenomena, the BTAE reflects the influence of several distinct mechanisms. Although a detailed discussion of each mechanism is beyond the scope of this report, we summarize below the empirical backing for both motivational and cognitive contributors to the BTAE.

**Motivational mechanisms**. Evidence indicates that people are motivated to perceive themselves favorably and that this desire for positive self-beliefs partly underlies the BTAE (Alicke & Govorun, 2005; Sedikides & Alicke, 2019; Sedikides et al., 2015). Consistent with the motivational perspective, the BTAE is larger for positive traits and weaker for negative traits that are perceived as controllable (Alicke, 1985), perhaps because people are motivated to attribute their strengths to internal factors (e.g., effort, ability) and their weaknesses to external factors (e.g., fate). In addition, the BTAE is more pronounced in the case of abstract dimensions (Dunning et al., 1989), vague dimensions (Logg, Haran, & Moore, 2018), as well as dimensions that lack external verification (Van Lange & Sedikides, 1998), presumably because people define these dimensions in an idiosyncratic and self-serving manner. Finally, the BTAE is larger for traits that are perceived as both personally important (Brown, 2012) and culturally important (Sedikides et al., 2003), perhaps because these traits are of greater motivational significance than unimportant traits.

Beyond examining differences in the BTAE based on trait importance, one experiment found that the BTAE was more pronounced among participants who received negative feedback about their intelligence than participants who received no feedback (Brown, 2012, Study 5). These data suggest that a motive to promote or protect the self directly contributes to the BTAE. Another set of studies found that comparative ratings of the average person in relation to the self (*How honest is the average student in comparison to you?*) are more favorable than absolute ratings of the average person (*How honest is the average student?*), and that this tendency to assimilate the average person to the self is more pronounced in the case of undesirable than desirable traits (Guenther & Alicke, 2010). These studies indicate that people assimilate the average person to the self during comparative judgment, but that self-enhancement concerns restrict the amount of assimilation for traits that are motivationally significant.

Additional support for the role of motivational mechanisms comes from work demonstrating that the BTAE continues to occur even when people are under cognitive load (Alicke et al., 1995, Study 7), which precludes deliberative thought about the self and others required for most cognitive explanations. Moreover, people continue to rate themselves as above average even when the average person is assigned a value that participants had previously selected for themselves (Alicke, Vredenburg, Hiatt, & Govorun, 2001). These data, as well as the fact that the BTAE occurs when people are quickly rating themselves on many traits, suggest that the BTAE cannot be fully explained in terms of biased recruitment or information processing about the self and others. Conversely, people may simply invoke an “I am better than average” heuristic when responding to comparative self-evaluation items (Alicke & Govorun, 2005), and this heuristic may be grounded in a functional motive to perceive the self as a positive, capable, and moral person (Fiske, 2014; Leary, 2007).

We argue that self-enhancement provides a parsimonious explanation for results suggesting motivational influences on the BTAE. However, self-verification theory (Swann, 2012) provides an important alternative explanation for several of these effects. Specifically, the BTAE may be stronger for positive and important traits because self-beliefs for these traits are held with greater certainty (Pelham & Swann, 1989), and people are more likely to seek confirmatory information for certain than uncertain self-views. Moreover, the BTAE may be stronger following negative feedback because feedback that conflicts with self-views triggers compensatory self-verification processes whereby people selectively activate or pursue positive information about themselves (Swann & Brooks, 2012). Lastly, cognitive load may both increase self-enhancement and decrease self-verification (Hixon & Swann, 1993), complicating explanations for cognitive load effects on the BTAE. Thus, although more research is needed to tease apart these competing explanations, it appears that both self-enhancement and self-verification strivings may contribute to biased self-beliefs.

**Cognitive mechanisms**. Research also suggests that several cognitive variables contribute to the BTAE and related phenomena (Chambers & Windschitl, 2004; Moore & Healy, 2008). The most prominent non-motivational contributor to the BTAE is *egocentrism*, or the tendency for people to overweight their own characteristics and underweight the characteristics of the average person when judging themselves in comparison to the average person. This undue focus on the self leads people to perceive themselves as above average on relatively common dimensions in which they perceive themselves favorably, but below average on relatively rare dimensions in which they perceive themselves unfavorably (e.g., juggling, computer programming; Kruger, 1999; Zell & Alicke, 2011). Further, judgments of the self in comparison to the average person are more strongly associated with, and more similar to, absolute judgments of the self than absolute judgments of the average person (Guenther & Alicke, 2010; Klar & Giladi, 1999). Egocentrism may occur, often rationally, because people know more about themselves than their average peer and thus rely upon this richer information source during judgment (Moore & Healy, 2008).

A related explanation, termed *focalism*, states that people overemphasize the characteristics and abilities of the focal object during comparative judgment, which in most cases is the self. That is, research on the BTAE often uses response scales in which the self is the target of evaluation and is therefore more focal than the average person (*How honest are you in comparison to the average person?*). Consistent with the focalism account, research indicates that the BTAE is reduced when the average person is placed in the focal position (*How honest is the average person in comparison to you?*) than when the self is placed in the focal position, as is customary in BTAE studies (Pahl & Eiser, 2005, 2007).

Lastly, a third explanation, termed the *generalized-group account*, states that the BTAE occurs because people often view individuated objects such as the self or another person more favorably than generalized objects such as the average group member. Consistent with this explanation, people perceive other individuals, such as their romantic partner (Brown & Han, 2012), their child (Lench, Quas, & Edelstein, 2006), and even randomly selected strangers, as above average (Klar, 2002). The results of such studies indicate that the BTAE may occur because individuated entities, like the self, are regarded more favorably than aggregated entities, like the average person.

Nonetheless, egocentrism, focalism, and generalized-group accounts do not completely explain the BTAE. That is, the BTAE remains even when researchers use response scales that obviate egocentrism and focalism, such as when self-evaluations and average-evaluations are made on separate scales as in the indirect method. Additionally, although people perceive most any individual as above average, people perceive themselves as superior to specific individuals as well as to group aggregates (Alicke et al., 1995; Krizan & Suls, 2008; Sedikides & Alicke, 2012).

**Caveats and Critiques**

A critique of research on the BTAE is that some people who perceive themselves as above average are in fact, above average. For example, it would be unsurprising if Serena Williams perceived herself as above average in athleticism, as she is in fact far above average. However, the majority of people overestimate their personality and ability when self-perceptions are compared to objective measures of these constructs (Heck & Krueger, 2015). Furthermore, people who rank in the first quartile (0-24th percentile) and second quartile (25-49th percentile) on performance tests tend to think erroneously that their performance ranks significantly above average (Dunning, 2011). Thus, many people who perceive themselves as above average are not actually above average. Nonetheless, it is important to recognize that the BTAE reflects a bias at the group as opposed to the individual level, and that not all individuals who perceive themselves as above average are necessarily in error (Moore, 2007).

According to another critique, individuals simply state publicly that they are above average, while privately recognizing that they are not. Although self-presentational concerns may exacerbate self-enhancement effects (Tyler & Rosier, 2009), individuals who believe that they are above average are willing to bet money that they will rank superior to others on objective tests (Williams & Gilovich, 2008). Moreover, offering financial incentives for unbiased self-appraisal fails to eliminate self-enhancement effects in performance prediction (Ehrlinger, Johnson, Banner, Dunning, & Kruger, 2008). Hence, individuals seem genuinely to believe that they are above average. Moreover, implicit tests that are less susceptible to socially desirable responding illustrate that individuals more quickly associate positive concepts and less quickly associate negative concepts with the self than with others (Karpinski, 2004). These implicit tests provide further support for the notion that self-superiority beliefs are genuine.

Finally, although we propose that the BTAE reflects biased (i.e., unrealistically positive) self-beliefs, this bias may result from mechanisms that are at least partly rational. People receive mostly positive feedback about themselves throughout life (Swann, 2012), many of the dimensions in which people evaluate themselves are ambiguous and therefore open to interpretation (Dunning et al., 1989; Logg et al., 2018), and people often evaluate themselves under conditions in which motivation or cognitive resources are low (Alicke et al., 1995). Therefore, the BTAE may predictably result from incomplete or biased information that people receive about themselves, idiosyncratic definitions of trait dimensions, or heuristics that culminate in somewhat biased estimates of one’s attributes and abilities while preserving limited cognitive resources for other pursuits.

**The Current Meta-Analysis**

Building upon prior narrative reviews of the BTAE, which have focused primarily on underlying mechanisms (Alicke & Govorun, 2005; Chambers & Windschitl, 2004; Moore & Healy, 2008; Sedikides & Alicke, 2012, 2019), the present article used meta-analysis to synthesize research on the BTAE. In doing so, we addressed several core questions about the effect, including (1) its magnitude and robustness, (2) the degree to which it is moderated by demographic variables and measurement characteristics, and (3) the extent to which it is associated with measures of psychological well-being.

**Magnitude and Robustness**

The BTAE is widely considered to be a highly robust effect—in fact, social psychology instructors often administer direct measures of the BTAE as a relatively foolproof demonstration of self-enhancement (Guenther & Alicke, 2010). However, it is not known whether the effect is consistent and robust across studies. Further, little is known about the overall magnitude of the BTAE. It is both practically and theoretically important to understand the overall size of the BTAE, as a large effect would indicate that people have substantially biased perceptions of themselves.

**Potential Moderators**

**Method**. As indicated above, the BTAE is typically studied using four methods: direct, indirect, forced-choice, and percentile. Research on unrealistic optimism, a phenomenon related to the BTAE, found larger self-enhancement effects with the direct method versus the indirect method (Otten & Van Der Pligt, 1996), likely because egocentrism and focalism are minimized when using the indirect method. However, it remains unclear whether the BTAE is also larger when examining the direct versus the indirect method. Further, little is known about the relative size of the BTAE in studies that use forced-choice or percentile methods. The forced-choice method may yield relatively large estimates of the BTAE, given that participants are required to choose among two extreme options and may select the option that best matches their self-view. Conversely, the percentile method may yield relatively small effects, as its flexible response format allows for the identification of participants with moderate yet still favorable self-views (e.g., someone who places themselves at the 52nd percentile).

In addition to comparing the BTAE across the four major methods, we examined whether the effect varied as a function of other methodological choices. Specifically, we tested whether direct method studies yield larger effects when they explicitly label the scale midpoint as “average,” and we tested whether indirect method studies yield larger effects when they counterbalance self and average other judgments. We did not formulate strong predictions regarding the potential effect of midpoint labels and judgment counterbalancing on the BTAE.

**Judgment domain**. Whereas many BTAE studies have participants evaluate themselves on personality traits (e.g., kindness, sensitivity), others have participants evaluate their abilities (e.g., math or verbal ability). Given that personality traits are typically more abstract and less subject to external verification than ability dimensions (Dunning et al., 1989; Van Lange, 1998), we anticipated that the BTAE would be larger for personality traits than abilities. Further, consistent with prior work on egocentrism (Kruger, 1999; Zell & Alicke, 2011), we anticipated that a BTAE would occur for relatively easy abilities, but that a worse-than-average effect (WTAE) would occur for relatively hard abilities. This variation in the magnitude of the BTAE by ability difficulty likely occurs because people overemphasize their own abilities and neglect the abilities of others’ during comparative judgment (i.e., egocentrism).

Another critical issue in the BTAE literature is the valence of the judgment dimension. Whereas many BTAE studies focus on positive dimensions (e.g., kind, sensitive), other studies focus on negative ones (e.g., unkind, insensitive), or include both. A BTAE on positive dimensions is viewed as a manifestation of self-enhancement or an exaggeration of one’s favorable qualities, but a BTAE on negative dimensions is viewed as a manifestation of self-protection or a minimization of one’s unfavorable qualities (Krueger & Wright, 2010). Presently, it remains unclear whether self-enhancement generally exerts a stronger motivational force than self-protection. Thus, by examining overall differences in the BTAE as a function of trait valence, the meta-analysis allowed for a novel comparison of these two fundamental self-motives.

Finally, prior research on the BTAE varies in the number of dimensions explored, with some studies having participants evaluate themselves on a single dimension (e.g., math ability; Mattern, Burrus, & Shaw, 2010) and others on dozens of dimensions (Alicke, 1985). People may engage in effortful cognitive strategies, such as thinking deeply about their own and others’ experiences in the domain, when rating themselves on a single dimension. Alternatively, people may simply adopt an “I am better than average” heuristic when rating themselves across many dimensions in an effort to conserve cognitive resources. Thus, one might expect the BTAE to be larger in studies that had participants evaluate themselves along many as opposed to few dimensions.

**Sample characteristics**. Self-enhancement theories argue that the desire for positive self-regard is universal, and therefore predict that the BTAE should obtain regardless of the particular country or culture being studied (Brown, 2010; Sedikides et al., 2015). Although initial evidence for the BTAE was obtained primarily in Western Individualist societies, later studies found evidence consistent with the BTAE in a variety of countries and cultures (Loughnan et al., 2011), including Eastern Collectivist societies such as China (Wu, 2018), Japan (Brown & Kobayashi, 2002), and Korea (Lee, 2012), despite modesty norms in these societies. Further, a meta-analysis of seven studies indicates that self-enhancement, defined broadly to include the BTAE and unrealistic optimism, is magnified in culturally relevant domains (Sedikides, Gaertner, & Vevea, 2005; see also, Gebauer, Sedikides, & Schrade, 2017). For example, the BTAE is larger for European Americans on individualistic traits (e.g., independent, unique), and larger for East Asians on collectivistic traits (e.g., cooperative, loyal; Sedikides et al., 2003). In sum, these data suggest that the BTAE is universal, but depends on the nature of the dimension assessed. Thus, differences in the magnitude of the BTAE across cultures may be driven by variations in the cultural importance of certain traits as opposed to culture per se.

Lastly, although most studies of the BTAE have been conducted on convenience samples of college students, the effect has also obtained in nationally representative samples of Americans (Heck, Simons, & Chabris, 2018; Stark & Sachau, 2016), and in college professors (Cross, 1977), MTurk workers (Howell & Ratliff, 2017, Study 2), prisoners (Sedikides et al., 2014), and truck drivers (Walton, 1999), among other groups. Thus, in the present work we examined whether the BTAE is larger in college student samples, who are typically studied in this literature, than in other samples. For exploratory purposes, we also examined the degree to which the BTAE varies as a function of other demographic variables including age, gender, and race/ethnicity. Based on prior work suggesting that narcissism, a personality variable defined by grandiose perceptions of self, is greater in men versus women (Grijalva et al., 2015), African Americans versus Caucasian Americans (Zeigler-Hill & Wallace, 2011), and young people versus older people (Foster, Campbell, & Twenge, 2003), we assessed whether the BTAE shows similar patterns.

**Referent characteristics**. Some studies on the BTAE have participants evaluate themselves in comparison to a general referent such as the average person (Eriksson & Funcke, 2014), whereas others use a more specific referent such as the average person of the same age, gender, and school as the participant (Lee, 2012). General referents provide more latitude for self-serving interpretations of the referent that might boost the BTAE (Dunning et al., 1989). However, people may be more motivated to perceive themselves as superior to specific referents, given their greater similarity to the self and self-relevance (Tesser, 1988). Provided these divergent possibilities, we did not formulate strong predictions about the influence of referent specificity on the BTAE.

**Psychological well-being**. Some scholars proposed that the BTAE and other related phenomena, collectively termed *positive illusions*, are more prevalent among psychologically healthy versus unhealthy individuals (i.e., people with depression or low self-esteem; Taylor & Brown, 1988), whereas others have argued that self-enhancement is associated with worse mental health (Colvin, Block, & Funder, 1995). To address this debate, a recent meta-analysis evaluated whether self-enhancement is differentially associated with *personal adjustment* (i.e., life satisfaction, positive affect, and low negative affect) than *interpersonal adjustment* (i.e., how favorably people are evaluated by others; Dufner, Gebauer, Sedikides, & Denissen, 2019). This meta-analysis reported a small-to-moderate association between self-enhancement and personal adjustment, but a near-zero association between self-enhancement and interpersonal adjustment. Critically, self-enhancement was defined broadly in this work to include over 25 measures besides the BTAE, with only a few included studies focusing on the BTAE in particular. Thus, the degree to which the BTAE specifically predicts psychological adjustment is unresolved.

**Method**

Research materials for this project, including a full dataset and complete list of databases and search terms, are publicly available on the Open Science Framework at https://osf.io/zpt82/?view\_only=fc3213cbcdc3443bbb9f3f58db3fdc98.

**Article Identification**

**Literature search**. We conducted a search of electronic databases (e.g., PsycINFO, PsycARTICLES, CINHAHL, ERIC, and SocINDEX) to identity articles on the BTAE. Search terms included better than average effect, above average effect, self-enhancement effect, comparative bias, and positive illusions. We identified additional articles by scanning the reference lists of included articles and major reviews of research on the BTAE or self-enhancement more broadly (i.e., Alicke & Govorun, 2005; Chambers & Windschitl, 2004; Dufner et al., 2019; Moore & Healy, 2008; Sedikides et al., 2015).

**Inclusion and exclusion criteria**. To be included in the meta-analysis, articles had to meet the following criteria: (1) be accessible online or through inter-library loan, (2) be written in English, (3) be a published, empirical article that reports primary empirical data, (4) include an evaluation of one’s current abilities, attributes, or traits either in comparison to or in addition to an evaluation of an average peer on the same dimensions, and (5) provide an effect size, or sufficient information to determine an effect size, indexing the magnitude of the BTAE in any age group (Figure 2). We restricted our analysis to published articles, given that inclusion of the enormous bank of unpublished datasets (consisting mostly of classroom demonstrations) was unfeasible. We defined abilities, attributes, and traits broadly to incorporate any competency (e.g., academic ability, athleticism, social skill), personal characteristic (e.g., health, physical attractiveness), or personality dimension (e.g., considerate, friendly) studied in prior research.

Based on these criteria, we excluded studies that examined comparative judgments for future outcomes (i.e., *unrealistic optimism*; Shepperd et al., 2013) and likelihood to engage in a moral behavior (i.e., *holier than thou beliefs*; Epley & Dunning, 2000). In addition, we excluded studies that contrasted comparative judgments of performance on a specific test with objective tests scores (Burson, Larrick, & Klayman, 2006), as this reflects a different index of self-enhancement. Finally, given our focus on comparative self-evaluations in relation to an average peer, we excluded studies that examined comparative self-evaluations in relation to one or a few specific others (Krizan, & Suls, 2008) as well as studies that examined comparative evaluations of a target besides the self in relation to the average person (Klar, 2002).

After exclusions, a total of 124 published articles that examined the BTAE in comparative self-evaluations remained (see Appendix A for article details). These articles collectively provided effect sizes from 291 independent samples and 965,307 participants. We note that five studies contributed disproportionately to the overall sample size. Specifically, two studies provided results from 805,708 participants (Mattern et al., 2010), two studies provided results from 98,633 participants (Howell & Ratliff, 2017), and one study provided results from 15,806 participants (Kuyper, Dijkstra, Buunk, & Van der Werf, 2011). The overall sample size excluding these five unusually large studies was 45,160 across 286 independent samples (average *n* = 157.90). Given the imbalance in sample sizes, our primary analyses used random-effects models, which are less influenced by large studies than are fixed-effect models (Borenstein, Hedges, Higgins, & Rothstein, 2009a).

**Obtaining Effect Sizes**

The BTAE is assessed either by having people rate themselves relative to others on a single scale (i.e., the direct, forced-choice, and percentile methods) or rate themselves and the average person on separate scales (i.e., the indirect method). Given that the BTAE is evaluated using a single group of participants, within-subjects approaches are necessary to estimate its size. Here, we assessed the magnitude of the BTAE using Cohen’s *dz* (Cohen, 1988; Lakens, 2013), which represents the standardized difference between a mean and a specified value. When ratings of the self and the average person are made on the same scale, *dz* is operationalized as the standardized difference between self-ratings and the scale midpoint ((*M*judgment – *Midpoint* ) / *SD*judgment), with the midpoint being assigned either to the middle value on a rating scale, the 50th percentile, or the middle value in between two options for direct, percentile, and forced-choice methods, respectively. When separate scales are used as in the indirect method, *dz* is operationalized as the standardized difference between self-ratings and average ratings; *M*difference / *SD*difference. Thus, *dz* provides a common metric that can be used for BTAEs derived from single-scale and two-scale approaches. Consistent with Cohen’s *d* commonly reported in between-subject’s studies, we interpreted *dz* values using the following rubric: 0.20 = small, 0.50 = medium, 0.80 = large.

We extracted from each article effect sizes in the form of *dz* (total *k* = 310) using several strategies. First, a few articles directly reported *dz* (*k* = 7). Second, we derived effect sizes from single-scale approaches (i.e., direct, forced-choice, and percentile methods; *k* = 199) using *t*-statistics gauging the BTAE, *dz* = *t* / sqrt(*N*), or means and standard deviations for comparative self-judgments, *dz* = (*M*– *Midpoint)* / *SD*. Third, we derived effect sizes from two-scale approaches (i.e., the indirect method, *k* = 63) using *t*-statistics gauging the BTAE, *dz* = *t* / sqrt(*N*), mean differences between self-evaluations and average-evaluations, *dz* = Mdifference / SDdifference, or mean self-evaluations and average-evaluations after accounting for the pooled standard deviation and bivariate association of these measures (Lenhard & Lenhard, 2016; Morris & DeShon, 2002). When the bivariate association was absent (*k* = 35), we used the mean correlation across 21 studies that provided this information in order to estimate the missing value (*r* = 0.34); sensitivity analyses that utilized a larger (*r* = 0.47) or smaller correlation (*r* = 0.22) to estimate missing values were also conducted (i.e., one standard deviation above or below the mean correlation). Fourth, we derived a few effect sizes by converting provided *p*-values to *t*-statistics, which we then converted to *dz* (*k* = 6).

We calculated separate effect sizes for direct, indirect, percentile, and forced-choice methods. When studies provided effect size information for multiple attributes, abilities, or traits using the same method, we averaged these effects to form a single, study-level estimate. Altogether, we obtained 310 study-level effect sizes (i.e., 274 studies provided a single effect, 16 studies provided separate effects for 2 methods, and 1 study provided separate effects for all 4 methods). The standard error of each effect size, which was necessary for meta-analytic computations, was 1/sqrt(*N*) given that all effect sizes were in standard deviation units (i.e., *SD* = 1). We also extracted bivariate correlations of the BTAE with self-esteem (*k* = 14) and life satisfaction (*k* = 8) from relevant studies to evaluate the association of the BTAE with measures of psychological well-being. We interpreted correlations as follows: 0.1 = small, 0.3 = medium, 0.5 = large (Cohen, 1988). We selected self-esteem and life satisfaction, because their association with the BTAE had been examined in several studies; no other well-being measure had been examined in more than two studies.

**Coding and Extraction of Moderators**

The first and second authors coded an initial set of effect sizes (70%) to enable moderation tests and resolved disagreements by discussion (all κ > .86). The remaining effect sizes were coded by the first author. Specifically, we coded the *sample type* as college students or other, and *sample culture* as East Asian (e.g., people from China, Japan, and Korea), European American (e.g., people from Australia, the UK, and the U.S.), or other. In addition, we coded the *domain type* of comparative judgments as abilities (e.g., driving ability, mathematics ability, intelligence), traits (e.g., personality variables, dispositions), or other (i.e., attributes, or a combination of abilities, attributes, and traits), and *domain valence* of comparative judgments as positive (e.g., happy or intelligent), negative (e.g., unhappy or unintelligent), or both. Next, we coded the *scale type* utilized to measure the BTAE as direct, forced-choice, indirect, or percentile. Further, we coded effects derived from the direct method to determine whether researchers explicitly labelled the midpoint of the scale as “average” (yes or no), and coded studies that used the indirect method to determine whether the order of self and average other judgments were counterbalanced (yes or no). Finally, we determined the specificity of the average other by (1) coding whether the average other was non-specific, that is, simply referred to as the “average person” or “most people” (yes or no), and (2) counting the number of variables in which the average other was matched to the participant. As such, we coded studies that referred to a non-specific average person as 0, and studies that referred to an average person of the same age, gender, and race as 3.

We extracted a few additional demographic moderators from each study. We extracted the percentage of participants who were female (*k* = 235), the percentage of participants in European-American samples who were Caucasian (i.e., White; *k* = 36), and the mean age of participants (*k* = 165) from studies that reported relevant information. Further, some studies provided separate effect sizes for positive and negative dimensions (*k* = 36), or easy and hard abilities (*k* = 7). Although the primary analysis aggregated across all dimensions in a given study, we extracted these separate effect sizes to enable “matched” tests of differences in the BTAE for positive versus negative dimensions and easy versus hard abilities under equivalent measurement conditions. Similarly, some studies provided separate estimates of the BTAE for women and men (*k* = 7), European Americans and East Asians (*k* = 11), or European Americans and East Asians on both individualistic and collectivistic traits (*k* = 3). We extracted these separate effects to enable additional “matched” tests of gender and cultural differences in the BTAE under equivalent measurement conditions.

**Analytic Strategy**

We conducted meta-analytic computations in R, using packages such as *meta* and *metafor* (Schwarzer, Carpenter, & Rücker, 2015; Viechtbauer, 2010; see also, Harrer, Cuijpers, Furukawa, & Ebert, 2019). We searched for evidence of publication bias in our meta-analysis using three strategies. First, we examined the distribution of obtained effect sizes in a funnel plot and used Egger’s test of the intercept (Egger, Smith, Schneider, & Minder, 1997) to evaluate whether the distribution was significantly asymmetrical, as would be expected when publication bias is present. Second, we used a trim and fill procedure to obtain a bias-corrected estimate of the overall effect (Duval & Tweedie, 2000). Third, we used selection model analyses to estimate the overall effect after adjusting for potential publication bias via weight-function modelling (Coburn & Vevea, 2019; McShane, Böckenholt, & Hansen, 2016). We also conducted selection model analyses on key moderator effects to estimate the influence of publication bias in these conditions.

In addition, we conducted meta-regression analyses to evaluate the association of continuous moderator variables (i.e., % female, % White, *M*age) with the BTAE. Lastly, we employed a repeated-measures approach to evaluate potential differences in the BTAE across positive versus negative dimensions, easy versus hard abilities, and individualistic versus collectivistic traits, with a variance that accounts for the bivariate association among these judgments (Borenstein, Hedges, Higgins, & Rothstein, 2009b). Two studies reported the association among judgments for positive and negative dimensions (*mean r* = -.01), and no studies reported the association among judgments for easy versus hard abilities or individualistic versus collectivistic traits. Based on this limited information, we entered missing correlations as 0 for these analyses. To estimate missing values, we also carried out sensitivity analyses that utilized a larger (*r* = 0.30) or smaller correlation (*r* = -0.30).

**Results**

**Overall Effect**

**Primary model**. As expected, the present meta-analysis yielded strong support for the BTAE. Specifically, there was a large BTAE after aggregating across 291 independent samples, *dz* = 0.78, 95% *CI* [0.71, 0.84] (Table 1). Nonetheless, there was considerable variability in the size of the BTAE across samples, *Q* = 71,419.52, *τ*2 = 0.29, *I*2 = 99.6, which called for moderation tests exploring the conditions under which it was most pronounced.

**Sensitivity analyses**. We conducted follow up analyses to explore whether the magnitude of the BTAE was influenced by assumptions of the primary (i.e., random-effects) model. Along these lines, a fixed-effect analysis yielded an even larger effect than the primary model (*dz* = 1.19). However, this outcome likely reflects the undue influence of five unusually large samples (Howell & Ratliff, 2017, Study 1; Kuyper et al., 2011; Mattern et al., 2010). When these samples were removed, a fixed-effect analysis yielded an effect size that was very similar to the primary model (*k* = 286, *dz* = 0.78). Further, an unweighted model that simply took the average of each meta-analytic effect regardless of its respective sample size (Bonett, 2009; Shuster, 2014) yielded a nearly identical effect to the primary model (*dz* = 0.78). Lastly, the magnitude of the BTAE was very similar when missing bivariate correlations between self and average other judgments (*k* = 27) were estimated to be one standard deviation above (*dz* = 0.78) or one standard deviation below (*dz* = 0.77) the mean correlation used in the primary analysis. Taken together, these results suggest that the BTAE was largely robust to different statistical approaches.

**Publication bias**. We used several strategies to evaluate the degree to which publication bias may have inflated the BTAE. First, we used Egger’s test of the intercept to evaluate whether effect sizes were asymmetrical. Although Egger’s test was statistically significant (intercept = ‑4.40, *p* < .001), a bias-corrected (trim and fill) estimate of effect size was larger than that obtained in the primary model (*dz* = 1.16, 106 studies added; Figure 3), rather than smaller as would be expected when publication bias is present. As a sensitivity analysis, we repeated both publication bias tests after removing unusually large studies. When the five studies with unusually large samples were removed, Egger’s test was not statistically significant (intercept = ‑0.77, *p* = .30) and a bias-corrected (trim and fill) estimate of effect size was only slightly larger than that obtained in the primary model (*dz* = 0.87, 29 studies added; Figure 4). In sum, these results are inconsistent with the presence of publication bias in the effect size distribution (i.e., selective publication of large or statistically significant effects).

Next, we quantified the potential effect of publication bias using selection model analyses. Specifically, we used the weight-function model to adjust for potential selection bias (Vevea & Hedges, 1995). When specifying *p*-value cutpoints of 0.01, 0.05, and 0.10, there was no significant difference in the magnitude of the BTAE for the unadjusted model versus the adjusted model, *dz* = 0.78 versus 0.72, Χ2(3) = 2.26, *p* = .52. In addition, we used selection model analyses to estimate the BTAE assuming varying degrees of selection bias (Vevea & Woods, 2005). Specific effect size estimates (*dz*) assuming different selection biases were as follows: 0.76 moderate two-tailed, 0.70 moderate one-tailed, 0.73 severe two-tailed, and 0.50 severe one-tailed. Thus, selection model analyses produced adjusted estimates for the BTAE that were similar to the unadjusted estimate from our primary model, with exception to the severe one-tailed model, where we observed a drop from 0.78 to 0.50. However, although the BTAE dropped in this model, it remained medium in size despite it being the most stringent test of publication bias. Altogether, the selection model analyses provide further evidence that publication bias did not have an undue influence on our estimate of the BTAE and likely increased it only slightly.

**Method type**. Next, we compared the size of the BTAE across the four major methods that have been implemented to assess it (i.e., direct, indirect, forced-choice, percentile; Table 2). We placed studies that used multiple methods into a separate category to maintain independence of observations (*k* = 17), and we averaged multiple effects within studies to form a single effect. The bulk of the studies that we obtained utilized the direct (*k* = 120) or indirect (*k* = 102) methods, with far fewer studies utilizing the percentile (*k* = 45) or forced-choice (*k* = 7) methods.

An omnibus test yielded significant variability in the magnitude of the BTAE across methods, *Q*(4) = 14.51, *p* = .006. As expected, a focused comparison demonstrated that the BTAE was significantly larger when comparing direct to indirect methods, *dz* = 0.91 versus 0.70, *Q*(1) = 9.22, *p* = .002. Studies using the forced-choice method yielded the largest effect (*dz* = 1.00), and studies using the percentile method (*dz* = 0.62) and multiple methods (*dz* = 0.65) yielded somewhat smaller effects. We obtained an identical pattern of results when we separated effects from multiple methods into their respective method categories. In summary, we found a robust BTAE for each of the four methods, but also found that there was considerable variability in the size of the BTAE across methods.

Effect size estimates for the major methods used to assess the BTAE typically remained after assuming different degrees of selection bias. However, there was a drop in each effect when examining the most extreme model (i.e., the severe one-tailed model). Specifically, there was a drop from 0.91 to 0.74 for the direct method, 1.00 to 0.68 for the forced-choice method, 0.70 to 0.47 for the indirect method, and 0.62 to 0.21 for the percentile method. These results suggest that publication bias may have inflated effects for the four major methods, especially the percentile method.

**Judgment Domain**

**Domain type**. We observed significant variability in the magnitude of the BTAE across the three domain types, *Q*(2) = 23.59, *p* < .001 (Table 3). Consistent with predictions, there was a significantly larger BTAE among studies that examined trait judgments than ability judgments, *dz* = 0.89 versus 0.51, *Q*(1) = 23.55, *p* < .001. Studies that examined other domains (e.g., attributes or a combination of traits and abilities) yielded a BTAE that fell in between the other two categories, *dz* = 0.75. Surprisingly, the number of studies examining the BTAE in personality traits (*k* = 164) was over twice the size as number of studies examining abilities (*k* = 65).

Effect size estimates for trait and ability judgments typically remained after assuming different degrees of selection bias. However, there was once again a drop in effect sizes when examining the most extreme model (i.e., the severe one-tailed model). In particular, the BTAE for abilities dropped from 0.51 to 0.09 in this model. Thus, publication bias may have inflated estimates of the BTAE in the domain of abilities.

Furthermore, when examining seven matched samples, a within-subjects approach yielded a significant difference in the magnitude of the BTAE for easy versus hard abilities, *t* = 36.84, *p* < .001 (all matched samples are listed in Appendix B). This difference remained significant in a sensitivity analysis in which we entered missing bivariate correlations between abilities as 0.30 or -0.30, *t*s > 36.25, *p*s < .001. As expected, judgments for easy abilities yielded a significant BTAE, *dz* = 1.10, but judgments for hard abilities yielded a significant worse-than-average effect (WTAE), *dz* = -0.52. Thus, these data suggest that the BTAE is not inevitable. Alternatively, consistent with an egocentrism account, people reliably show a WTAE in domains in which they view themselves unfavorably.

**Domain valence**. There was significant variability in the magnitude of the BTAE by domain valence, *Q*(2) = 8.07, *p* = .02. Specifically, the BTAE was significantly smaller when comparing studies on positive judgment domains to studies on both positive and negative judgment domains, *Q*(1) = 7.94, *p* = .005, and non-significantly smaller when comparing studies on positive judgment domains to studies on negative judgment domains, *Q*(1) = 1.53, *p* = .22, with little evidence of publication bias (except a drop in the severe one-tailed model for positive judgment domains). Nonetheless, this analysis was obscured by the fact that far more studies examined positive judgment domains (*k* = 174) than both domains (*k* = 94) or negative domains (*k* = 23), and so it is possible that these groups of studies systematically varied in other ways than domain valence.

Addressing this concern, we carried out an unconfounded test of the effect of domain valence using 36 matched samples (i.e., studies that provided separate effect sizes for positive and negative dimensions under equivalent measure conditions). A within-subjects comparison yielded a significant difference, such that the BTAE was larger for positive dimensions than negative dimensions, *dz* = 0.92 versus 0.62, *t* = 10.54, *p* < .001. Further, a sensitivity analysis showed that the difference between positive versus negative dimensions remained significant when missing bivariate correlations between dimensions, which we entered as 0 in the main analysis, were entered as 0.30 or -0.30, *t*s > 10.46, *p*s < .001. In all, although an initial analysis did not yield strong conclusions regarding the effect of domain valence, data from matched comparisons provide strong evidence that the BTAE is elevated on positive versus negative dimensions.

**Number of dimensions**. Results of a meta-regression analysis yielded a significant positive association between the magnitude of the BTAE and the number of judgment dimensions included in each study (*p* = .002; Table 4). These data are consistent with the argument that people rely on an “I am better-than-average” heuristic when making judgments across many as opposed to few dimensions.

**Sample Characteristics**

**Culture**. Across the entire collection of studies, an omnibus test yielded no significant difference in the magnitude of the BTAE when comparing European Americans, East-Asians, and participants from other cultural groups, *Q*(2) = 1.76, *p* = .42, with little evidence of publication bias, except for the severe one-tailed model (Table 5). Nonetheless, there was a much larger number of studies on European Americans (*k* = 222) than East Asians (*k* = 36) or members of other cultural groups (*k* = 33), and, as such, it is possible that these groups of studies differed in ways besides culture.

We conducted a more direct comparison of the potential moderating effect of culture by aggregating data from 11 matched samples, in which European Americans and East Asians were examined within the same studies. This matched comparison yielded a statistically significant difference, such that European Americans evidenced a much larger overall BTAE than East Asians, *dz* = 0.98 versus 0.40, *Q*(1) = 6.02, *p* = .01.

Furthermore, data from three of these matched samples allowed us to explore differences in the magnitude of the BTAE across individualistic and collectivistic traits. Although the BTAE was significantly larger for European Americans versus East Asians in the case of individualistic traits, *dz* = 1.20 versus 0.41, *Q*(1) = 16.01, *p* < .001, there was no significant difference between these cultural groups in the case of collectivistic traits, *dz* = 0.96 versus 1.03, *Q*(1) = 0.05, *p* = .82. Moreover, although the BTAE did not significantly differ across individualistic versus collectivistic dimensions for European Americans (*t* = 1.04, *p* = .32), the BTAE was significantly smaller on individualistic dimensions for East Asians (*t* = 6.08, *p* < .001). Differences by trait for European Americans (*t*s < 1.03, *p*s > .28) and East Asians (*t*s > 6.08, *p*s < .001) remained unchanged in sensitivity analyses.

Readers should note that these matched analyses are not redundant with the prior meta-analysis on cultural differences in self-enhancement (Sedikides et al., 2005). Whereas the prior meta-analysis conceptualized self-enhancement broadly to include both the BTAE and unrealistic optimism, the present analysis focused exclusively on the BTAE. In addition, the present analysis included data from two articles that were published after the prior report (Hamamura, Heine, & Takemoto, 2007; Wu, 2018).

**Gender**. Results from a meta-regression analysis produced no significant association between the magnitude of the BTAE and the percentage of participants who were female (*p* = .56). We also addressed the potential influence of gender by focusing on seven studies that included effect sizes for both gender groups under equivalent measurement conditions (i.e., each study included an effect size for men and women derived from the same methods). In these matched samples, there was no significant difference in the magnitude of the BTAE for women versus men, *dz* = 0.63 versus 0.61, *Q*(1) = 0.01, *p* = .93, indicating that the BTAE is constant across gender groups.

**Age**. As expected, results from a meta-regression analysis yielded a significant association between the mean age of participants and the magnitude of the BTAE, such that the effect was larger in younger as opposed to older samples (*p* = .02). The youngest sample obtained in this research had a mean age of 5.4 and the oldest sample had a mean age of 70.2. Predicted effect sizes (*dz*) for different age groups are as follows: age 5 = 1.01, age 20 = 0.88, age 45 = 0.66, and age 70 = 0.44.

**Race**. When aggregating across 36 studies that provided relevant information, results from a meta-regression analysis yielded a non-significant, negative association between the percentage of participants who were Caucasian American and the BTAE, *p* = .16. Thus, when examining European American samples, the BTAE does not appear to be disproportionately concentrated in Caucasians versus members of ethnic minority groups.

**Sample type.** There was no significant difference in the size of the BTAE when comparing college student samples to other samples, *dz* = 0.77 versus 0.78, *Q*(1) = 0.05, *p* = .83. Thus, the BTAE is not limited to college student samples. Further, although a majority of studies were conducted on college student samples (*k* = 178), over 38% (*k* = 113) were conducted on other samples. The present analysis, therefore, clearly suggests that the BTAE extends beyond college student convenience samples.

**Self-esteem and happiness**. There was a medium-sized, positive association between the BTAE and self-esteem across 14 studies that examined this association, *r* = .34 [*CI* = .28, .40], *n* = 1,832 (Appendix C). Similarly, there was a medium-sized, positive association between the BTAE and overall life satisfaction across eight studies that examined this association, *r* = .33 [*CI* = .25, .42], *n* = 1,692. As anticipated, therefore, the tendency to perceive oneself as above average was associated with greater self-esteem and happiness. However, the moderate size of these associations indicates that the BTAE is not redundant with self-esteem and happiness.

**Referent Characteristics**

**Referent specificity**. Although it did not reach statistical significance, the BTAE was somewhat larger in studies that explicitly defined the nature of the referent versus studies that did not, *dz* = 0.81 versus 0.65, *Q*(1) = 2.88, *p* = .09 (Table 6). There was little evidence of publication bias for these estimates, except a notable drop in the severe one-tailed model for studies that did not explicitly define the referent (i.e., 0.65 to 0.12). However, results from a meta-regression analysis indicated that the magnitude of the BTAE was not significantly associated with the specificity of the referent (*p* = .64). Thus, studies that described the average peer in a highly precise way (e.g., the average person at your school of the same age and gender) yielded similar BTAEs than studies that described the average peer in a vague manner (e.g., the average person).

**Midpoint label**. Focusing on the direct method, we found no significant difference in the magnitude of the BTAE when comparing studies that explicitly labelled the scale midpoint “average” versus those that did not, *dz* = 0.95 versus 0.87, *Q*(1) = 0.63, *p* = .43. Therefore, explicitly labelling the midpoint as “average” does not appear to influence responses during comparative self-judgment.

**Judgment order**. Focusing on the indirect method, the BTAE was significantly larger in studies that counterbalanced self and average peer-evaluations versus studies that did not, *dz* = 0.83 versus 0.59, *Q*(1) = 6.80, *p* = .009. Of the 55 studies that did not counterbalance, 23 had participants make self-ratings first, four had participants make average-ratings first, and 28 did not specify the order of self and average evaluations.

**Discussion**

The better-than-average effect (BTAE) is the tendency for people to perceive their abilities, attributes, and personality traits as superior to those of their average peer. Prior qualitative reviews of the BTAE literature have documented its occurrence in various contexts (Alicke & Govorun, 2005; Sedikides & Alicke, 2012), elaborated upon several mechanisms that may underlie it (Chambers & Windschitl, 2004; Moore & Healy, 2008), and highlighted its relevance to self-enhancement theories (Alicke & Sedikides, 2009; Sedikides & Alicke, 2019). Going further, the present work provided the first quantitative review of the BTAE, and in doing so, evaluated several core questions that have long occupied researchers in this area. Specifically, we synthesized a large body of research on the BTAE, spanning 124 published articles, 291 independent samples, and over 950,000 participants, to evaluate its robustness, as well as the degree to which it is moderated by sample characteristics and other methodological features of prior studies.

Our meta-analysis clarified numerous aspects of the BTAE. First, it demonstrated that the BTAE is highly robust across studies, with overall effect size estimates that vary from large to very large, depending upon the statistical approach. The BTAE is larger than most effects in social-personality psychology, which are typically small to medium (*d* = 0.43; Richard, Bond, Stokes-Zoota, 2003). Additionally, with a few exceptions noted below, we obtained little evidence of publication bias in the BTAE literature, which lends further confidence in the existence and robustness of the effect.

Nonetheless, there was substantial variability in the size of the BTAE across studies. Further, effect size estimates were considerably larger with direct and forced choice methods than with indirect and percentile methods. On the one hand, these results are consistent with the argument that cognitive biases such as egocentrism and focalism may inflate estimates of the BTAE when direct measures are used (Chambers & Windschitl, 2004; Moore & Healy, 2008). On the other hand, it is impressive that a robust BTAE still remains even when using methods that constrain these cognitive biases (i.e., the indirect method), and conservative methods that explicitly define the average as the median rank (i.e., the percentile method).

Second, our meta-analysis demonstrated variability in the size of the BTAE across different judgment dimensions. The BTAE was larger for personality traits than for abilities, likely because personality traits are more abstract and less subject to external verification than abilities (Dunning et al., 1989; Van Lange, 1998). Additionally, when examining 36 matched comparisons in which other variables were held constant, the BTAE was larger for positive dimensions than negative dimensions, which suggests that the motive to self-enhance (exaggerate one’s positive qualities) may be more pronounced than the motive to self-protect (minimize one’s negative qualities). Lastly, consistent with the argument that the BTAE reflects heuristic processing (Alicke et al., 2001; Alicke & Govorun, 2005), the effect was larger when participants rated themselves across many dimensions rather than few dimensions.

Third, our meta-analysis assessed the degree to which demographic variables and other methodological factors moderate the BTAE. An analysis of 11 matched comparisons yielded a significantly larger BTAE in the case of European Americans than East Asians. It is possible that the BTAE was larger among European Americans because the dimensions were of greater cultural importance to them. Indeed, the three studies that considered dimension importance found that European Americans exhibited a larger BTAE on individualistic traits, but there was no difference between cultural groups on collectivistic traits. Moreover, although the BTAE varied by culture, it was generally robust in both European Americans and East Asians, which supports the position that self-enhancement is universal (Sedikides, 2018; Sedikides et al., 2015).

Beyond culture, there was little influence of gender or race on the BTAE. Although the BTAE was slightly larger in younger samples, it was equally robust in non-college versus college student samples. Thus, the disproportionate use of college student convenience samples in this literature does not appear to have inflated estimates of the effect. Further, the BTAE was larger when examining indirect method studies that counterbalanced self and average judgments versus studies that did not do so. Counterbalancing judgments reflects higher quality methods, and therefore one interpretation of this result is that higher quality studies yield larger effects. Lastly, the specificity of the referent had a small but non-significant effect on the BTAE. Thus, more work is needed to understand better the potential moderating effect of referent specificity on the BTAE.

Fourth, our meta-analysis found that the BTAE was significantly and moderately associated with self-esteem and overall life satisfaction, which is consistent with the argument that self-enhancement processes correlate with psychological well-being (Dufner et al., 2019; Taylor & Brown, 1988). Nonetheless, because self-esteem and life satisfaction are both indicative of *personal adjustment* (with self-esteem being merely an indirect measure of this construct), it remains unclear whether the BTAE is differentially associated with *interpersonal adjustment.* Although prior research suggests that self-enhancement processes in general may not be associated with interpersonal adjustment (Dufner et al., 2019), the relation of the BTAE specifically with this outcome could not be tested due to a lack of pertinent studies. Moreover, the correlational nature of our analyses prevents any causal conclusions regarding the potential impact of the BTAE on psychological adjustment. Future research is needed to examine why the proclivity for biased self-views evolved despite its potentially harmful association with interpersonal adjustment. One possibility is that self-enhancement reaps benefits when expressed in agentic domains and in early stages of acquaintanceship but reaps costs when expressed in communal domains or in later relationship stages (Dufner et al., 2019; Sedikides, Hoorens, & Dufner, 2015).

Fifth, we found that the BTAE, both in general and in specific conditions, largely remained in analyses that accounted for the possibility of publication bias. Surprisingly, an initial trim and fill analysis yielded a much larger effect than the primary model (with over 100 studies added). However, five unusually large samples had a disproportionate influence on this result, and, because these studies had large effects (likely due to a focus on the direct method or personality traits), many other studies had to be imputed to create symmetry in the effect size distribution. Indeed, a second trim and fill analysis that removed the five unusually large samples yielded a similar result to that of the primary model. Moreover, selection model analyses typically produced similar effects to that of the primary model, with exception to the severe one-tailed model, where we observed a drop from large to medium for the overall effect, as well as notable drops for several moderation effects (e.g., studies on the percentile method, ability judgments, and positive traits). These results clarify areas of the BTAE literature in which publication bias may be of elevated concern.

**Strengths and Theoretical Implications**

This meta-analysis synthesized a large and highly diverse collection of studies, spanning multiple disciplines (e.g., social, personality, clinical, educational, and applied psychology) to summarize what is currently known about the BTAE. Our work represents the first appraisal of the overall size and robustness of the BTAE. Additionally, the use of meta-analysis enabled novel assessments of potential moderators, including several demographic and methodological moderators that are difficult to measure in primary empirical studies. Finally, our meta-analytic approach enabled traditional moderation tests at the between-study level, but also uniquely enabled aggregation of within-study effects, which identified pronounced differences in the magnitude of the BTAE as a function of dimension valence, difficulty, and cultural importance. A major advantage of this within-study approach is that it isolates the influence of potential moderating variables, while ensuring that all other factors are held constant.

More broadly, the meta-analysis contributes to core theories on self and identity. First, the present findings bolster self-enhancement theories (Alicke & Sedikides, 2009; Sedikides & Strube, 1997) by showing that people generally have positively biased perceptions of their abilities, attributes, and personalities. The BTAE is considered to be a major “pillar” of self-enhancement theories (Sedikides & Alicke, 2019), and the highly robust BTAE identified here indicates that these theories are on solid footing. Although less direct, the findings are also consistent with self-verification theory (Swann, 1992), in that selective seeking and exposure to positive feedback may ultimately result in self-evaluation biases such as the BTAE.

Second, the findings contribute to social comparison theories (Festinger, 1954; Suls & Wheeler, 2017) by showing that comparative self-evaluations generally reflect self-superiority beliefs. Thus, although people may engage in upward comparisons with superior others more frequently downward comparisons with inferior others (Gerber et al., 2018), downward comparisons appear to be more salient contributors to the self-concept than upward comparisons. Indeed, one reason why upward comparison may occur more frequently than downward comparison is because people perceive high status others as more similar to the self than low status others (Collins, 1996). Further, engaging in upward comparisons with similar others may elevate self-evaluations rather than deflate them (Mussweiler, 2003), given that people may view superior others as an example of what their future portends rather than a threat to self-superiority (Lockwood & Kunda, 1997).

Third, the meta-analysis buttresses theoretical perspectives on self-knowledge, which have long posited gaps and distortions in self-beliefs (Dunning, 2005; Vazire & Carlson, 2010). The meta-analysis uniquely advances this literature by estimating the degree to which people generally have biased perceptions of themselves, and by identifying conditions under which such biases are most pronounced. Moreover, the current findings complement prior research on the accuracy of self-perception. Along these lines, a synthesis of 22 meta-analyses found that self-evaluations of ability are moderately accurate (Zell & Krizan, 2014), and parallel research has evinced moderately accurate self-evaluations in the domain of personality (Vazire & Carlson, 2010). When viewed together with the current findings, extant research suggests that people have positively biased views of themselves, while also maintaining reasonably accurate self-views. Therefore, consistent with a central assertion of the Truth and Bias Model (West & Kenny, 2011), bias and accuracy in self-evaluation appear to co-exist.

**Limitations and Future Directions**

Despite these contributions, the meta-analysis also has limitations and highlights avenues for future research. Only one of the included articles examined child samples (Hagá, Olson, & Garcia-Marques, 2018) and thus it remains unclear when children begin to show the BTAE and what developmental processes contribute to its emergence. Self-verification theory proposes that positive self-beliefs formed in childhood lead people to later seek feedback and relationship partners that verify these beliefs (Swann, 2012; Swann & Buhrmester, 2013). Thus, although research is needed to directly test these assertions in the context of the BTAE, self-superiority beliefs should emerge early in life (Thomaes, Brummelman, & Sedikides, 2017) and should strengthen over time as a function of selective exposure to positive feedback.

Additionally, most BTAE studies in the meta-analysis involved European American samples, relatively few studies compared the magnitude of the effect across cultural groups, and only three studies compared the effect across cultural groups as a function of the cultural importance of the self-evaluation dimensions (Heine & Lehman, 1997, Study 1; Hornsey & Jetten, 2005, Study 2; Sedikides et al., 2003, Study 1). Therefore, more research is needed before strong conclusions can be made about potential culture by dimension importance interactions in the BTAE. The absence of foreign language studies was also a key limitation of the meta-analysis that may have impacted its ability to evaluate cultural differences. Research examining the non-English literature on the BTAE is in demand. In addition, future meta-analyses should incorporate unpublished studies on cultural differences, as studies that fail to find a significant cultural difference may be less likely to be published.

Besides these demographic considerations, future investigations will do well to assess the mental health and behavioral correlates of the BTAE. Although the meta-analysis indicates that the BTAE is positively associated with personal adjustment (i.e., life satisfaction), it remains possible that the effect is inversely associated with interpersonal adjustment (Hoorens, Pandelaere, Oldersma, & Sedikides, 2012; Van Damme, Hoorens, & Sedikides, 2016). Moreover, the BTAE in health and safety domains may predict adverse outcomes, such as a failure to engage in necessary precautions (e.g., not wearing a seatbelt) or excessive risk taking (e.g., driving while intoxicated). Thus, both the short-term and long-term effects of the BTAE on consequential, behavioral outcomes await further testing (Chung et al., 2016).

Lastly, moderation tests in the present meta-analysis were sometimes constrained by insufficient reporting of prior studies. Future articles should provide detailed demographic information regarding included samples to facilitate analysis of the effect of age, gender, and race/ethnicity on the BTAE. Moreover, future articles should report correlations between self-judgments and average judgments when the indirect method is used as well as correlations between judgments in different domains (e.g., positive vs. negative dimensions, hard vs. easy abilities, individualistic vs. collectivistic traits) when the BTAE is compared across domains.

**Conclusions**

The BTAE is widely regarded as both a classic and durable finding of keen interest to social-personality psychologists as well as behavioral scientists in other specialty areas (Dunning et al., 2004; Kassin et al., 2017). The present review and meta-analysis provides the most comprehensive coverage of the BTAE to date. Our work supports the view that the BTAE is a highly robust and replicable phenomenon. However, our work also indicates that the BTAE is not inevitable or impervious to influence. Indeed, the effect varies predictably as a function of relevant methodological and sample characteristics, and even reverses under specified boundary conditions. Moreover, although more research is needed, preliminary evidence suggests that the BTAE is positively associated with psychological well-being. In short, we hope that our synthesis serves as a one-stop resource for scholars interested in the BTAE and ultimately inspires research further exploring the nature and consequences of the effect.

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Table 1

*Estimates of Overall Effect Size*

|  |  |  |  |
| --- | --- | --- | --- |
| **Estimate Type** | ***k*** | ***dz*** | **95% *CI*** |
| *Primary Model* |  |  |  |
| Random-effects | 291 | 0.78 | [0.71, 0.84] |
| *Sensitivity Analyses* |  |  |  |
| Fixed-effect | 291 | 1.19 | [1.19, 1.19] |
| Fixed-effect, dropped huge *N* studies | 286 | 0.78 | [0.77, 0.79] |
| Unweighted | 291 | 0.78 | [0.71, 0.84] |
| Random-effects, dropped huge *N* studies | 286 | 0.77 | [0.70, 0.83] |
| Random-effects, correlation +1 SD | 291 | 0.78 | [0.72, 0.85] |
| Random-effects, correlation -1 SD | 291 | 0.77 | [0.71, 0.84] |
| *Publication Bias Corrected Estimates* |  |  |  |
| Trim and fill | 397 | 1.16 | [1.08, 1.23] |
| Trim and fill, dropped huge *N* studies | 315 | 0.87 | [0.80, 0.93] |
| Weight function (moderate 2-tail) | 291 | 0.76 | ---- |
| Weight function (moderate 1-tail) | 291 | 0.70 | ---- |
| Weight function (severe 2-tail) | 291 | 0.73 | ---- |
| Weight function (severe 1-tail) | 291 | 0.50 | ---- |

*Note*. *N* = 965,307 for the primary model. *N* = 45,160 when the five unusually large studies were dropped. Weight function models do not provide 95% *CI*s.

Table 2

*Magnitude of the BTAE by Method*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Method** | ***k*** | ***N*** | ***dz* [95% *CI*]** | ***Q*** | **Test Value** | **Weight Function** |
| *Independent Effects (k = 289)* | | | | |  |  |
| Direct | 120 | 838,147 | 0.91 [0.81, 1.01] | 45,997.3\*\* | *Q*btw = 14.5\* | 0.89, 0.86, 0.87, 0.74 |
| Forced-choice | 7 | 1,505 | 1.00 [0.44, 1.57] | 674.8\*\* |  | 0.99, 0.92, 0.97, 0.68 |
| Indirect | 102 | 114,174 | 0.70 [0.60, 0.79] | 15,517.4\*\* |  | 0.68, 0.63, 0.65, 0.47 |
| Multiple | 17 | 7,019 | 0.65 [0.33, 0.97] | 1,050.0\*\* |  | 0.62, 0.52, 0.59, 0.13 |
| Percentile | 45 | 4,462 | 0.62 [0.46, 0.78] | 1,090.0\*\* |  | 0.59, 0.51, 0.56, 0.21 |
| *Partially Overlapping Effects (k = 310)* | | | | |  |  |
| Direct | 131 | 843,706 | 0.90 [0.83, 0.96] | 49,885.2\*\* | ---- |  |
| Forced-choice | 9 | 7,461 | 0.97 [0.90, 1.05] | 1,308.3\*\* |  |  |
| Indirect | 116 | 121,055 | 0.68 [0.62, 0.74] | 36,085.6\*\* |  |  |
| Percentile | 54 | 10,128 | 0.65 [0.57, 0.72] | 1,963.2\*\* |  |  |

*Note*. Due to a lack of independence, a test value could not be calculated for overlapping effects. Weight function estimates reflect, in order, moderate two-tail, moderate one-tail, severe two-tail, and severe one-tail selection models. \* *p* < .05, \*\* *p* < .001

Table 3

*Magnitude of the BTAE by Domain Type*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Moderator** | **Group** | ***k*** | ***N*** | ***dz* [95% *CI*]** | ***Q*** | **Test Value** | **Weight Function** |
| *All Effects* |  |  |  |  |  |  |  |
| Domain type | Abilities | 65 | 817,101 | 0.51 [0.39, 0.64] | 29,087.4\*\* | *Q*btw = 23.6\*\* | 0.49, 0.40, 0.46, 0.09 |
|  | Traits | 164 | 119,126 | 0.89 [0.80, 0.98] | 16,497.1\*\* |  | 0.87, 0.83, 0.85, 0.69 |
|  | Other | 62 | 29,080 | 0.75 [0.64, 0.87] | 7,279.9\*\* |  | 0.74, 0.71, 0.72, 0.63 |
| Domain valence | Both | 94 | 14,275 | 0.89 [0.80, 0.98] | 2,583.8\*\* | *Q*btw = 8.1\* | 0.88, 0.87, 0.86, 0.82 |
|  | Negative | 23 | 101,677 | 0.83 [0.66, 1.01] | 3,034.5\*\* |  | 0.82, 0.81, 0.81, 0.77 |
|  | Positive | 174 | 849,355 | 0.71 [0.62, 0.80] | 53,666.8\*\* |  | 0.68, 0.60, 0.66, 0.29 |
| *Matched Comparisons* |  |  |  |  |  |  |  |
| Ability type | Easy | 7 | 373 | 1.10 [1.06, 1.15] | 39.0\*\* | *t* = 36.8\*\* |  |
|  | Hard | 7 |  | -0.52 [-0.59, -0.46] | 88.3\*\* |  |  |
| Domain valence | Positive | 36 | 2,662 | 0.92 [0.86, 0.98] | 570.8\*\* | *t* = 10.5\*\* |  |
|  | Negative | 36 |  | 0.62 [0.58, 0.67] | 394.2\*\* |  |  |

*Note*. Matched comparisons were equivalent in all aspects except the moderating factor. *Q* are reported for between-subjects comparisons, and *t* statistics are reported for within-subjects comparisons. Weight function estimates reflect, in order, moderate two-tail, moderate one-tail, severe two-tail, and severe one-tail selection models. \* *p* < .05, \*\* *p* < .001

Table 4

*Meta-Regression Analyses Examining Continuous Moderators of the BTAE*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Moderator** | ***k*** | ***n*** | ***B*(*SE*)** | ***r2*** |
| # dimensions | 291 | 965,307 | 0.007 (0.002)\* | 2.9% |
| % female | 235 | 154,530 | 0.095 (0.162) | 0.0% |
| Age (mean) | 165 | 143,482 | -0.009 (0.004)\* | 2.5% |
| % white | 36 | 11,169 | -0.509 (0.351) | 3.1% |
| Referent specificity | 291 | 965,307 | 0.013 (0.028) | 0.0% |

Note. Values represent regression coefficients (*SE*). \* *p* < .05

Table 5

*Magnitude of the BTAE by Sample Type*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Moderator** | **Group** | ***k*** | ***N*** | ***dz* [95% *CI*]** | ***Q*** | **Test Value** | **Weight Function** |
| *All Effects* |  |  |  |  |  |  |  |
| Sample culture | East Asian | 36 | 4,008 | 0.90 [0.70, 1.11] | 1,996.9\*\* | *Q*btw = 1.8 | 0.88, 0.83, 0.86, 0.63 |
|  | European American | 222 | 857,997 | 0.76 [0.69, 0.83] | 52,497.2\*\* |  | 0.74, 0.69, 0.71, 0.51 |
|  | Other | 33 | 103,302 | 0.74 [0.54, 0.95] | 5,715.2\*\* |  | 0.72, 0.65, 0.70, 0.38 |
| Sample type | College students | 178 | 820,197 | 0.77 [0.68, 0.86] | 29,993.5\*\* | *Q*btw = 0.0 | 0.75, 0.68, 0.72, 0.42 |
|  | Other | 113 | 145,110 | 0.78 [0.69, 0.87] | 41,098.6\*\* |  | 0.77, 0.74, 0.75, 0.63 |
| *Matched Comparisons* | | | | | | | |
| Sample Culture | East Asian | 11 | 991 | 0.40 [0.09, 0.71] | 315.0\*\* | *Q*btw = 6.0\* |  |
|  | European American | 11 | 686 | 0.98 [0.63, 1.33] | 207.1\*\* |  |  |
| Individualistic traits | East Asian | 3 | 136 | 0.41 [0.11, 0.70] | 24.1\* | *Q*btw = 16.0\* |  |
|  | European American | 3 | 131 | 1.20 [0.94, 1.45] | 14.7\* |  |  |
| Collectivistic traits | East Asian | 3 | 136 | 1.03 [0.71, 1.35] | 42.3\*\* | *Q*btw = 0.1 |  |
|  | European American | 3 | 131 | 0.96 [0.41, 1.51] | 107.9\* |  |  |
| Sample gender | Men | 7 | 736 | 0.61 [0.31, 0.91] | 84.0\*\* | *Q*btw = 0.0 |  |
|  | Women | 7 | 821 | 0.63 [0.38, 0.88] | 78.8\*\* |  |  |

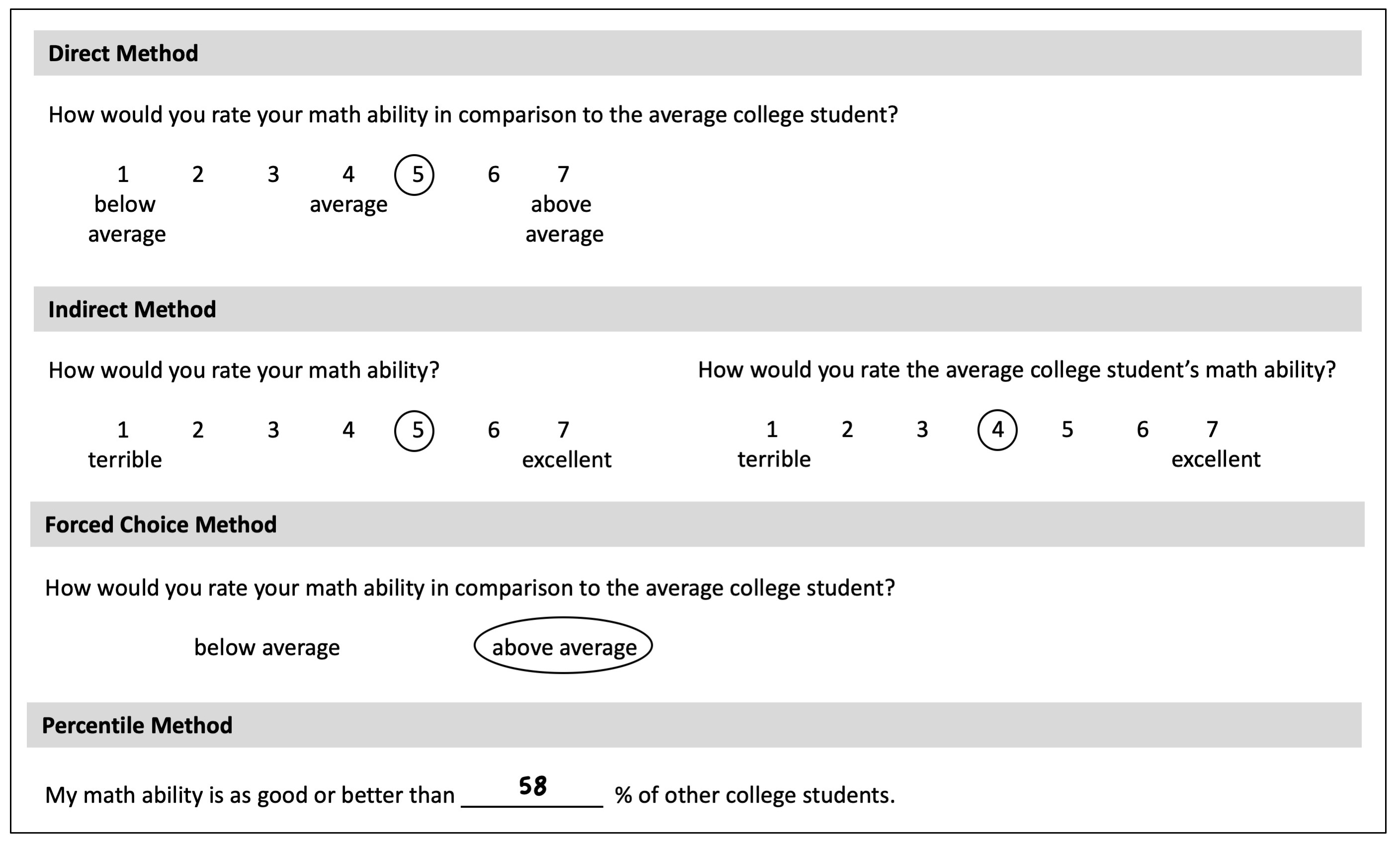
*Note*. Matched comparisons were equivalent in all aspects except the moderating factor. Weight function estimates reflect, in order, moderate two-tail, moderate one-tail, severe two-tail, and severe one-tail selection models. \* *p* < .05, \*\* *p* < .001

Table 6

*Magnitude of the BTAE by Referent Characteristics*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Moderator** | **Group** | ***k*** | ***N*** | ***dz* [95% *CI*]** | ***Q*** | **Test Value** | **Weight Function** |
| Referent type | Not explicit | 56 | 107,567 | 0.65 [0.48, 0.82] | 9,696.6\*\* | *Q*btw = 2.9 | 0.62, 0.52, 0.60, 0.12 |
|  | Explicit | 235 | 857,740 | 0.81 [0.74, 0.87] | 53,018.4\*\* |  | 0.79, 0.75, 0.77, 0.61 |
| Midpoint (direct) | Not explicit | 63 | 11,660 | 0.87 [0.73, 1.01] | 2,796.5\*\* | *Q*btw = 0.6 |  |
|  | Explicit | 57 | 826,487 | 0.95 [0.81, 1.09] | 41,299.5\*\* |  |  |
| Order (indirect) | Balanced | 47 | 5,878 | 0.83 [0.70, 0.96] | 814.7\*\* | *Q*btw = 6.8\* |  |
|  | Other | 55 | 108,296 | 0.59 [0.45, 0.72] | 11,168.9\*\* |  |  |

*Note*. Midpoint type was restricted to direct method studies (*k* = 120) and order was restricted to indirect method studies (*k* = 102). Weight function estimates reflect, in order, moderate two-tail, moderate one-tail, severe two-tail, and severe one-tail selection models. Weight function estimates for the direct and indirect method studies are presented in Table 2. \* *p* < .05, \*\* *p* < .001

**

*Figure 1*. Methods used to assess comparative self-evaluation, with sample responses indicative of a BTAE in judgments of math ability.

*A screenshot of a cell phone

Description automatically generated*

*Figure 2*. Flowchart for the article search.

A close up of a piece of paper

Description automatically generated

*Figure 3*. Funnel plot for the trim-and-fill analysis. Dark circles are obtained effect sizes (*k* = 291) and light circles are effect sizes added in the trim-and-fill-analysis (*k* = 106).

A close up of text on a white background

Description automatically generated

*Figure 4*. Funnel plot for the trim-and-fill analysis, after removal of five studies with unusually large samples. Dark circles are obtained effect sizes (*k* = 286) and light circles are effect sizes added via trim-and-fill (*k* = 29).

**Appendix A**

Table A1

*Characteristics of 124 Articles (291 Independent Samples) Included in the Meta-Analysis*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Article** | **Group** | ***N*** | ***M*age** | **%female** | **%white** | **Traits** | **Referent** | **Method** | **Domain** | **Valence** | **Culture** | **Sample** | ***dz*** |
| Alicke, 1985 |  | 88 |  | 58.0 |  | 154 | 1 | indirect | traits | both | EurAm | college | 0.69 |
| Alicke et al., 1995 | S1 | 121 |  | 57.9 |  | 40 | 2 | direct | traits | both | EurAm | college | 1.32 |
| Alicke et al., 1995 | S2 | 109 |  |  |  | 8 | 2 | indirect | traits | both | EurAm | college | 0.85 |
| Alicke et al., 1995 | S4 | 29 |  | 56.4 |  | 10 | 1 | direct | traits | pos | EurAm | college | 2.04 |
| Alicke et al., 1995 | S7 high load | 33 |  | 53.8 |  | 10 | 1 | direct | traits | pos | EurAm | college | 1.98 |
| Alicke et al., 1995 | S7 low load | 33 |  | 53.8 |  | 10 | 1 | direct | traits | pos | EurAm | college | 2.57 |
| Alicke et al., 2001 | S1 | 151 |  | 56.3 |  | 26 | 1 | direct | traits | both | EurAm | college | 0.77 |
| Alicke et al., 2001 | S2 | 91 |  | 74.7 |  | 26 | 1 | indirect | traits | both | EurAm | college | 0.61 |
| Alicke et al., 2001 | S3 | 93 |  | 74.2 |  | 34 | 1 | indirect | traits | both | EurAm | college | 0.63 |
| Bai & Chow, 2013 | women | 221 |  | 100 |  | 14 | 1 | indirect | other | pos | Asian | other | 0.67 |
| Bai & Chow, 2013 | men | 224 |  | 0 |  | 14 | 1 | indirect | other | pos | Asian | other | 0.85 |
| Barnard & Olivarez, 2007 |  | 302 |  | 56.0 | 75.7 | 1 | 0 | direct | abilities | pos | EurAm | college | 0.61 |
| Blanton et al., 2001 |  | 92 |  |  |  | 20 | 2 | multiple | abilities | pos | EurAm | college | -0.44 |
| Bell et al., 2019 | S1 | 88 | 19.8 | 62.6 | 68.0 | 3 | 1 | direct | traits | neg | EurAm | college | 0.95 |
| Bell et al., 2019 | S2a | 129 | 18.7 | 77.0 | 76.0 | 1 | 1 | direct | traits | neg | EurAm | college | 1.12 |
| Bell et al., 2019 | S2b | 267 | 19.3 | 69.0 | 76.0 | 1 | 1 | direct | traits | neg | EurAm | college | 0.88 |
| Bosson et al., 2000 |  | 83 |  | 52.4 |  | 5 | 3 | direct | other | pos | EurAm | college | 0.83 |
| Boyd-Wilson et al., 2004 | S1 low happiness | 68 | 20.9 | 48.8 |  | 16 | 3 | indirect | traits | both | EurAm | college | 0.68 |
| Boyd-Wilson et al., 2004 | S1 moderate happiness | 67 | 20.9 | 48.8 |  | 16 | 3 | indirect | traits | both | EurAm | college | 1.05 |
| Boyd-Wilson et al., 2004 | S1 high happiness | 68 | 20.9 | 48.8 |  | 16 | 3 | indirect | traits | both | EurAm | college | 1.12 |
| Boyd-Wilson et al., 2004 | S2 low happiness | 67 | 21.6 | 47.3 |  | 16 | 3 | indirect | traits | both | EurAm | college | 0.52 |
| Boyd-Wilson et al., 2004 | S2 moderate happiness | 75 | 21.6 | 47.3 |  | 16 | 3 | indirect | traits | both | EurAm | college | 0.93 |
| Boyd-Wilson et al., 2004 | S2 high happiness | 63 | 21.6 | 47.3 |  | 16 | 3 | indirect | traits | both | EurAm | college | 1.04 |
| Boyd-Wilson et al., 2000 | women | 99 | 21.3 | 100 |  | 16 | 3 | indirect | traits | both | EurAm | college | 1.10 |
| Boyd-Wilson et al., 2000 | men | 104 | 20.5 | 0 |  | 16 | 3 | indirect | traits | both | EurAm | college | 1.16 |
| Brookings & Serratelli, 2006 |  | 81 | 20.2 | 71.6 |  | 21 | 1 | direct | other | pos | EurAm | college | 1.22 |
| Brown, 1986 | S1 | 44 |  | 77.3 |  | 20 | 0 | indirect | traits | both | EurAm | college | 1.21 |
| Brown, 1986 | S2 | 36 |  | 50.0 |  | 20 | 0 | indirect | traits | both | EurAm | college | 1.89 |
| Brown, 1986 | S3 | 84 |  | 100 |  | 10 | 0 | indirect | traits | pos | EurAm | college | 1.88 |
| Brown, 2012 | S1 | 29 |  |  |  | 10 | 0 | indirect | traits | pos | EurAm | college | 2.20 |
| Brown, 2012 | S3 high import | 19 |  |  |  | 5 | 0 | indirect | traits | pos | EurAm | college | 0.86 |
| Brown, 2012 | S3 low import | 19 |  |  |  | 5 | 0 | indirect | traits | pos | EurAm | college | 0.27 |
| Brown, 2012 | S5 failure | 22 |  |  |  | 5 | 0 | indirect | traits | pos | EurAm | college | 2.10 |
| Brown, 2012 | S5 control | 22 |  |  |  | 5 | 0 | indirect | traits | pos | EurAm | college | 1.21 |
| Brown & Kobayashi, 2002 | S1 European American | 35 |  | 62.8 | 100 | 8 | 2 | indirect | traits | pos | EurAm | college | 0.58 |
| Brown & Kobayashi, 2002 | S1 Asian American | 28 |  | 62.8 | 0 | 8 | 2 | indirect | traits | pos | other | college | 0.58 |
| Brown & Kobayashi, 2002 | S1 Japanese | 23 |  | 62.8 |  | 8 | 2 | indirect | traits | pos | Asian | college | 0.58 |
| Brown & Kobayashi, 2002 | S2 | 37 |  | 43.2 |  | 8 | 2 | indirect | traits | pos | Asian | college | 0.54 |
| Brown & Kobayashi, 2002 | S3 | 78 | 54.5 | 21.8 |  | 8 | 2 | indirect | traits | pos | Asian | other | 0.46 |
| Chinchilla et al., 2018 | S1 | 243 | 15.0 | 63.0 |  | 13 | 1 | indirect | traits | both | EurAm | other | 0.78 |
| Chinchilla et al., 2018 | S2 | 442 | 31.2 | 75.0 |  | 16 | 1 | indirect | traits | both | EurAm | college | 1.14 |
| Chung et al., 2016 |  | 264 |  | 59.0 | 38.0 | 1 | 2 | direct | abilities | pos | EurAm | college | 0.63 |
| Cohen et al., 2014 | control | 39 |  | 62.0 | 80.0 | 20 | 0 | indirect | traits | both | EurAm | college | 0.65 |
| Cohen et al., 2014 | schizotypy | 39 |  | 59.0 | 77.0 | 20 | 0 | indirect | traits | both | EurAm | college | 0.04 |
| Cross, 1977 |  | 586 |  |  |  | 1 | 1 | forced choice | abilities | pos | EurAm | other | 1.86 |
| Davidai & Deri, 2019 | S2B | 100 | 39.0 | 60.0 | 81.0 | 3 | 0 | direct | traits | neg | EurAm | other | 0.83 |
| Davidai & Deri, 2019 | S3 self-perception | 50 | 35.3 | 55.6 |  | 6 | 1 | percentile | traits | pos | EurAm | other | 1.06 |
| Davidai & Deri, 2019 | S5C | 100 | 35.3 | 54.0 | 81.0 | 4 | 0 | direct | other | pos | EurAm | other | 0.49 |
| Dunning et al., 1989 | S1 | 27 |  |  |  | 28 | 2 | percentile | traits | both | EurAm | college | 0.60 |
| Dunning et al., 1989 | S2 | 25 |  |  |  | 28 | 2 | direct | traits | both | EurAm | college | 0.56 |
| Dunning et al., 1989 | S3 two criteria | 39 |  |  |  | 7 | 2 | percentile | traits | both | EurAm | college | 0.17 |
| Dunning et al., 1989 | S3 four criteria | 39 |  |  |  | 7 | 2 | percentile | traits | both | EurAm | college | 0.26 |
| Dunning et al., 1989 | S3 six criteria | 35 |  |  |  | 7 | 2 | percentile | traits | both | EurAm | college | 0.28 |
| Dunning et al., 1989 | S3 unspecified | 39 |  |  |  | 7 | 2 | percentile | traits | both | EurAm | college | 0.53 |
| Dunning et al., 1989 | S4 control | 12 |  |  |  | 3 | 2 | percentile | abilities | pos | EurAm | college | 0.22 |
| Dunning et al., 1989 | S4 own | 12 |  |  |  | 3 | 2 | percentile | abilities | pos | EurAm | college | 0.11 |
| Dunning et al., 1989 | S4 yoked | 12 |  |  |  | 3 | 2 | percentile | abilities | pos | EurAm | college | -0.13 |
| El-Alayli et al., 2006 | S2 | 70 | 21.0 | 67.0 |  | 22 | 1 | indirect | traits | both | EurAm | college | 1.32 |
| El-Alayli & Wynne, 2015 | S3 | 251 | 34.6 | 58.0 | 52.0 | 53 | 0 | direct | traits | both | other | other | 0.86 |
| Endo et al., 2000 | S2 European Canadian | 98 |  | 63.3 |  | 20 | 3 | indirect | traits | pos | EurAm | college | 0.55 |
| Endo et al., 2000 | S2 Asian Canadian | 111 |  | 55.0 |  | 20 | 3 | indirect | traits | pos | other | college | 0.28 |
| Endo et al., 2000 | S2 Japanese | 222 |  | 34.2 |  | 20 | 3 | indirect | traits | pos | Asian | college | -0.64 |
| Eriksson & Funcke, 2014 | S2 | 200 | 37.0 | 58.0 |  | 19 | 0 | direct | traits | pos | EurAm | other | 0.87 |
| Eriksson & Funcke, 2014 | S3 | 800 | 33.0 | 51.0 |  | 14 | 1 | direct | traits | pos | EurAm | other | 0.87 |
| Eriksson & Funcke, 2014 | S2 Democrat | 81 | 36.0 | 51.0 |  | 8 | 1 | direct | traits | pos | EurAm | other | 0.46 |
| Eriksson & Funcke, 2014 | S2 Republican | 59 | 36.0 | 51.0 |  | 8 | 1 | direct | traits | pos | EurAm | other | 0.77 |
| Fischer et al., 2007 | S1 low depletion | 50 | 23.6 | 72.0 |  | 4 | 0 | direct | abilities | pos | EurAm | college | 1.32 |
| Fischer et al., 2007 | S1 high depletion | 50 | 23.6 | 72.0 |  | 4 | 0 | direct | abilities | pos | EurAm | college | 0.78 |
| Fischer et al., 2007 | S5 low depletion | 15 | 22.6 | 90.0 |  | 5 | 0 | direct | other | pos | EurAm | college | 0.12 |
| Fischer et al., 2007 | S5 high depletion | 15 | 22.6 | 90.0 |  | 5 | 0 | direct | other | pos | EurAm | college | -0.79 |
| Foster et al., 2018 | S1 | 251 | 20.5 | 24.3 | 83.5 | 3 | 1 | multiple | abilities | pos | EurAm | other | 1.42 |
| Foster et al., 2018 | S2 entering | 19 | 20.5 | 20.6 | 83.5 | 3 | 1 | multiple | abilities | pos | EurAm | other | 0.83 |
| Foster et al., 2018 | S2 exiting | 15 | 20.5 | 20.6 | 83.5 | 3 | 1 | multiple | abilities | pos | EurAm | other | 1.42 |
| Fothergill & Wolfson, 2015 |  | 184 | 37.8 |  |  | 10 | 2 | direct | traits | both | EurAm | other | 0.89 |
| Fowers et al., 2008 | USA | 49 |  | 64.6 |  | 20 | 0 | indirect | traits | both | EurAm | other | 1.10 |
| Fowers et al., 2008 | Turkish nonconsang. | 58 |  | 64.6 |  | 20 | 0 | indirect | traits | both | other | other | 0.68 |
| Fowers et al., 2008 | Turkish consang. | 56 |  | 64.6 |  | 20 | 0 | indirect | traits | both | other | other | 0.29 |
| Frewen & Lundberg, 2012 |  | 91 | 21.0 | 75.0 |  | 20 | 0 | indirect | other | both | EurAm | college | 0.26 |
| Gabriel et al., 1994 | men | 62 | 21.6 | 0 | 82.0 | 2 | 1 | percentile | other | pos | EurAm | college | 0.86 |
| Gabriel et al., 1994 | women | 84 | 21.6 | 100 | 82.0 | 2 | 1 | percentile | other | pos | EurAm | college | 0.49 |
| García et al., 2009 | S1 | 90 | 24.9 | 64.4 | 7.8 | 42 | 4 | direct | other | both | EurAm | college | 1.74 |
| García et al., 2009 | S2 | 227 | 22.0 | 42.6 | 7.4 | 42 | 4 | direct | other | both | EurAm | college | 1.66 |
| Gebauer et al., 2017 | S1a Christian | 296 | 35.8 | 61.5 |  | 6 | 3 | indirect | traits | pos | EurAm | other | 0.51 |
| Gebauer et al., 2017 | S1a control | 671 | 35.0 | 58.7 |  | 6 | 3 | indirect | traits | pos | EurAm | other | 0.37 |
| Gebauer et al., 2017 | S1b Christian | 374 | 36.3 | 62.2 |  | 6 | 3 | indirect | traits | pos | EurAm | other | 0.43 |
| Gebauer et al., 2017 | S1b control | 777 | 35.9 | 59.3 |  | 6 | 3 | indirect | traits | pos | EurAm | other | 0.34 |
| Gebauer et al., 2018 | S1 control | 93 | 40.3 | 79.4 |  | 4 | 2 | direct | abilities | pos | EurAm | other | 0.83 |
| Gebauer et al., 2018 | S1 yoga | 93 | 40.3 | 79.4 |  | 4 | 2 | direct | abilities | pos | EurAm | other | 0.90 |
| Gebauer et al., 2018 | S2 control | 160 | 40.8 | 86.3 |  | 10 | 3 | direct | traits | pos | EurAm | other | 0.96 |
| Gebauer et al., 2018 | S2 meditation | 158 | 40.8 | 86.3 |  | 10 | 3 | direct | traits | pos | EurAm | other | 1.12 |
| Glaser & Weber, 2007 |  | 212 | 40.0 | 5.0 |  | 1 | 2 | percentile | abilities | pos | EurAm | other | 0.34 |
| Goetz et al., 2006 | Munich | 380 | 32.5 | 61.3 |  | 4 | 1 | indirect | traits | pos | EurAm | other | 0.70 |
| Goetz et al., 2006 | Venice | 545 | 39.5 | 47.0 |  | 4 | 1 | indirect | traits | pos | EurAm | other | 0.48 |
| Gold & Brown, 2011 |  | 154 | 19.2 | 84.4 |  | 5 | 2 | indirect | traits | both | EurAm | college | 0.58 |
| Goldie & Wolfson, 2014 |  | 77 | 34.9 | 7.8 |  | 12 | 1 | direct | other | pos | EurAm | other | 0.82 |
| Gordon et al., 2013 | low anxiety | 35 | 21.6 | 76.0 | 57.2 | 11 | 0 | direct | other | both | EurAm | college | 1.41 |
| Gordon et al., 2013 | medium anxiety | 37 | 21.6 | 76.0 | 57.2 | 11 | 0 | direct | other | both | EurAm | college | 1.05 |
| Gordon et al., 2013 | high anxiety | 36 | 21.6 | 76.0 | 57.2 | 11 | 0 | direct | other | both | EurAm | college | 0.19 |
| Gort, 2009 |  | 108 |  |  |  | 6 | 2 | direct | abilities | pos | EurAm | other | 0.17 |
| Guenther & Alicke, 2010 | S1 self-average | 104 |  |  |  | 23 | 1 | indirect | traits | both | EurAm | college | 0.88 |
| Guenther & Alicke, 2010 | S1 average-self | 104 |  |  |  | 23 | 1 | indirect | traits | both | EurAm | college | 1.09 |
| Guenther & Alicke, 2010 | S1 simultaneous | 104 |  |  |  | 23 | 1 | indirect | traits | both | EurAm | college | 1.00 |
| Guenther & Alicke, 2010 | S2 self-anchor | 64 |  | 64.4 |  | 23 | 1 | indirect | traits | both | EurAm | college | 0.82 |
| Hamamura et al,. 2007 | S1 Japanese | 31 |  | 64.5 |  | 15 | 1 | indirect | traits | pos | Asian | college | 0.36 |
| Hamamura et al,. 2007 | S1 Asian Canadian | 48 |  | 72.3 |  | 15 | 1 | indirect | traits | pos | other | college | 0.45 |
| Hamamura et al,. 2007 | S1 Euro Canadian | 38 |  | 75.0 |  | 15 | 1 | indirect | traits | pos | EurAm | college | 0.61 |
| Hamamura et al,. 2007 | S2 Japanese | 97 |  | 43.3 |  | 10 | 1 | direct | traits | pos | Asian | college | 0.36 |
| Hamamura et al,. 2007 | S2 Asian Canadian | 61 |  | 52.5 |  | 10 | 1 | direct | traits | pos | other | college | 1.11 |
| Hamamura et al,. 2007 | S2 Euro Canadian | 46 |  | 47.8 |  | 10 | 1 | direct | traits | pos | EurAm | college | 2.06 |
| Hagá et al., 2018 | S1 5 yr old | 21 | 5.4 | 43.0 |  | 4 | 1 | multiple | traits | both | EurAm | other | 1.77 |
| Hagá et al., 2018 | S1 8 yr old | 21 | 8.6 | 33.0 |  | 4 | 1 | multiple | traits | both | EurAm | other | 1.25 |
| Hagá et al., 2018 | S1 11 yr old | 20 | 11.5 | 67.0 |  | 4 | 1 | multiple | traits | both | EurAm | other | 0.71 |
| Hagá et al., 2018 | S2 5 yr old | 20 | 5.7 | 50.0 |  | 3 | 2 | direct | other | both | EurAm | other | 1.70 |
| Hagá et al., 2018 | S2 8 yr old | 20 | 8.5 | 55.0 |  | 3 | 2 | direct | other | both | EurAm | other | 1.16 |
| Hagá et al., 2018 | S2 11 yr old | 20 | 11.6 | 55.0 |  | 3 | 2 | direct | other | both | EurAm | other | 0.75 |
| Harrison & Shaffer, 1994 | S1 | 53 | 39.0 | 62.0 |  | 1 | 1 | indirect | other | neg | EurAm | other | 0.59 |
| Harrison & Shaffer, 1994 | S2 | 126 | 31.0 | 44.0 |  | 1 | 1 | indirect | other | neg | EurAm | other | 0.77 |
| Harrison & Shaffer, 1994 | S3 | 185 | 36.0 | 49.0 |  | 1 | 1 | indirect | other | neg | EurAm | other | 0.64 |
| Harrison & Shaffer, 1994 | S4 | 151 |  |  |  | 1 | 1 | indirect | other | neg | EurAm | other | 0.89 |
| Harrison & Shaffer, 1994 | S5 self-norm | 174 | 30.0 | 56.0 |  | 1 | 1 | indirect | other | neg | EurAm | other | 0.55 |
| Harrison & Shaffer, 1994 | S5 norm-self | 172 | 30.0 | 56.0 |  | 1 | 1 | indirect | other | neg | EurAm | other | 0.52 |
| Harrison & Shaffer, 1994 | S6 | 112 | 23.0 | 36.0 |  | 1 | 1 | indirect | other | neg | EurAm | college | 0.65 |
| Heck et al., 2018 | telephone | 1,838 |  | 62.6 | 85.0 | 1 | 0 | direct | abilities | pos | EurAm | other | 0.40 |
| Heck et al., 2018 | online | 983 |  | 58.7 | 77.7 | 1 | 0 | direct | abilities | pos | EurAm | other | 0.67 |
| Harré et al., 2005 | S1 | 314 | 19.9 | 31.8 |  | 8 | 1 | direct | abilities | both | EurAm | other | 0.62 |
| Heine & Lehman, 1997 | S1 Japanese | 82 |  | 67.1 |  | 10 | 2 | percentile | traits | pos | Asian | college | 0.31 |
| Heine & Lehman, 1997 | S1 Asian Canadian | 44 |  | 63.6 |  | 10 | 2 | percentile | traits | pos | other | college | 1.26 |
| Heine & Lehman, 1997 | S1 Euro Canadians | 75 |  | 76.0 |  | 10 | 2 | percentile | traits | pos | EurAm | college | 1.91 |
| Heine & Lehman, 1999 | Japanese | 161 |  | 36.0 |  | 20 | 3 | indirect | traits | pos | Asian | college | -0.24 |
| Heine & Lehman, 1999 | Asian Canadian | 151 |  | 73.5 |  | 20 | 3 | indirect | traits | pos | other | college | -0.04 |
| Heine & Lehman, 1999 | Euro Canadian | 90 |  | 72.2 |  | 20 | 3 | indirect | traits | pos | EurAm | college | 0.41 |
| Hilton et al., 2011 | S2 | 221 |  |  |  | 6 | 2 | direct | abilities | pos | EurAm | college | -0.02 |
| Hilton et al., 2011 | S3 | 97 |  |  |  | 6 | 2 | direct | abilities | pos | EurAm | college | 0.21 |
| Hoorens, 1995 |  | 92 | 16.5 | 48.9 |  | 34 | 4 | direct | traits | both | EurAm | other | 0.76 |
| Hoorens & Harris, 1998 |  | 152 |  | 33.6 |  | 28 | 1 | indirect | other | both | EurAm | college | 0.34 |
| Hornsey, 2003 | S1 | 85 | 18.8 | 74.1 |  | 18 | 2 | direct | traits | both | EurAm | college | 1.82 |
| Hornsey, 2003 | S2 | 40 | 19.7 | 60.0 |  | 18 | 2 | direct | traits | both | EurAm | college | 1.41 |
| Hornsey & Jetten, 2005 | S1 | 42 | 18.7 | 61.9 |  | 7 | 2 | indirect | traits | both | EurAm | college | 0.66 |
| Hornsey & Jetten, 2005 | S2 individualist | 16 | 22.4 | 73.3 |  | 7 | 1 | indirect | traits | both | EurAm | college | 0.42 |
| Hornsey & Jetten, 2005 | S2 collectivist | 14 | 19.7 | 78.6 |  | 7 | 1 | indirect | traits | both | Asian | college | 0.46 |
| Howell & Ratliff, 2017 | S1 exploratory | 45,898 | 28.7 | 72.6 |  | 1 | 0 | indirect | traits | neg | other | other | 1.54 |
| Howell & Ratliff, 2017 | S1 confirmatory | 52,735 | 28.6 | 71.9 |  | 1 | 0 | indirect | traits | neg | other | other | 1.54 |
| Howell & Ratliff, 2017 | S2 | 1,125 | 36.3 | 53.8 |  | 1 | 3 | indirect | traits | neg | EurAm | other | 0.28 |
| Kansal & Singh, 2018 |  | 500 |  | 24.4 |  | 3 | 0 | direct | abilities | pos | other | other | 0.24 |
| Khan et al., 2019 | individual | 454 | 39.1 | 37.9 |  | 4 | 1 | direct | abilities | pos | Asian | other | 0.47 |
| Khan et al., 2019 | institutional | 66 | 39.8 | 34.8 |  | 4 | 1 | direct | abilities | pos | Asian | other | 0.95 |
| Klar, 2002 | S1 undergrads | 48 |  |  |  | 7 | 1 | direct | traits | pos | other | college | 0.28 |
| Klar, 2002 | S1 police | 23 |  | 0 |  | 8 | 1 | direct | other | pos | other | other | 0.81 |
| Klar, 2002 | S1 high school | 24 | 16.0 | 50.0 |  | 10 | 1 | direct | traits | pos | other | other | 1.04 |
| Klein et al., 2006 | S1 | 293 |  | 49.5 |  | 1 | 0 | percentile | abilities | pos | EurAm | college | 0.78 |
| Klein et al., 2006 | S2 Pittsburgh | 100 |  | 51.4 |  | 1 | 0 | multiple | abilities | pos | EurAm | college | 0.45 |
| Klein et al., 2006 | S2 Sacramento | 100 |  | 51.4 |  | 1 | 0 | multiple | abilities | pos | EurAm | college | 0.00 |
| Kobayash & Brown, 2003 | high self-esteem | 60 |  | 69.8 |  | 8 | 1 | indirect | traits | pos | other | college | 1.49 |
| Kobayash & Brown, 2003. | low self-esteem | 53 |  | 69.8 |  | 8 | 1 | indirect | traits | pos | other | college | 0.72 |
| Kruger, 1999 | S1 | 37 |  | 78.4 |  | 8 | 2 | percentile | abilities | pos | EurAm | college | 0.02 |
| Kruger, 1999 | S2 easy | 49 |  | 81.7 |  | 1 | 2 | multiple | abilities | pos | EurAm | college | 0.46 |
| Kruger, 1999 | S2 difficult | 55 |  | 81.7 |  | 1 | 2 | multiple | abilities | pos | EurAm | college | -0.43 |
| Kruger, 1999 | S3 | 49 |  | 63.3 |  | 4 | 2 | percentile | abilities | pos | EurAm | college | 0.05 |
| Kurman, 2003 | S1a individualist | 227 |  |  |  | 6 | 2 | forced choice | traits | pos | other | other | 1.60 |
| Kurman, 2003 | S1a collectivist | 243 |  |  |  | 6 | 2 | forced choice | traits | pos | Asian | other | 0.54 |
| Kurman, 2003 | S1b individualist | 144 |  |  |  | 6 | 2 | forced choice | traits | pos | other | college | 1.94 |
| Kurman, 2003 | S1b collectivist | 155 |  |  |  | 6 | 2 | forced choice | traits | pos | Asian | college | 0.46 |
| Kurman, 2003 | S1d individualist | 80 |  |  |  | 6 | 2 | direct | traits | pos | other | other | 1.42 |
| Kurman, 2003 | S1d collectivist | 64 |  |  |  | 6 | 2 | direct | traits | pos | other | other | 0.77 |
| Kuyper & Dijkstra, 2009 |  | 588 |  | 54.9 |  | 23 | 1 | direct | other | both | EurAm | other | 0.04 |
| Kuyper et al., 2011 |  | 15,806 | 13.0 | 50.6 |  | 5 | 1 | direct | other | pos | EurAm | other | 0.15 |
| Lee, 2012 | S3 American | 83 |  |  |  | 29 | 4 | percentile | traits | both | EurAm | college | 1.25 |
| Lee, 2012 | S3 Korean | 141 |  |  |  | 29 | 4 | percentile | traits | both | Asian | college | 0.67 |
| Lee et al., 2010 | S1 English | 52 | 19.3 | 61.6 |  | 46 | 2 | direct | traits | both | Asian | college | 0.99 |
| Lee et al., 2010 | S1 Chinese | 47 | 19.3 | 61.6 |  | 46 | 2 | direct | traits | both | Asian | college | 0.58 |
| Lee et al., 2002 | S1 therapist | 103 | 41.1 | 72.8 |  | 20 | 0 | indirect | traits | both | EurAm | other | 1.31 |
| Lee et al., 2002 | S1 client | 89 | 33.0 | 31.5 |  | 20 | 0 | indirect | traits | both | EurAm | other | 0.92 |
| Lee et al., 2002 | S2 therapist | 62 | 33.6 | 85.5 |  | 20 | 0 | indirect | traits | both | Asian | other | 1.50 |
| Lee et al., 2002 | S2 client | 45 | 29.9 | 77.8 |  | 20 | 0 | indirect | traits | both | Asian | other | 0.68 |
| Logg et al., 2018 | S1 | 212 | 30.2 | 51.4 |  | 2 | 0 | indirect | traits | pos | other | other | 0.25 |
| Logg et al., 2018 | S2 desirable | 333 | 34.0 | 48.6 |  | 2 | 0 | indirect | traits | pos | other | other | 0.70 |
| Logg et al., 2018 | S2 undesirable | 333 | 34.0 | 48.6 |  | 2 | 0 | indirect | traits | pos | other | other | 0.19 |
| Logg et al., 2018 | S3 desirable | 195 | 33.0 | 49.4 |  | 1 | 1 | indirect | traits | pos | other | other | 0.32 |
| Logg et al., 2018 | S3 undesirable | 195 | 33.0 | 49.4 |  | 1 | 1 | indirect | traits | pos | other | other | -0.31 |
| Logg et al., 2018 | S4 desirable | 179 | 34.0 | 46.0 |  | 1 | 1 | indirect | traits | pos | other | other | 0.30 |
| Logg et al., 2018 | S4 undesirable | 179 | 34.0 | 46.0 |  | 1 | 1 | indirect | traits | pos | other | other | -0.37 |
| Logg et al., 2018 | S6 | 136 |  |  |  | 10 | 1 | indirect | other | pos | EurAm | college | 0.45 |
| Logie & Frewen, 2015 |  | 104 | 18.6 | 66.7 | 63.0 | 16 | 0 | indirect | traits | both | EurAm | college | -0.05 |
| Luo et al., 2016 | S1 | 178 | 21.6 | 55.1 |  | 16 | 2 | direct | traits | pos | Asian | college | 1.44 |
| Luo et al., 2016 | S2 | 464 | 20.3 | 57.1 |  | 16 | 2 | direct | traits | pos | Asian | other | 1.83 |
| Lynn et al., 2014 |  | 91 | 19.0 | 43.0 |  | 1 | 2 | direct | abilities | pos | EurAm | college | 0.18 |
| Măirean & Havârneanu, 2018 |  | 366 | 39.1 | 50.8 |  | 9 | 1 | direct | abilities | pos | EurAm | other | 0.66 |
| Martha & Delhomme, 2009 | cyclist | 119 | 37.7 | 0 |  | 3 | 4 | direct | abilities | pos | EurAm | other | 0.61 |
| Martha & Laurendeau, 2010 | triathlete | 119 | 36.3 | 0 |  | 1 | 3 | direct | abilities | pos | EurAm | other | 0.09 |
| Martha et al., 2010 | non-sportsmen | 89 | 37.1 | 0 |  | 1 | 4 | direct | abilities | pos | EurAm | other | 0.70 |
| Martha et al., 2010 | low-risk sportsmen | 53 | 36.8 | 0 |  | 1 | 4 | direct | abilities | pos | EurAm | other | 0.65 |
| Martha et al., 2010 | skydiver | 201 | 36.0 | 0 |  | 2 | 4 | direct | abilities | pos | EurAm | other | 0.63 |
| Martha et al., 2010 | base jumper | 39 | 31.6 | 0 |  | 2 | 4 | direct | abilities | pos | EurAm | other | 0.53 |
| Martha et al., 2010 | paraglider | 73 | 37.6 | 0 |  | 2 | 4 | direct | abilities | pos | EurAm | other | 0.56 |
| Mattern et al., 2010 | Sample 1 | 153,961 |  |  |  | 1 | 1 | direct | abilities | pos | EurAm | college | 1.62 |
| Mattern et al., 2010 | Sample 2 | 651,747 |  |  |  | 1 | 1 | direct | abilities | pos | EurAm | college | 1.14 |
| Matz & Hinsz, 2000 |  | 171 |  | 50.9 |  | 1 | 1 | percentile | abilities | pos | EurAm | college | 0.28 |
| Merkle & Weber, 2011 |  | 64 | 24.0 | 31.0 |  | 4 | 1 | direct | abilities | pos | EurAm | college | 0.75 |
| Morry et al., 2014 | S1 | 136 | 20.2 | 59.6 | 50.0 | 40 | 2 | indirect | traits | both | EurAm | college | 0.47 |
| Murray et al., 1996a | men | 75 | 30.5 | 0 |  | 21 | 1 | indirect | other | both | EurAm | other | 0.68 |
| Murray et al., 1996a | women | 75 | 30.5 | 100 |  | 21 | 1 | indirect | other | both | EurAm | other | 0.61 |
| Murray et al., 1996b | men | 121 | 19.5 | 0 |  | 21 | 1 | indirect | other | both | EurAm | college | 0.53 |
| Murray et al., 1996b | women | 121 | 19.5 | 100 |  | 21 | 1 | indirect | other | both | EurAm | college | 0.96 |
| Norasakkunkit & Kalick, 2002 | Euro American | 135 |  | 63.7 |  | 10 | 2 | percentile | traits | pos | EurAm | college | 1.36 |
| Norasakkunkit & Kalick, 2002 | Asian | 150 |  | 67.3 |  | 10 | 2 | percentile | traits | pos | Asian | college | 0.63 |
| Pahl & Eiser, 2005 |  | 90 | 21.0 | 48.9 |  | 10 | 1 | direct | traits | both | EurAm | college | 0.71 |
| Pahl & Eiser, 2007 | pretest | 40 | 21.0 | 67.5 |  | 4 | 3 | direct | other | both | EurAm | college | 0.49 |
| Pahl & Eiser, 2005 | main study | 198 | 23.0 | 43.9 |  | 10 | 3 | direct | other | both | EurAm | college | 0.77 |
| Pahl et al., 2009 | pilot | 33 | 22.0 | 78.8 |  | 20 | 1 | direct | traits | pos | other | college | 0.49 |
| Pahl et al., 2009 | S1 self-other | 26 | 21.0 | 57.7 |  | 20 | 2 | direct | traits | both | EurAm | college | 1.27 |
| Pahl et al., 2009 | S1 other-self | 26 | 21.0 | 57.7 |  | 20 | 2 | direct | traits | both | EurAm | college | 0.76 |
| Pelham & Swann, 1989 |  | 486 |  | 51.1 |  | 10 | 2 | direct | other | pos | EurAm | college | 1.28 |
| Pietroni & Hughes, 2016 |  | 64 | 22.4 | 53.1 |  | 11 | 1 | forced choice | abilities | pos | EurAm | college | 0.40 |
| Pollard & Courage, 2017 | multitasking | 40 | 21.1 | 82.0 |  | 1 | 0 | direct | abilities | pos | EurAm | college | -0.24 |
| Pollard & Courage, 2017 | background | 40 | 21.1 | 82.0 |  | 1 | 0 | direct | abilities | pos | EurAm | college | -0.13 |
| Pollard & Courage, 2017 | control | 40 | 21.1 | 82.0 |  | 1 | 0 | direct | abilities | pos | EurAm | college | 0.11 |
| Pronin et al., 2002 | Survey 1 | 24 |  |  |  | 8 | 1 | indirect | traits | neg | EurAm | college | 1.70 |
| Pronin et al., 2002 | Survey 2 | 30 |  |  |  | 11 | 2 | indirect | traits | neg | EurAm | college | 0.57 |
| Pronin et al., 2002 | Survey 3 | 76 |  |  |  | 16 | 1 | direct | traits | neg | EurAm | other | 0.22 |
| Robinson et al., 2004 | men | 37 | 18.9 | 0 | 73.0 | 30 | 1 | indirect | other | neg | EurAm | college | 0.02 |
| Robinson et al., 2004 | women | 78 | 18.9 | 100 | 73.0 | 30 | 1 | indirect | other | neg | EurAm | college | 0.49 |
| Rose et al., 2012 | S1 strong hander | 68 |  | 74.0 |  | 6 | 2 | multiple | abilities | pos | EurAm | college | 0.12 |
| Rose et al., 2012 | S1 mixed hander | 59 |  | 74.0 |  | 6 | 2 | multiple | abilities | pos | EurAm | college | 0.00 |
| Roy et al., 2013 | S4 most are good | 47 |  | 67.0 |  | 1 | 0 | percentile | abilities | pos | EurAm | college | 0.19 |
| Roy et al., 2013 | S4 most are bad | 50 |  | 67.0 |  | 1 | 0 | percentile | abilities | pos | EurAm | college | -0.22 |
| Roy et al., 2013 | S5 most are good | 32 |  | 83.0 | 85.0 | 1 | 0 | percentile | abilities | pos | EurAm | college | 0.20 |
| Roy et al., 2013 | S5 most are bad | 29 |  | 83.0 | 85.0 | 1 | 0 | percentile | abilities | pos | EurAm | college | -0.77 |
| Scherer et al., 2016 | S1 | 102 | 38.5 | 79.4 | 97.1 | 8 | 2 | multiple | other | both | EurAm | other | 1.21 |
| Scherer et al., 2016 | S2 | 91 | 37.8 | 79.4 | 95.6 | 8 | 2 | multiple | other | both | EurAm | other | 0.29 |
| Scherer et al., 2016 | S3a | 20 |  |  |  | 32 | 2 | direct | other | both | EurAm | college | 1.12 |
| Scherer et al., 2016 | S3b | 35 |  |  |  | 32 | 2 | indirect | other | both | EurAm | college | 1.04 |
| Schmidt et al., 1999 |  | 117 | 61.6 | 51.0 |  | 12 | 1 | direct | abilities | pos | EurAm | other | 1.37 |
| Sedikides et al., 2003 | S1 American | 40 |  | 50.0 |  | 16 | 6 | direct | traits | pos | EurAm | college | 0.83 |
| Sedikides et al., 2003 | S1 Japanese | 40 |  | 50.0 |  | 16 | 6 | direct | traits | pos | Asian | college | 1.37 |
| Sedikides et al., 2003 | S2 independent | 48 |  |  |  | 16 | 6 | direct | traits | pos | EurAm | college | 0.32 |
| Sedikides et al., 2003 | S2 interdependent | 48 |  |  |  | 16 | 6 | direct | traits | pos | EurAm | college | 0.37 |
| Sedikides et al., 2014 |  | 79 | 20.4 |  |  | 9 | 1 | direct | traits | pos | EurAm | other | 0.98 |
| Seo & Scammon, 2014 | S1 | 92 |  |  |  | 4 | 2 | percentile | traits | pos | EurAm | college | 0.43 |
| Seo & Scammon, 2014 | S2 | 62 |  |  |  | 8 | 2 | direct | traits | pos | EurAm | college | 0.70 |
| Sibley & Harré, 2009 | pos framing | 50 | 19.2 | 65.3 |  | 16 | 1 | direct | other | both | EurAm | college | 0.70 |
| Sibley & Harré, 2009 | neg framing | 50 | 19.2 | 65.3 |  | 16 | 1 | direct | other | both | EurAm | college | 0.95 |
| Sibley & Harré, 2009 | control | 50 | 19.2 | 65.3 |  | 16 | 1 | direct | other | both | EurAm | college | 1.07 |
| Sohn, 2009 | pos feedback | 102 | 30.2 | 88.7 |  | 20 | 2 | direct | traits | both | Asian | other | 2.09 |
| Sohn, 2009 | neg feedback | 101 | 30.2 | 88.7 |  | 20 | 2 | direct | traits | both | Asian | other | 2.28 |
| Sproesser et al., 2015 |  | 770 | 47.7 | 58.0 |  | 1 | 2 | indirect | other | both | EurAm | other | 0.67 |
| Stark & Sachau, 2016 |  | 4,950 | 47.4 | 36.6 | 80.1 | 12 | 2 | multiple | other | both | EurAm | other | 1.31 |
| Suls et al., 2002 | S1 | 98 |  | 51.0 |  | 27 | 2 | direct | traits | both | EurAm | college | 0.79 |
| Svenson, 1981 | American skill | 41 | 22.0 |  |  | 1 | 1 | percentile | abilities | pos | EurAm | college | 1.21 |
| Svenson, 1981 | American safety | 40 | 22.0 |  |  | 1 | 1 | percentile | other | pos | EurAm | college | 1.27 |
| Svenson, 1981 | Swedish skill | 45 | 33.0 |  |  | 1 | 1 | percentile | abilities | pos | EurAm | college | 0.41 |
| Svenson, 1981 | Swedish safety | 35 | 33.0 |  |  | 1 | 1 | percentile | other | pos | EurAm | college | 0.66 |
| Swami et al., 2009 | women | 143 | 34.1 | 100.0 |  | 20 | 0 | percentile | other | pos | EurAm | other | 0.10 |
| Swami et al., 2009 | men | 113 | 34.1 | 0 |  | 20 | 0 | percentile | other | pos | EurAm | other | 0.15 |
| Swami & Allum, 2012 |  | 304 | 24.3 | 51.6 | 91.0 | 20 | 0 | percentile | other | pos | EurAm | other | 0.00 |
| Swenson et al., 2014 |  | 78 | 19.0 | 50.0 |  | 9 | 0 | percentile | traits | both | EurAm | college | 0.61 |
| Tam et al., 2012 | S1 | 85 | 19.9 | 71.8 |  | 74 | 3 | direct | traits | pos | Asian | college | 1.15 |
| Tam et al., 2012 | S2 | 65 | 18.9 | 55.4 | 100 | 74 | 1 | direct | traits | pos | EurAm | college | 1.99 |
| Taylor et al., 2003 |  | 92 | 20.6 | 51.1 | 43.5 | 42 | 3 | direct | other | both | EurAm | other | 1.19 |
| Van Lange & Sedikides, 1998 |  | 156 |  |  |  | 2 | 2 | direct | other | both | EurAm | college | 0.70 |
| Varnum, 2015 | S1 | 209 |  | 32.1 |  | 9 | 1 | percentile | other | pos | EurAm | other | 1.09 |
| Varnum, 2015 | S2 | 318 |  | 36.8 |  | 9 | 1 | percentile | other | pos | EurAm | other | 1.06 |
| Varnum, 2015 | S3 | 305 |  | 41.3 |  | 9 | 1 | percentile | other | pos | EurAm | other | 1.16 |
| Varnum, 2015 | S4 | 316 |  | 39.9 |  | 9 | 1 | percentile | other | pos | EurAm | other | 1.22 |
| Varnum, 2015 | S5 | 228 |  | 36.4 |  | 9 | 1 | percentile | other | pos | EurAm | other | 1.03 |
| Vautier & Bonnefon, 2008 | internet | 597 |  |  |  | 5 | 0 | indirect | traits | pos | other | other | 0.41 |
| Vautier & Bonnefon, 2008 | paper | 953 | 31.7 | 50.0 |  | 5 | 3 | indirect | traits | pos | EurAm | other | 0.62 |
| Vincze, 2010 |  | 102 | 23.8 | 76.5 |  | 42 | 3 | direct | traits | both | EurAm | college | 1.34 |
| Vincze et al., 2012 |  | 304 | 21.5 | 58.9 |  | 42 | 3 | direct | traits | both | EurAm | other | 1.08 |
| Walton, 1999 |  | 1,006 | 44.5 | 1.0 |  | 6 | 1 | multiple | abilities | pos | EurAm | other | 0.84 |
| Walton & Bathurst, 1998 |  | 86 |  | 46.5 |  | 2 | 1 | forced choice | abilities | pos | EurAm | other | 0.20 |
| Williams & Gilovich, 2008 |  | 49 |  |  |  | 4 | 1 | percentile | traits | pos | EurAm | college | 0.82 |
| Williams & Gilovich, 2012 | S2 self point-estimate | 45 |  | 55.9 |  | 12 | 2 | percentile | traits | pos | other | other | 1.92 |
| Wohleber & Matthews, 2016 |  | 129 | 20.2 | 49.6 |  | 13 | 3 | indirect | abilities | pos | EurAm | college | 0.99 |
| Wright, 2000 |  | 200 | 20.8 | 67.8 |  | 5 | 1 | direct | abilities | pos | EurAm | college | 0.30 |
| Wu, 2018 | S1 American | 30 |  |  |  | 8 | 1 | percentile | abilities | pos | EurAm | college | 0.72 |
| Wu, 2018 | S1 Chinese | 30 |  |  |  | 8 | 1 | percentile | abilities | pos | Asian | college | 0.64 |
| Zajenkowski & Gignac, 2018 | S1 | 303 | 24.3 | 68.0 |  | 1 | 0 | direct | abilities | pos | EurAm | college | 0.85 |
| Zajenkowski & Gignac, 2018 | S2 | 225 | 23.5 | 52.9 |  | 1 | 0 | direct | abilities | pos | EurAm | college | 1.36 |
| Zavareh et al., 2018 |  | 256 | 31.9 | 23.8 |  | 4 | 3 | direct | other | pos | other | other | 0.89 |
| Zell & Alicke, 2011 | young | 85 | 23.7 | 43.7 |  | 12 | 2 | indirect | traits | pos | EurAm | other | 0.94 |
| Zell & Alicke, 2011 | middle-aged | 75 | 49.2 | 60.0 |  | 12 | 2 | indirect | traits | pos | EurAm | other | 1.10 |
| Zell & Alicke, 2011 | older | 77 | 70.2 | 58.4 |  | 12 | 2 | indirect | traits | pos | EurAm | other | 0.24 |
| Zhang et al., 2016 | S1 Chinese | 124 | 21.8 | 62.1 |  | 26 | 1 | direct | traits | pos | Asian | college | 1.68 |
| Zhang et al., 2016 | S1 Chinese Canadian | 81 | 19.2 | 70.4 | 0 | 26 | 1 | direct | traits | pos | other | college | 0.96 |
| Zhang et al., 2016 | S3 contemporary | 54 | 24.4 | 63.2 |  | 21 | 1 | direct | traits | pos | Asian | college | 1.74 |
| Zhang et al., 2016 | S3 traditional | 54 | 24.4 | 63.2 |  | 21 | 1 | direct | traits | pos | Asian | college | 0.94 |
| Zhang et al., 2016 | S3 neutral | 54 | 24.4 | 63.2 |  | 21 | 1 | direct | traits | pos | Asian | college | 1.69 |
| Zhang et al., 2017 | S1 | 36 | 21.3 | 52.8 |  | 60 | 3 | direct | traits | neg | Asian | college | 0.89 |
| Zhang et al., 2017 | S2 independent | 27 | 21.7 | 51.9 |  | 60 | 3 | direct | traits | neg | Asian | college | 1.40 |
| Zhang et al., 2017 | S2 interdependent | 27 | 21.7 | 51.9 |  | 60 | 3 | direct | traits | neg | Asian | college | 1.28 |
| Zhang et al., 2017 | S2 neutral | 27 | 21.7 | 51.9 |  | 60 | 3 | direct | traits | neg | Asian | college | 0.94 |

**Appendix B**

Table B1

*Studies Examining the Magnitude of the BTAE for Easy versus Hard Abilities*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Article** | **Group** | ***N*** | ***dz (easy)*** | ***dz (hard)*** |
| Davidai & Deri, 2019 | S5C | 100 | 1.30 | -0.32 |
| Kruger, 1999 | S1 | 37 | 0.58 | -0.54 |
|  | S3 | 49 | 0.95 | -0.84 |
| Rose et al., 2012 | S1 strong handers | 68 | 1.38 | -1.15 |
|  | S1 mixed handers | 59 | 1.04 | -1.03 |
| Wu, 2018 | S1 Americans | 30 | 1.77 | -0.33 |
|  | S1 Chinese | 30 | 0.67 | 0.61 |
| **All effects (*k* = 7)** |  | **373** | **1.10 [1.06, 1.15]** | **-0.52 [-0.59, -0.46]** |

*Note*. *dz* (easy) = BTAE for easy abilities. *dz* (hard) = BTAE for hard abilities. Positive values indicate a BTAE and negative values indicate a WTAE.

Table B2

*Studies Examining the Magnitude of the BTAE for Positive versus Negative Dimensions*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Article** | **Group** | ***N*** | ***dz* (pos)** | ***dz* (neg)** |
| Alicke, 1985 |  | 88 | 0.69 | 0.71 |
| Alicke et al., 1995 | S1 | 121 | 1.58 | 1.06 |
| Boyd-Wilson et al., 2004 | S1, low happiness | 68 | 0.69 | 0.68 |
|  | S1, moderate happiness | 67 | 1.03 | 1.09 |
|  | S1, high happiness | 68 | 1.22 | 1.03 |
|  | S2, low happiness | 67 | 0.64 | 0.43 |
|  | S2, moderate happiness | 75 | 0.95 | 0.92 |
|  | S2, high happiness | 63 | 1.03 | 1.09 |
| Brown, 1986 | S1 | 44 | 1.00 | 1.43 |
|  | S2 | 36 | 2.13 | 1.65 |
| Cohen et al., 2014 | controls | 39 | 0.55 | 0.77 |
|  | schizotypy | 39 | -0.12 | 0.19 |
| Dunning et al, 1989 | S1 | 27 | 0.77 | 0.44 |
|  | S2 | 25 | 0.54 | 0.57 |
|  | S3 two criteria | 39 | -0.13 | 0.47 |
|  | S3 four criteria | 39 | 0.15 | 0.36 |
|  | S3 six criteria | 35 | 0.54 | 0.01 |
|  | S3 unspecified criteria | 39 | 0.54 | 0.53 |
| El-Alayli & Wynne, 2015 | S3 | 251 | 1.13 | 0.59 |
| Fothergill & Wolfson, 2015 |  | 184 | 1.21 | 0.57 |
| Fowers et al., 2008 | USA | 49 | 1.53 | 0.69 |
|  | Turkish nonconsanguineous | 58 | 0.75 | 0.62 |
|  | Turkish consanguineous | 56 | 0.31 | 0.27 |
| Frewen & Lundberg, 2012 |  | 91 | 0.37 | 0.16 |
| Hoorens, 1995 |  | 92 | 0.96 | 0.57 |

Table B2 (Continued)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Article** | **Group** | ***N*** | ***dz* (pos)** | ***dz* (neg)** |
| Lee, 2012 | S3 Americans | 83 | 1.57 | 0.94 |
|  | S3 Koreans | 141 | 1.34 | 0.01 |
| Lee et al., 2010 | S1 English | 52 | 1.52 | 0.46 |
|  | S1 Chinese | 47 | 1.05 | 0.11 |
| Lee et al., 2002 | S1 therapists | 103 | 1.58 | 1.06 |
|  | S1 clients | 89 | 1.19 | 0.66 |
|  | S2 therapists | 62 | 1.73 | 1.29 |
|  | S2 clients | 45 | 1.58 | 1.06 |
| Logie & Frewen, 2015 |  | 104 | 0.13 | -0.22 |
| Suls et al., 2002 | S1 | 98 | 0.82 | 0.75 |
| Swenson et al., 2014 |  | 78 | 0.98 | 0.25 |
| **All effects (*k* = 36)** |  | **2,662** | **0.92 [0.86, 0.98]** | **0.62 [0.58, 0.67]** |

*Note*. *dz* (pos) = BTAE for positive dimensions. *dz* (neg) = BTAE for negative dimensions.

Table B3

*Studies Examining the Magnitude of the BTAE for European Americans versus East Asians*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Article** | **Group** | ***N*** | **Country** | ***dz*** |
| Brown & Kobayashi, 2002 | S1 European Americans | 35 | USA | 0.58 |
|  | S1 Asian Americans | 23 | Japan | 0.58 |
| Endo et al, 2000 | S2, European Canadian | 98 | Canada | 0.55 |
|  | S2, Japanese | 222 | Japan | -0.64 |
| Hamamura et al., 2007 | S1 European Canadian | 38 | Canada | 0.61 |
|  | S1 Japanese | 31 | Japan | 0.37 |
|  | S2 European Canadian | 46 | Canada | 2.06 |
|  | S2 Japanese | 97 | Japan | 0.36 |
| Heine & Lehman, 1997 | S1 European Canadians | 75 | Canada | 1.91 |
|  | S1 Japanese | 82 | Japan | 0.31 |
| Heine & Lehman, 1998 | European Canadians | 90 | Canada | 0.41 |
|  | Japanese | 161 | Japan | -0.24 |
| Hornsey & Jetten, 2005 | S2 individualist | 16 | Various | 0.42 |
|  | S2 collectivist | 14 | Various | 0.46 |
| Lee, 2012 | S3 Americans | 83 | USA | 1.25 |
|  | S3 Koreans | 141 | Korea | 0.67 |
| Norasakkunkit & Kalick, 2002 | European Americans | 135 | USA | 1.36 |
|  | Asians | 150 | Various | 0.63 |
| Sedikides et al., 2003 | S1 Americans | 40 | USA | 0.83 |
|  | S1 Japanese | 40 | Japan | 1.37 |
| Wu, 2018 | S1 Americans | 30 | USA | 0.72 |
|  | S1 Chinese | 30 | China | 0.64 |
| **All effects (*k* = 11)** | **European Americans** | **686** |  | **0.98 [0.63, 1.33]** |
| **All effects (*k* = 11)** | **East Asians** | **991** |  | **0.40 [0.09, 0.71]** |

Table B4

*Studies Examining the Magnitude of the BTAE on Individualistic versus Collectivistic Traits*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Article** | **Group** | ***N*** | **Country** | ***dz* (ind)** | ***dz* (col)** |
| Heine & Lehman, 1997 | S1 European Canadians | 75 | Canada | 1.63 | 2.19 |
|  | S1 Japanese | 82 | Japan | 0.85 | 1.67 |
| Hornsey & Jetten, 2005 | S2 individualist | 16 | Various | 0.62 | 0.22 |
|  | S2 collectivist | 14 | Various | -0.05 | 0.97 |
| Sedikides et al., 2003 | S1 Americans | 40 | USA | 1.24 | 0.42 |
|  | S1 Japanese | 40 | Japan | 1.05 | 1.69 |
| **All effects (*k* = 3)** | **European Americans** | **131** |  | **1.20 [0.94, 1.45]** | **0.96 [0.41, 1.51]** |
| **All effects (*k* = 3)** | **East Asians** | **136** |  | **0.41 [0.11, 0.70]** | **1.03 [0.71, 1.35]** |

*Note*. *dz* (ind) = BTAE for individualistic traits. *dz* (col) = BTAE for collectivistic traits.

Table B5

*Studies Examining the Magnitude of the BTAE for Men versus Women*

|  |  |  |  |
| --- | --- | --- | --- |
| **Article** | **Group** | ***N*** | ***dz*** |
| Bai & Chow, 2013 | men | 224 | 0.85 |
|  | women | 221 | 0.67 |
| Boyd-Wilson et al., 2000 | men | 104 | 1.16 |
|  | women | 99 | 1.10 |
| Gabriel et al., 1994 | men | 62 | 0.86 |
|  | women | 84 | 0.49 |
| Murray et al., 1996a | men | 75 | 0.68 |
|  | women | 75 | 0.61 |
| Murray et al., 1996b | men | 121 | 0.53 |
|  | women | 121 | 0.96 |
| Robinson et al., 2004 | men | 37 | 0.02 |
|  | women | 78 | 0.49 |
| Swami et al., 2009 | men | 113 | 0.15 |
|  | women | 143 | 0.10 |
| **All effects (*k* = 7)** | **men** | **736** | **0.61 [0.31, 0.91]** |
| **All effects (*k* = 7)** | **women** | **821** | **0.63 [0.38, 0.88]** |

**Appendix C**

Table C1

*Studies Examining the Association of the BTAE with Self-Esteem and Life Satisfaction*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Article** | **Group** | ***N*** | **Self-Esteem** | **Life Satisfaction** |
| Bosson et al., 2000 |  | 83 | 0.45 |  |
| Boyd-Wilson et al., 2004 | S1 | 203 |  | 0.27 |
| Boyd-Wilson et al., 2004 | S2 | 205 |  | 0.26 |
| Brookings & Serratelli, 2006 |  | 81 |  | 0.34 |
| Chung et al., 2016 |  | 264 | 0.19 |  |
| El-Alayli et al., 2006 | S2 | 70 |  | 0.24 |
| Frewen & Lundberg, 2012 |  | 91 | 0.35 |  |
| Gabriel et al., 1994 | men | 62 | 0.31 |  |
|  | women | 84 | 0.02 |  |
| Goetz et al., 2006 | Munich sample | 380 |  | 0.58 |
|  | Venice sample | 545 |  | 0.62 |
| Hamamura et al., 2007 | S2 | 204 | 0.52 |  |
| Hoorens, 1995 |  | 91 | 0.30 | 0.25 |
| Hornsey, 2003 | S2 | 40 | 0.47 |  |
| Kurman, 2003 | S1a individualist | 227 | 0.31 |  |
|  | S1a collectivist | 243 | 0.43 |  |
|  | S1b individualist | 144 | 0.31 |  |
|  | S1b collectivist | 155 | 0.32 |  |
|  | S1d individualist | 80 | 0.51 |  |
|  | S1d collectivist | 64 | 0.28 |  |
| Schmidt et al., 1999 |  | 117 |  | 0.02 |
| **All Effects** |  |  | **0.34 [0.28, 0.40]** | **0.33 [0.25, 0.42]** |

*Note*. Effect sizes represent correlations between the BTAE and measures of self-esteem (*k* = 14) or life satisfaction (*k* = 8).