

# The Nomological Net of the HEXACO Model of Personality: A Large-Scale Meta-Analytic Investigation

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## Abstract

Based on lexical studies, the HEXACO (honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience) model of personality has been proposed as a model of basic personality structure that summarizes individual differences in six broad trait dimensions. Although research across various fields relies on the HEXACO model increasingly, a comprehensive investigation of the nomological net of the HEXACO dimensions is missing entirely. Thus, it remains unclear whether each HEXACO dimension accounts for individual variation across theoretically relevant outcome criteria. We close this gap through a large-scale meta-analytic investigation, testing whether each HEXACO dimension is uniquely linked to one broad and theoretically relevant outcome domain. Results from 426 individual meta-analyses, 436 independent samples, and 3,893 effect-size estimates corroborate this unique mapping. Specifically, honesty-humility maps onto the outcome domain of exploitation, emotionality onto insecurity, extraversion onto sociality, agreeableness versus anger onto obstruction, conscientiousness onto duty, and openness to experience onto exploration. Overall, the current investigation provides a comprehensive empirical test of the (breadth of) content captured by the HEXACO dimensions and allows for a broad specification of the nomological net of the HEXACO model overall.

## Keywords

HEXACO model, meta-analysis, nomological net, personality traits

Individual differences are omnipresent in all domains of thinking, feeling, and behaving. A seminal step in research on and understanding of individual differences was the development of models of basic personality structure. These models describe which individual differences—in terms of personality traits—exist and how they can be summarized parsimoniously yet comprehensively in basic personality dimensions. Generally speaking, “personality traits are the relatively enduring patterns of thoughts, feelings, and behaviors that reflect the tendency to respond in certain ways under certain circumstances” (Roberts, 2009, p. 140). Basic personality dimensions, in turn, capture several related specific trait characteristics, each in a single, broad dimension. Thus, basic personality dimensions have been compared with latitudes and longitudes (Goldberg, 1993; Ozer & Reise, 1994) because they allow for locating any (more specific) trait in a comprehensive personality space.

Most recent advancements in the study of personality structure starting around 20 years ago (Ashton & Lee, 2001; Ashton, Lee, & Son, 2000) led to the development of a six-factorial model of basic personality structure, termed the *HEXACO model of personality* (Ashton & Lee, 2007). The HEXACO model encompasses six trait dimensions: honesty-humility, emotionality, extraversion, agreeableness versus anger (in the following termed *agreeableness*), conscientiousness, and openness to experience (in the following termed *openness*). Research relying on the HEXACO model as a framework of individual differences has heavily increased in recent years, not only in personality psychology (e.g., Ruchensky,

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Donnellan, & Edens, 2018) but also across (psychological) disciplines such as behavioral economics (e.g., Thielmann, Spadaro, & Balliet, 2020; Zhao & Smillie, 2015), clinical psychology (e.g., Gaughan, Miller, & Lynam, 2012), educational psychology (e.g., Allgaier, Zettler, Wagner, Püttmann, & Trautwein, 2015; McAbee, Casillas, Way, & Guo, 2019), political psychology (e.g., Lee, Ashton, Griep, & Edmonds, 2018), and work and organizational psychology (e.g., Lee, Berry, & Gonzalez-Mulé, 2019; Pletzer, Bentvelzen, Oostrom, & de Vries, 2019).

Despite these developments, there is still a lack of large-scale empirical evidence on the nomological net of the HEXACO dimensions. The nomological net of a construct or its operationalization comprises its interrelations with other (more or less related) constructs and outcomes. Hereafter, we refer to the latter simply as *outcome criteria* or *outcomes*. Stated differently, a nomological net consists of all the evidence on how a construct is linked to any outcome criterion. In turn, whether a construct's nomological net corresponds to its theoretical conceptualization—in the sense that the construct is more strongly linked to more proximal outcomes, and more weakly linked to more distal outcomes—has been considered a crucial step for establishing construct validity (for a more detailed introduction, see Cronbach & Meehl, 1955).

Although the HEXACO dimensions have been linked to countless outcomes, there exist no large-scale empirical attempts to integrate these findings across various outcome domains (for meta-analyses on specific, single outcomes in relation to one or several HEXACO dimensions, see Lee et al., 2019; Moshagen, Thielmann, Hilbig, & Zettler, 2019; Muris, Merckelbach, Otgaar, & Meijer, 2017; Pletzer et al., 2019; Thielmann et al., 2020). As a consequence, whether each HEXACO dimension—at the broad, aggregate level—accounts for individual variation across outcome criteria that are theoretically relevant in terms of each dimension's conceptualization remains an open question. Crucially, given that each HEXACO dimension is meant to represent a unique class of individual differences, each dimension should be particularly linked to—or map onto—one specific outcome domain, that is, a broad set of theoretically relevant outcome criteria. Evidence on such a mapping—in the sense that each HEXACO dimension maps onto one outcome domain in particular—is necessary (and arguably overdue) to test whether each dimension actually represents its theoretical core and, in turn, to illuminate the nomological net of the HEXACO model as a whole.

As a remedy, we provide the first comprehensive summary of evidence linking the HEXACO dimensions to several criteria and criterion classes representing six distinct outcome domains. Specifically, we theoretically derived outcome domains from the situation, trait, and

outcome activation (STOA) model (De Vries, Tybur, Pollet, & Van Vugt, 2016). This model specifies six key domain-specific situational affordances—exploitation, insecurity, sociality, obstruction, duty, and exploration—that provide a basis for the expression of personality traits in behavior. We tested whether the HEXACO dimensions show differential relations with these outcome domains compatible with the dimensions' theoretical conceptualizations. Overall, we provided 426 individual meta-analyses across 436 independent samples and 3,893 effects to test whether and to what extent each of the six HEXACO dimensions particularly maps onto one specific, theoretically relevant domain of thinking, feeling, and behaving (and vice versa).

In so doing, we provide the first broad overview of the relations between the HEXACO dimensions and various outcomes, both self-reported (referring to the majority of effects) and non-self-reported (e.g., behavioral, observer reports). Indeed, especially in light of the recent “replicability crisis” in psychology, meta-analyses are crucial because they can provide insights into the robustness of effects across studies (Asendorpf et al., 2013; Braver, Thoemmes, & Rosenthal, 2014; Funder et al., 2014; Maxwell, Lau, & Howard, 2015). In the following, we first briefly introduce the HEXACO model and then derive our hypotheses about which outcome domain each HEXACO dimension should be linked to in particular.

## The HEXACO Model of Personality

The most influential and common approach to derive models of basic personality structure is to consider results across lexical studies. In lexical studies, researchers select all personality-descriptive adjectives from a dictionary and collect self-ratings and/or observer ratings on (a subset of) these adjectives. The ratings are then factor-analyzed to obtain a small number of unrelated factors that can explain as much of the covariance in the ratings as possible. Each of the factors contains strongly related adjectives (the specific trait characteristics). Thus, the overall aim is to extract/retain as many factors (basic personality dimensions) as necessary but as few as possible to account for a large proportion of individual differences.

For many years, research has predominantly suggested that five basic personality dimensions provide the best solution to summarize individual differences in a comprehensive yet parsimonious way (Digman, 1990; John & Srivastava, 1999; McCrae & Costa, 2008). These so-called Big Five dimensions—neuroticism/(low) emotional stability, extraversion, agreeableness, conscientiousness, and openness to experience/intellect—have guided research on individual differences in psychology (e.g., Allen & Walter, 2018; Costa, McCrae,

**Table 1.** Common Defining Adjectives Derived From Lexical Studies and Definitions for Each HEXACO Dimension

Dimension	Common defining adjectives derived from lexical studies <sup>a</sup>	Definition <sup>b</sup>
Honesty-humility	Faithful/loyal, fair-minded, honest, modest/unassuming, sincere versus Boastful, deceitful, greedy, hypocritical, pompous, pretentious, sly	Tendency to be fair and genuine in dealing with others, in the sense of cooperating with others even when one might exploit them without suffering retaliation
Emotionality	Anxious, emotional, fearful, oversensitive, sentimental, vulnerable versus Brave, independent, self-assured, stable, tough	Tendencies relevant to the construct of kin altruism, including not only empathic concern and emotional attachment toward close others (who tend to be one's kin) but also the harm-avoidant and help-seeking behaviors that are associated with investment in kin
Extraversion	Active, cheerful, extraverted, lively, outgoing, sociable, talkative versus Introverted, passive, quiet, reserved, shy, withdrawn	Engagement in social endeavors (e.g., socializing, leading, or entertaining)
Agreeableness versus anger	Agreeable, gentle, lenient, mild, patient, peaceful, tolerant versus Choleric, ill-tempered, quarrelsome, stubborn	Tendency to be forgiving and tolerant of others, in the sense of cooperating with others even when one might be suffering exploitation by them
Conscientiousness	Careful, diligent, disciplined, organized, precise, thorough versus Absent-minded, irresponsible, lazy, negligent, reckless, sloppy	Engagement in task-related endeavors (e.g., working, planning, and organizing)
Openness to experience	Creative, innovative, intellectual, ironic, unconventional versus Conventional, shallow, unimaginative	Engagement in idea-related endeavors (e.g., learning, imagining, and thinking)

Note: HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience.

<sup>a</sup>Ashton and Lee (2007, p. 154) and Ashton and Lee (2008, p. 1953). <sup>b</sup>Ashton and Lee (2007, p. 156).

& Löckenhoff, 2019; Kim, Jörg, & Klassen, 2019) and beyond (e.g., Huang, 2019; Lodi-Smith, Rodgers, Cunningham, Lopata, & Thomeer, 2019). More recently, however, results from several newly conducted or reanalyzed lexical studies across various languages (Ashton et al., 2004; De Raad et al., 2014; Lee & Ashton, 2008; Saucier, 2009) have suggested that six basic personality dimensions can be identified across languages. This finding is most prominently reflected in the HEXACO model (Ashton & Lee, 2007).<sup>1</sup> In the most common operationalization of this model, the HEXACO Personality Inventory-Revised (HEXACO-PI-R; Ashton & Lee, 2009; Lee & Ashton, 2006, 2018), each HEXACO dimension is measured via four facets.<sup>2</sup> Table 1 provides an overview of the HEXACO dimensions, including defining adjectives from lexical studies as well as definitions (for more information on the HEXACO model, see [www.hexaco.org](http://www.hexaco.org)).

Comparing the HEXACO model with five-factor models of personality,<sup>3</sup> three basic trait dimensions—extraversion, conscientiousness, and openness—are conceptualized in

largely the same way, although the models differ with regard to the facet structure of these dimensions. Correspondingly, correlations ( $r$ ) between these "similar" HEXACO and Big Five dimensions are typically very large, around .70 to .80 (e.g., Hilbig, Moshagen, & Zettler, 2016; Lee & Ashton, 2013; Thalmayer, Saucier, & Eigenhuis, 2011).

With regard to the remaining dimensions, however, differences are more substantial. That is, part of the variance of Big Five neuroticism and agreeableness is differently represented in HEXACO emotionality and agreeableness, respectively. For instance, some temperament-related aspects are typically represented in neuroticism in the Big Five but in agreeableness in the HEXACO model, whereas some sentimentality-related aspects are typically represented in agreeableness in the Big Five but in emotionality in the HEXACO model. Moreover and most prominently, the HEXACO model adds a sixth dimension—honesty-humility—that comprises some content captured by the Big Five (mostly so by Big Five agreeableness) but also some content not captured by

the Big Five—at least partially because of the persistent omission of content related to ethics, honesty, integrity, and morality in corresponding (earlier) lexical analyses (Saucier, 2019). Support for this conceptualization based on six basic trait dimensions has, in addition to the results from lexical studies, been accumulated by two other lines of research in particular. Indeed, both of these lines of research suggest that the HEXACO model provides explanatory power over and above the Big Five. First, there is evidence that the personality space as captured by the HEXACO model—and measured via the HEXACO-PI-R—cannot be sufficiently accounted for by measures of the Big Five (Ashton & Lee, 2019; Ashton, Lee, & Visser, 2019; Lee & Ashton, 2019). That is, the HEXACO-PI-R was found to account for variance outside the personality space captured by measures of the Big Five.

Second, and arguably even more importantly, evidence shows that the HEXACO dimensions explain unique variance in relevant outcome criteria beyond the Big Five. Most of this evidence focused on criteria that are theoretically linked to honesty-humility given that this dimension reflects the main difference between the HEXACO and other models of basic personality structure. Corresponding studies showed that honesty-humility outperforms other basic personality dimensions in predicting different outcome criteria, such as the Dark Triad personality traits (i.e., narcissism, machiavellianism, and psychopathy; e.g., Muris et al., 2017), counterproductive work behavior (e.g., Pletzer et al., 2019), dishonesty and cheating (e.g., Heck, Thielmann, Moshagen, & Hilbig, 2018), and prosocial behavior (e.g., Thielmann et al., 2020; Zhao, Ferguson, & Smillie, 2016). Taken together, HEXACO honesty-humility, emotionality, and agreeableness cover variance included in Big Five neuroticism and agreeableness, but (a) part of this variance is represented in different dimensions, and (b) the HEXACO model captures variance outside the Big Five, especially because of the addition of honesty-humility. Thus, the HEXACO model represents an adapted and extended variant of the well-known Big Five. It should be noted, however, that research on how to best structure and summarize personality traits in terms of a specific number of dimensions is still ongoing (e.g., Saucier, 2019).

## Mapping the HEXACO Dimensions Onto Theoretically Relevant Outcome Domains

Although prior research provided support for (the usefulness of) a six-factorial representation of basic personality as structured in the HEXACO model, a crucial step in corroborating the HEXACO model is still missing:

No study to date has provided a comprehensive investigation of its nomological net. As described above, investigating a construct's nomological net is vital to test whether the construct actually represents its theoretical conceptualization. Arguably, the most comprehensive way to achieve such a test is via meta-analytically linking a construct to diverse outcome criteria (for examples, see Gorman et al., 2012; Sleep, Weiss, Lynam, & Miller, 2019; Tornau & Frese, 2013).

We applied this logic to test whether each HEXACO dimension accounts for variance across criteria representing one specific, theoretically relevant outcome domain. Such (meta-analytic) evidence allows for a broad understanding of the individual differences captured by a personality dimension: If a basic personality dimension (e.g., conscientiousness) indeed accounts for individual differences in a specific class of traits (e.g., being diligent, organized, self-controlled), it must be linked to a certain outcome domain (e.g., duty) comprising a variety of criteria that are theoretically relevant given the conceptualization of the personality dimension in question (e.g., performing at school or at work, forgoing impulse gratification for long-term benefit). In brief, such evidence is crucial to learn whether the dimension matches its (broad) theoretical conceptualization.

Beyond merely testing whether a dimension is linked to a specific outcome domain, it is also important to seek corresponding dissociations: Only if each dimension of a personality model such as the HEXACO is related to one theoretically relevant outcome domain in particular—rather than to several domains—and only if a domain is linked to one dimension in particular—rather than to several dimensions—does the mapping of dimensions onto outcome domains provide insights into the *unique* class of individual differences captured by each dimension. Thus, to specify the nomological net of the HEXACO model in a comprehensive way, it is also necessary to test to what extent each HEXACO dimension accounts for variance in outcome domains that are not (so) relevant according to the conceptualization of the dimension in question.

To specify which HEXACO dimension should be linked to which outcome domain in particular, we adapted and extended the STOA framework of domain-specific situational affordances introduced by De Vries, Tybur, et al. (2016). Specifically, De Vries, Tybur, et al. proposed six domain-specific situational affordances that allow for the expression of certain personality traits in behavior in a situation. Although we do not focus on situational affordances, the STOA framework provides a valid theoretical basis for our investigation given that (a) the affordances proposed can arguably be understood to reflect key, distinct domains of human experiencing and behavior and (b) the STOA framework

proposes that each HEXACO dimension is associated with one domain-specific situational affordance in particular. The model thus offers a theoretical basis that allows one to derive clear hypotheses about which HEXACO dimension should map primarily onto which outcome domain.

In the description of our hypotheses below, we use the following terms: *Dimension* refers to one of the six HEXACO personality dimensions (Ashton & Lee, 2007). *Domain* refers to one of the six outcome domains of thinking, feeling, and behaving (inspired by the STOA framework of domain-specific situational affordances; De Vries, Tybur, et al., 2016). *Criterion class* refers to the way each domain is represented in our analyses, that is, which criterion classes constitute a domain; for instance, the domain exploitation is represented by the criterion classes of immoral behavior, short-term mating, dark traits, (low) active cooperation, and (low) environmental behavior. Finally, *criterion* refers to the specific outcome variables assessed in a study. Thus, a criterion class subsumes several criteria; for instance, the criteria constituting the criterion class of immoral behavior are aggression, antisocial behavior, cheating/dishonesty, counterproductive behavior, criminality/delinquency, low integrity, unethical decision making, and other immoral behaviors.

## Honesty-Humility/Exploitation

The personality dimension of honesty-humility is defined as the “tendency to be fair and genuine in dealing with others, in the sense of cooperating with others even when one might exploit them without suffering retaliation” (Ashton & Lee, 2007, p. 156). It comprises characteristics such as being fair-minded, modest, and sincere as opposed to being boastful, deceitful, and greedy (Ashton & Lee, 2008). In the HEXACO-PI-R, honesty-humility is operationalized by the facets fairness, greed avoidance, modesty, and sincerity.

Although the HEXACO model was developed using a data-driven approach (i.e., lexical studies), Ashton and Lee (2001, 2007) conceptualized the HEXACO dimensions to refer to concepts from evolutionary theory. At this juncture, honesty-humility has been linked to reciprocal altruism (Trivers, 1971). The basic idea of reciprocal altruism is that one might situationally reduce one’s fitness by increasing another person’s fitness (e.g., via sharing resources) and that individuals can both show and profit from such altruistic behavior at some point. Thus, honesty-humility essentially refers to one aspect of reciprocal altruism (i.e., people’s inclination toward fairness and altruism), that is, nonexploitation and active cooperation, respectively (Ashton, Lee, & De Vries, 2014).

We expect honesty-humility to be linked to the outcome domain of exploitation in particular. Exploitation subsumes thoughts, feelings, and behaviors related to individuals’ inclination to aim for personal gains (broadly defined) at the expense of others. We operationalize exploitation through the following criterion classes: immoral behavior, short-term mating, dark traits, active cooperation, and environmental behavior. The criterion class of immoral behavior comprises criteria characterized by the opportunity to gain personal benefits (both material and immaterial, e.g., feelings of joy or pleasure) at the expense of other people or organizations. Thus, immoral behavior comprises criteria such as cheating, counterproductive work behavior, and unethical decision making. The criterion class of short-term mating involves criteria characterized by the opportunity to engage in sexual encounters without a long-term commitment, such as mating effort and sexual quid pro quo. The criterion class of dark traits encompasses traits that represent a “general tendency to maximize one’s individual utility—disregarding, accepting, or malevolently provoking disutility for others—, accompanied by beliefs that serve as justifications” (Moshagen, Hilbig, & Zettler, 2018, p. 657; e.g., Machiavellianism, narcissism, psychopathy). Active cooperation encompasses criteria representing cooperative, fair-minded, and loyal behavior (e.g., altruism, cooperation). Finally, the criterion class of environmental behavior involves criteria representing one’s willingness to contribute to the improvement of the environment, potentially even at personal costs (e.g., proenvironmentalism). Given that honesty-humility is conceptualized in terms of nonexploitation and active cooperation (Ashton, Lee, & De Vries, 2014; Ashton & Lee, 2007), it must be negatively linked to immoral behavior, short-term mating, and dark traits and positively linked to active cooperation and environmental behavior.

## Emotionality/Insecurity

The dimension of emotionality is defined as representing “tendencies relevant to the construct of kin altruism, including not only empathic concern and emotional attachment toward close others (who tend to be one’s kin) but also the harm-avoidant and help-seeking behaviors that are associated with investment in kin” (Ashton & Lee, 2007, p. 156). It comprises characteristics such as being anxious, emotional, and sentimental as opposed to being brave, stable, and tough (Ashton & Lee, 2008). In the HEXACO-PI-R, the facets of emotionality are anxiety, dependence, fearfulness, and sentimentality. By definition, emotionality is linked to the evolutionary concept of kin altruism/selection (e.g., Hamilton, 1964).

We expect emotionality to be linked to the outcome domain of insecurity in particular. Insecurity captures thoughts, feelings, and behaviors related to individuals' inclination to avoid, as opposed to approach, threats to themselves or (close) others, including seeking help and support by others. Specifically, facing threats has uncertain (or insecure) outcomes, ranging from suffering from the threat to obtaining gains from overcoming them. Similar to the concept of gain related to exploitation, threat is considered in a broad sense, including actual physical threats, hostile conditions such as a stressful environment, situations in which people potentially worry about an outcome (e.g., making an investment, participating in a test), and others.

We operationalize insecurity by the criterion classes of anxiety, avoidance, risk aversion, and stressors.<sup>4</sup> Anxiety refers to nervousness or worries as a result of threats or uncertain outcomes, encompassing criteria such as different phobias. Avoidance refers to criteria representing that people actively avoid threatening or uncertain situations (e.g., avoidance motivation). Likewise, risk aversion encompasses variables indicating that people avoid (vs. approach) risks, primarily including risk-taking behaviors and attitudes. Finally, stressors refer to all kinds of variables representing potential stressors and thus threatening environments. This criterion class encompasses criteria such as job stress and low friend support. Given that emotionality subsumes individual differences in how anxious, dependent on others, or emotionally unstable people are, this dimension must be positively related to all criterion classes representing the domain of insecurity.

## **Extraversion/Sociality**

The personality dimension of extraversion is defined as representing "engagement in social endeavors (such as socializing, leading, or entertaining)" (Ashton & Lee, 2007, p. 156) and comprises characteristics such as being active, cheerful, and sociable as opposed to being reserved, shy, and withdrawn (Ashton & Lee, 2008). In the HEXACO-PI-R, the operationalized facets of extraversion are liveliness, sociability, social boldness, and social self-esteem. Extraversion is related to the evolutionary concept of social-attention-holding power (Gilbert, 1989, 1992; Gilbert, Price, & Allan, 1995), a more human-oriented variant of the concept of resource-holding potential (Chance & Jolly, 1970). Here, the underlying idea is that engaging in social endeavors directs positive attention to oneself (e.g., being perceived as more dominant or liked), which, in turn, can result in obtaining resources that are dependent on the approval by or support of others.

We expect extraversion to be linked to the outcome domain of sociality in particular. Sociality captures thoughts, feelings, and behaviors related to individuals' inclination between choosing group activities and social attention as opposed to solitary activities and social withdrawal. For instance, people can stay absent from social gatherings or if attending, decide to remain quiet, or they can actively participate in group activities, even to the extent of trying to function as a leader.

We operationalize sociality by the criterion classes of social network, leadership, and positivity. Social network encompasses criteria representing whether people invest in social activities or have a large social network, including popularity, hours spent with friends, and positive social exchanges. Leadership encompasses criteria representing whether people reach leadership positions or show behavior typically associated with leadership. Finally, positivity encompasses criteria representing whether people have a generally positive outlook, such as happiness, positive affect, and satisfaction. Positivity can be considered to represent sociality given that social activities usually provide an opportunity to express one's liveliness and engage in joyful and positive interactions. Given that extraversion comprises characteristics related to engagement in social activities as well as enjoying social activities and life in general, this dimension must be linked to the domain of sociality. Thus, extraversion is hypothesized to correlate positively with all criterion classes representing sociality.

## **Agreeableness/Obstruction**

The personality dimension of agreeableness is defined as the "tendency to be forgiving and tolerant of others, in the sense of cooperating with others even when one might be suffering exploitation by them" (Ashton & Lee, 2007, p. 156). It comprises characteristics such as being lenient, patient, and tolerant as opposed to being ill-tempered, quarrelsome, and stubborn (Ashton & Lee, 2008). In the HEXACO-PI-R, the facets of agreeableness are flexibility, forgiveness, gentleness, and patience. Thus, agreeableness complements honesty-humility as another aspect of reciprocal altruism (Trivers, 1971) and refers to how people react to exploitative acts by others (e.g., with forgiveness vs. retaliation). This tendency was also referred to as nonretaliation or reactive cooperation (Ashton, Lee, & De Vries, 2014; Hilbig, Zettler, Leist, & Heydasch, 2013).

We expect agreeableness to be linked to the outcome domain of obstruction in particular. Obstruction captures thoughts, feelings, and behaviors related to individuals' inclination to be lenient and forgiving or

conversely, to seek for revenge and retaliation. For instance, when being criticized by others, people might try to resolve the situation calmly, or they may respond aggressively. Likewise, some situations allow people to punish others who treated them (or others) badly; in these situations, some people might show forgiveness, whereas others may aim for revenge.

We operationalize obstruction by the criterion classes of insensitivity to unfairness and reactive cooperation. Insensitivity to unfairness encompasses criteria representing an insensitivity toward being exploited by others, including variables such as a low tendency to perceive injustice and low victim sensitivity. Reactive cooperation encompasses criteria related to forgiving, lenient, or patient thoughts, feelings, and behaviors as opposed to retaliation and revenge. Given that agreeableness has been related to reactive cooperation in the realm of reciprocal altruism (Ashton, Lee, & De Vries, 2014), it must be linked primarily to the domain of obstruction. Thus, we hypothesize that agreeableness will correlate positively with both insensitivity to unfairness (coded such that high values indicate more lenience) and reactive cooperation.

## Conscientiousness/Duty

The personality dimension of conscientiousness is defined as representing “engagement in task-related endeavors (such as working, planning, and organizing)” (Ashton & Lee, 2007, p. 156) and comprises characteristics such as being diligent, disciplined, and precise as opposed to being irresponsible, lazy, and sloppy (Ashton & Lee, 2008). In the HEXACO-PI-R, the facets of conscientiousness are diligence, organization, perfectionism, and prudence. Conscientiousness relates to evolutionary notions about obtaining resources through organizing, planning, or working (Ashton & Lee, 2007; De Vries, Wawoe, & Holtrop, 2016). Specifically, engaging in task-related endeavors can result in obtaining resources that cannot be obtained otherwise (e.g., obtaining food through farming or hunting).

We expect conscientiousness to be linked to the outcome domain of duty in particular. Duty captures thoughts, feelings, and behaviors related to individuals’ inclination to plan, organize, or work in general as opposed to immediate impulse gratification or procrastination. Examples are situations in which people have to learn or work to accomplish things as opposed to being tempted to follow their immediate desires instead of resisting and/or investing efforts.

We operationalize duty via four criterion classes: achievement/performance, exercising, perfectionism, and self-control (vs. impulsivity). Achievement/performance

encompasses criteria related to the expression of different levels of achievement or performance, including, for example, academic and job performance. Exercising involves criteria related to exercise behaviors that can be considered as one form of working for a long-term goal (in terms of health and physical fitness). Typical examples of corresponding criteria are physical activity and training hours per week. Furthermore, we consider the criterion class of perfectionism, which encompasses criteria representing people’s aim to be thorough and to do things correctly. As a more general form of forgoing immediate impulse gratification, we finally consider the criterion class of self-control (vs. impulsivity), which is mostly represented by criteria directly assessing self-control or (low) impulsivity. In light of the traits captured by conscientiousness, this dimension must be linked primarily to the domain of duty. We therefore expect positive relations between conscientiousness and achievement/performance, exercising, perfectionism, and self-control.

## Openness/Exploration

The personality dimension of openness is defined as representing “engagement in idea-related endeavors (such as learning, imagining, and thinking)” (Ashton & Lee, 2007, p. 156). It comprises characteristics such as being creative, ironic, and unconventional as opposed to being conventional, shallow, and unimaginative (Ashton & Lee, 2008). In the HEXACO-PI-R, the facets of openness are aesthetic appreciation, creativity, inquisitiveness, and unconventionality. Openness relates to evolutionary theorizing about the importance of (cultural/social) learning (e.g., Kameda & Nakanishi, 2002, 2003). That is, engaging in idea-related endeavors can result in obtaining resources through discovery or learning (from others’ experiences), such as discovering new advantageous food or settlement options.

We expect openness to be linked to the outcome domain of exploration in particular. Exploration captures thoughts, feelings, and behaviors related to individuals’ inclination to discover, explore, and even change things, compared with conservation or tradition and thus stability. We operationalize exploration via the criterion classes of creativity, curiosity, conservatism, and prejudice. Creativity involves criteria representing a tendency for creative, novel, or unconventional approaches. Curiosity, in turn, encompasses criteria related to the opportunity to strive for exploration in the sense of being curious about new things. A typical example (apart from curiosity itself) is openness to novel experiences. Conservatism encompasses criteria representing a tendency to strive for conservative,

stable, or traditional thoughts, feelings, and behavior. This class contains criteria such as conservative political orientation or right-wing authoritarianism. Finally, prejudice involves criteria related to a preference for one's own group compared with being open to other people or groups, including unfavorable attitudes toward contact with immigrants and general prejudice. Given that openness captures creative and unconventional characteristics, this dimension must be linked primarily to the domain of exploration. Therefore, we expect positive correlations between openness and both creativity and curiosity and negative correlations between openness and both conservatism and prejudice.

## The Present Investigation

In summary, for each of the six HEXACO dimensions, one can derive a clear hypothesis about which outcome domain the dimension should primarily map onto if its underlying conceptualization holds. However, variance in criteria—and, in turn, in criterion classes and outcome domains—is typically determined by multiple personality and situational characteristics as well as their interactions (Buss, 2009; Funder, 2009; Furr & Funder, in press). Moreover, personality dimensions are usually interrelated to some extent (Van der Linden, te Nijenhuis, & Bakker, 2010), which also holds for the HEXACO dimensions (Moshagen et al., 2019). Thus, it is reasonable to assume certain secondary relations between the HEXACO dimensions and outcome domains. Nonetheless, in our investigation, we focus on the expected primary relations of each HEXACO dimension with its expected mapping ("counterpart") domain. The reason is that we aim to provide a theory-driven test on the most aggregated level possible of whether each HEXACO dimension captures a unique class of individual differences that can account for one relevant outcome domain. Consequently, none of the secondary relations that can be expected for a certain HEXACO dimension should turn out stronger than the association between the HEXACO dimension and its counterpart domain. Figure 1 provides a summary of our hypotheses concerning the mapping of dimensions onto domains as well as to-be-expected secondary relations. For the sake of brevity and clarity, we do not go into detail with the expected secondary relations, and we also neglect any potential links between a HEXACO dimension and a criterion class or a criterion from another domain than a dimension's counterpart domain. For instance, one can expect that emotionality is related substantially to the criterion class of short-term mating within exploitation, but there is no reason to expect emotionality to be substantially related to exploitation

in general (which is why we do not further consider this link in our expectations).

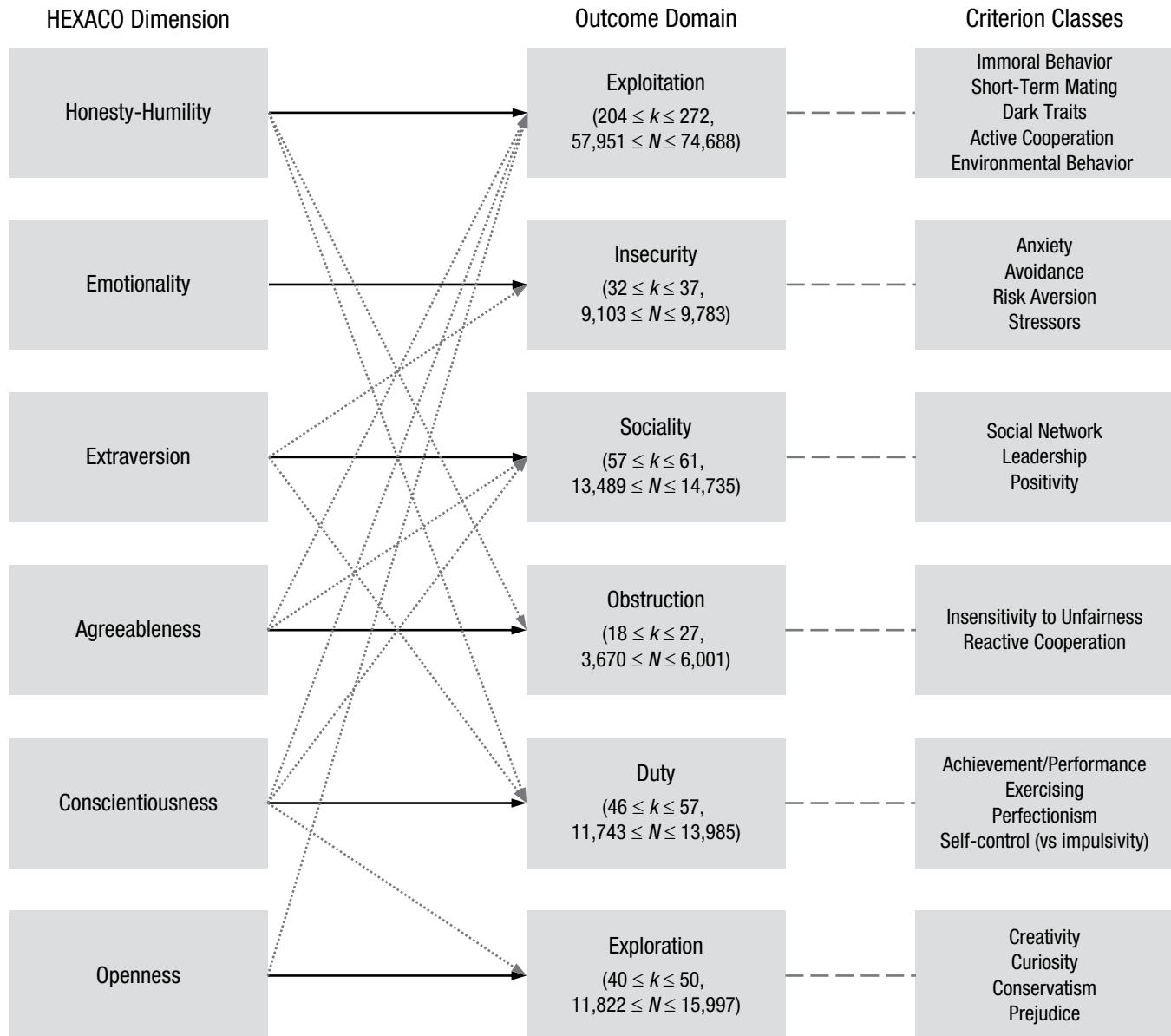
Ultimately, our central hypothesis is that each HEXACO dimension is related most strongly to its counterpart domain and that each outcome domain is related most strongly to its HEXACO counterpart dimension. On the criterion class and criterion levels, we expect each HEXACO dimension to correlate substantially with all criterion classes and criteria within its counterpart domain.

## Method

### Literature search

We aimed to include all data relevant for our research question from published articles, proceedings, and working papers as well as unpublished dissertations and theses. The literature search consisted of several steps performed in July 2016. First, we conducted a search using the string "HEXACO" OR "Big Six" (a keyword used in some articles referring to the HEXACO model) OR "honesty-humility" (the assumption was that the HEXACO model has often been used primarily because of its inclusion of honesty-humility). We searched for documents made available from 2000 onward given that Ashton et al. (2000) represents the first article promoting the idea of six personality dimensions in line with the HEXACO model. We conducted this search in EBSCOhost/PsycINFO (searching in: all text; resulting in 560 hits) and Scopus (searching in: article title, abstract, keywords; resulting in 508 hits). Furthermore, we conducted three independent searches in Google Scholar: one searching for *HEXACO personality*, one searching for *"honesty-humility" personality*, and one searching for *"Big Six" personality* (searching in: "with at least one of the words" and "anywhere in the article"). Each of the three Google Scholar searches resulted in more than 1,000 hits, from which Google Scholar shows only the first 1,000, which we extracted.

Second, we copied all references listed on [www.hexaco.org](http://www.hexaco.org), a website hosted by the developers of the HEXACO model, Michael C. Ashton and Kibeom Lee, that aims to list all publications related to the HEXACO model. Third, we scanned all abstracts from articles in press as well as all articles in the two most recent issues of the following journals, searching for references to the HEXACO model: *Assessment* (two hits), *European Journal of Personality*, *Journal of Individual Differences*, *Journal of Personality* (one hit), *Journal of Personality and Social Psychology*, *Journal of Personality Assessment* (two hits), *Journal of Research in Personality*, *Learning and Individual Differences* (one hit), *Personality and Individual Differences* (five hits),



**Fig. 1.** Expected primary relations (solid line) and secondary relations (dotted line) between the HEXACO dimensions and outcome domains. HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience.

*Personality and Social Psychology Bulletin*, and *Social Psychological and Personality Science*.

Fourth, we searched for documents citing one of the following 16 articles: Ashton and Lee (2007, 2009); Ashton et al. (2014); Ashton, Lee, and Goldberg (2007); Ashton et al. (2000); Boies, Yoo, Ebacher, Lee, and Ashton (2004); De Vries (2013); De Vries, Ashton, and Lee (2009); De Vries, Lee, and Ashton (2008); Lee and Ashton (2004, 2006, 2008); Moshagen, Hilbig, and Zettler (2014); Romero, Villar, and López-Romero (2015); Sibley et al. (2011); and Wakabayashi (2014). These articles were chosen because they either represent seminal theoretical articles about the HEXACO model

or introduce a questionnaire that aims to assess the HEXACO dimensions in a certain language. Overall, the search resulted in 1,288 hits excluding duplicates.

Because the coding of the extracted documents took longer than expected, we repeated all search steps in September and October 2017 and limited our search to findings published from 2016 onward (EBSCOhost/PsycINFO, resulting in 150 hits; Scopus, resulting in 128 hits; Google Scholar, again resulting in several thousand hits; and documents that cited 1 of the 16 articles, resulting in 540 hits).

Combining all searches and excluding duplicates across the search strategies resulted in 2,371 references,

of which—on the basis of the title, abstract, and keywords—1,208 references were identified as being potentially relevant for our investigation (other references referred to, e.g., the Big Six audit firms, chemical structures involving the respective search strings, or nonempirical discussions of the concept of humility). These 1,208 references were then screened thoroughly with regard to the inclusion criteria described in what follows. Whenever we had no access to a document or relevant information concerning the inclusion criteria or the coding of the study variables (see below), we contacted the corresponding author via e-mail and asked for the document or information, respectively.

### **Inclusion criteria**

To be included in one of the meta-analyses, documents needed to report empirical findings on the basis of a self-report and/or observer report version of the HEXACO-PI-R. Thus, we included studies based on the 60-item HEXACO-60 (Ashton & Lee, 2009), the 100-item HEXACO-100 (Lee & Ashton, 2018), the full 200-item HEXACO-PI-R (HEXACO-200; Lee & Ashton, 2004, 2006), or an ad hoc questionnaire based on HEXACO-PI-R items. For ad hoc questionnaires, we required the items to cover all four facets of a respective dimension to ensure that a dimension was captured in sufficient breadth.<sup>5</sup>

Regarding the type of publications, we focused on journal articles, proceedings, dissertations, theses, and working papers published in English. We excluded book chapters and books based on a screening of 20 random exemplars, none of which reported empirical findings that had not previously been reported in a published article (and were thus already included). Note that the exclusion criteria often overlapped (e.g., a German book chapter) so that the following percentages are based on our coded exclusion criterion.

On the basis of the criteria, we excluded 364 (30%) documents that did not include a HEXACO-PI-R questionnaire or reported no empirical data at all, 77 (6%) documents that were published in a language other than English, 65 (5%) books or book chapters, and 59 documents because of data or sample overlap (5%). Another 87 documents (7%) had to be excluded because there was insufficient information available to code the data (see below) and the corresponding authors either did not respond to our request(s) to provide additional information (4%; note that 69 authors kindly responded to our request) or we were unable to obtain a valid contact information of the corresponding author (3%). Finally, for the current meta-analyses, we excluded 235 (19%) documents because the reported studies did not

address any criterion representing a domain as investigated herein (e.g., the Big Five).

In case a document fulfilled the criteria for inclusion but effect-size information was missing for (some) criterion variables of interest, we contacted the corresponding author and asked for the full correlation matrix of the variables of interest, including the inter-correlations between the HEXACO dimensions (if several HEXACO dimensions were assessed). In this process, we considered all criterion variables assessed in a study (as apparent from the document) even if they were neglected in the report of results. Thereby, we also included previously unpublished data in the meta-analyses. Furthermore, we contacted the corresponding authors whenever we identified a possible overlap in the use of certain data sets in different documents to avoid repeated inclusion of the same data. More generally, great care was taken to ensure that documents were excluded if the data they reported had already been reported elsewhere.<sup>6</sup> Overall, we included 321 documents (27% of the thoroughly screened documents) for at least one of the reported meta-analyses.

### **Coding of study variables**

I. Zettler and I. Thielmann coded the data. The coding scheme, including a brief description of all variables coded (Table O1) as well as the data used in the analyses, is available in the additional materials on Open Science Framework (OSF; <https://osf.io/3ykq8>). The two coders first coded a random selection of 20 articles and resolved any disagreement and then repeated this procedure for a second set of random 30 articles, which yielded very high agreement across the codings. All documents were then divided equally among the coders.

To ensure a valid representation of domains for our analysis, we combined a top-down and a bottom-up approach to assign criterion classes and criteria to the six theoretically derived outcome domains focused on herein. Specifically, I. Zettler and I. Thielmann first independently proposed criterion classes representing a certain domain and then discussed their suggestions until agreement was reached. Then, B. E. Hilbig and M. Moshagen critically evaluated the resulting suggestions, and in the case of any disagreement, all of the authors discussed until agreement was reached. Next, in the processes of screening and coding, the coders considered all data potentially representing a domain. After the coding of the data was completed but before any analyses were conducted, I. Zettler and I. Thielmann independently assigned all available criteria to criterion classes and discussed their assignments until agreement was reached. This process was then repeated for the

assignment of criterion classes to domains. Next, B. E. Hilbig and M. Moshagen again evaluated the assignments, and finally, all of the authors discussed until complete agreement was reached.

### Analytic procedures

Our analyses are based on Pearson's product-moment correlation coefficient ( $r$ ). Effect sizes provided in different metrics were transformed into  $r$  using appropriate conversion formulas (e.g., Borenstein, Hedges, Higgins, & Rothstein, 2009). We used the R software environment (Version 3.6.1; R Core Team, 2019); the corresponding R script for effect-size transformation and aggregation can be found in the additional materials on OSF. A single study could contribute multiple effect sizes as long as the sample for each effect size was independent (e.g., if results for various subsamples were reported) and/or if the effect sizes referred to different meta-analyses (e.g., when reporting correlations of several HEXACO dimensions with a single criterion). If an independent sample of a single study provided more than one effect size for the same criterion and personality dimension (e.g., reported correlations to various measures of counterproductive work behavior), these effects were averaged while taking the intercorrelation of the criteria into account (Hunter & Schmidt, 2004). This step ensured that each independent sample contributed only once to a given meta-analysis. If the intercorrelation between the criteria was not available, we conservatively assumed perfect redundancy. The same procedure was applied to the effect sizes of a single study when meta-analyzing on a higher level of aggregation. That is, in case a study reported multiple effects for the same domain, such as active cooperation and environmental behavior for exploitation, these effects were aggregated when computing the overall effect for the domain, but the effects were not aggregated for the meta-analyses of the respective criterion classes (because these are independent analyses). Reliability composites were computed in a similar fashion (Hunter & Schmidt, 2004). If a study merely reported a range of reliabilities, we applied the lower bound of the reported range to all dimensions.<sup>7</sup>

Effect sizes were aggregated using random-effects psychometric meta-analysis with sample-size weights according to Hunter and Schmidt (2004). Effect sizes were corrected for attenuation according to Cronbach's  $\alpha$  estimate of internal consistency as reported in the corresponding study. If no such estimate was available (and for effect sizes involving single-item measures), we conservatively assumed perfect reliability. We did not correct effect sizes that were derived from latent variable models (e.g., correlations between factors in a confirmatory factor analysis model) because such

models inherently correct for measurement error. The presence of heterogeneity in effect sizes was assessed using Cochrane's  $Q$  statistic. A significant test outcome indicates that the observed variance in the effect size is due at least in part to true effect variance across studies (rather than being due merely to random fluctuations). In addition, we report  $I^2$  values that indicate the percentage of observed variance that is due to true effect-size variance.

Although we tried to include as much unpublished data as possible from the considered documents, there is always the risk of selective publication of statistically significant results biasing the results of a meta-analysis. To detect the presence of publication bias, we resorted to the rank-correlation method (Begg & Mazumdar, 1994), Egger's regression test (Egger, Davey Smith, Schneider, & Minder, 1997), and the trim-and-fill method (Duval & Tweedie, 2000a, 2000b). These methods are based on the rationale that the selective inclusion of studies showing significant outcomes is evident in a relation between the magnitude of effect and the precision of a study such that larger effect sizes are to be expected from studies with lower precision.

All analyses were performed in R using the *metafor* package (Version 1.4; Viechtbauer, 2010). For each meta-analysis on the relation between a HEXACO dimension and a domain, criterion classes within a domain, and criteria within a criterion class, we report the number of independent samples ( $k$ ), the total sample size ( $N$ ), and the meta-analytic correlation estimate corrected for attenuation ( $\hat{\rho}$ ) along with its standard error. In the additional material on the OSF, we also report the uncorrected estimates (Tables O2–O8). Note that we created criterion groups for some criterion classes only (i.e., only if meaningful groups could be created and there were at least three independent samples for each of these groups; we created 43 criterion groups within 11 criterion classes). Furthermore, note that the number of independent samples considered within a domain (criterion class) does not necessarily match the sum of independent samples across the criterion classes (criterion groups) because effects were aggregated whenever they referred to the same domain (criterion class; see above).

## Results

Overall, we linked each of the six HEXACO dimensions to six domains, 22 criterion classes within the six domains, and 43 criterion groups within 11 criterion classes, resulting in  $(6 \times [6 + 22 + 43]) = 426$  single meta-analyses in total. Table 2 provides an overview of the data set at large and shows that our analyses are based on 321 publications (78% journal articles) involving 402 independent studies, 436 independent samples, and 3,893

**Table 2.** Overview of Data Set

Statistic	Value
Publications used	321
Types of publications	
Journal articles	251
Theses	62
Proceedings	2
Other/not applicable	6
Independent studies	402
Independent samples	436
Considered effects in total	3,893
Number of participants in total	112,697
Country of study	
United States	119
Canada	66
Germany	62
The Netherlands	43
Italy	12
Iran	12
Other/NA	88
HEXACO-PI-R version <sup>a</sup>	
HEXACO-60	212
HEXACO-100	150
HEXACO-200	55
Ad hoc HEXACO	5
Unknown HEXACO version	17
HEXACO-PI-R rating type	
Self-report	413
Observer report	2
Both	21
Source of criteria for rating	
Behavior	123
Observer report	13
Other	866
Behavior/observer report	3
Observer report/other	3
Behavior/observer report/other	1
Unknown	80

Note: NA = not applicable; HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience; HEXACO-PI-R = HEXACO Personality Inventory-Revised.

<sup>a</sup>The resulting number (439) is larger than the number of independent samples because two versions of the HEXACO-PI-R were occasionally used within a sample (e.g., items of the HEXACO-60 for some dimensions and items of the HEXACO-100 for other dimensions).

effects (in the Supplemental Material available online, we provide the complete list of publications included in the meta-analyses for the six domains). The overall sample size was 112,697 participants, with an average of 258 participants ( $SD = 234$ , range = 19–2,631) per independent sample. The data stem from at least 31 different countries (some articles did not allow for unambiguously determining the country); the majority of studies were conducted in the United States (30%), Canada (16%), Germany (15%), and the Netherlands

(11%; any other country < 10%). Most studies used the HEXACO-60 (48%), followed by the HEXACO-100 (34%) and the HEXACO-200 (13%). Concerning the assessment of both the HEXACO dimensions and the criteria under scrutiny, it is striking that a clear majority was based solely on self-reports, amounting to 95% for the assessment of the HEXACO dimensions and 80% for the assessment of the criteria. For 11% of the effect sizes, the criteria were assessed via observations of actual behavior.

Overall, there was only scattered evidence for publication bias in the data (Table 3). In particular, the rank test was significant for only two of the analyses linking the HEXACO dimensions to the domains, and Egger's regression test indicated the presence of publication bias for 3 out of 36 analyses only. Likewise, the trim-and-fill-adjusted estimates of the mean correlations were highly similar to the unadjusted estimates (see Tables O4–O10 on OSF). Altogether, these findings indicate that the results of the meta-analyses are not affected substantially by publication bias. In what follows, we first present the main results concerning the hypothesized unique mapping of the HEXACO dimensions onto the outcome domains. Then, we present the results for each domain in detail and include findings for the criterion classes and criteria.

### ***Do the HEXACO dimensions map onto their counterpart outcome domain?***

Table 4 provides an overview of the results as pertaining to the core hypotheses, and Figure 2 yields a concise illustration of these results. Specifically, Table 4 shows the disattenuated correlations between each HEXACO dimension and its counterpart domain (e.g., honesty-humility-exploitation), the range of correlations between the respective HEXACO dimension and the remaining domains (e.g., the correlations between honesty-humility and insecurity, sociality, obstruction, duty, and exploitation), as well as the range of correlations between the respective domain and the remaining HEXACO dimensions (e.g., the correlations between exploitation and emotionality, extraversion, agreeableness, conscientiousness, and openness).

In line with the main hypotheses, each HEXACO dimension was substantially linked to its counterpart domain. Specifically, the relations were honesty-humility-exploitation,  $\hat{\rho} = -.48$ ; emotionality-insecurity,  $\hat{\rho} = .27$ ; extraversion-sociality,  $\hat{\rho} = .53$ ; agreeableness-obstruction,  $\hat{\rho} = .33$ ; conscientiousness-duty,  $\hat{\rho} = .41$ ; and openness-exploration,  $\hat{\rho} = .38$ . Furthermore, each HEXACO dimension yielded substantially smaller (secondary) correlations with the remaining (noncounterpart) domains: The highest secondary relation emerged for agreeableness-exploitation,  $\hat{\rho} = -.26$ , which also resulted in the

**Table 3.** Indices of Publication Bias and Corrected Effect-Size Estimates

Personality dimension & outcome domain	Begg's $\hat{\tau}$	Egger's $z$	$k$ missing studies	Trim-and-fill adjusted $\hat{\rho}$
Honesty-humility				
Exploitation	.05	0.59	4*	-.49*
Insecurity	-.01	1.81	4*	.02
Sociality	-.02	0.96	0	.11*
Obstruction	.13	1.54	5*	.13*
Duty	-.10	-1.63	6*	.21*
Exploration	-.16	0.61	1	.09*
Emotionality				
Exploitation	.01	0.52	0	-.15*
Insecurity	.13	2.16*	0	.27*
Sociality	-.04	-1.46	0	-.11*
Obstruction	-.01	0.79	0	-.10*
Duty	.03	1.30	0	-.03
Exploration	-.14	-0.81	0	-.01
Extraversion				
Exploitation	.05	-0.32	0	-.02
Insecurity	.03	-1.09	18*	-.08
Sociality	.03	1.10	0	.53*
Obstruction	.16	-1.16	0	.14*
Duty	.02	-0.85	0	.19*
Exploration	.18	1.26	2	.14*
Agreeableness				
Exploitation	.02	0.44	0	-.26*
Insecurity	.15	1.77	11*	-.07
Sociality	.00	1.29	0	.18*
Obstruction	.23	1.21	4*	.27*
Duty	-.10	-1.30	1	.15*
Exploration	.04	0.58	1	.04
Conscientiousness				
Exploitation	.08	0.90	0	-.24*
Insecurity	.13	1.80	0	-.02
Sociality	-.03	0.51	0	.25*
Obstruction	-.05	-0.37	0	.11*
Duty	-.03	0.27	0	.41*
Exploration	.28*	2.48*	17*	-.09*
Openness to experience				
Exploitation	.02	-0.33	3	-.10*
Insecurity	.03	-0.36	3	-.10*
Sociality	.20*	2.15*	5*	.11*
Obstruction	.07	-0.84	1	.11*
Duty	.00	-0.13	0	.11*
Exploration	.10	-0.51	0	.38*

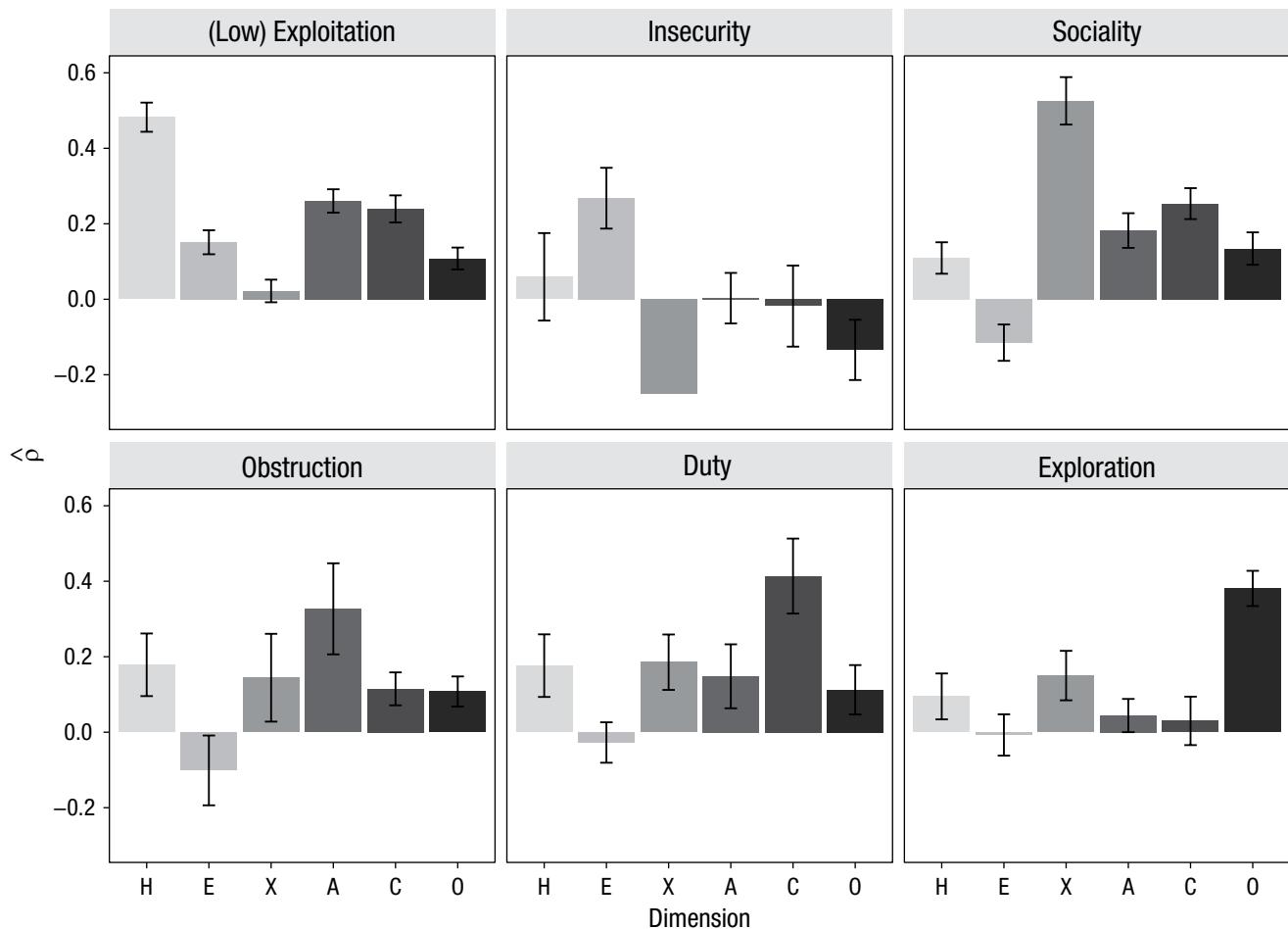
Note: Begg's  $\hat{\tau}$  = Begg's rank correlation; Egger's  $z$  =  $z$  value from Egger's regression test;  $k$  missing studies = estimated number of missing studies according to trim-and-fill method; trim-and-fill adjusted  $\hat{\rho}$  = trim-and-fill estimated mean true-score correlation corrected for unreliability.

\* $p < .05$ .

descriptively smallest discrepancy between a dimension's primary and secondary relation (agreeableness:  $\hat{\rho} = .33$  with obstruction and  $|\hat{\rho}| = .26$  with exploitation).

In a similar vein, for all domains except insecurity, correlations with the primary HEXACO counterpart

dimension were substantially larger descriptively compared with correlations with the other HEXACO dimensions. For insecurity, the correlation with emotionality ( $\hat{\rho} = .27$ ) was only slightly larger than the correlation with extraversion ( $|\hat{\rho}| = .25$ ; correlations with all other



**Fig. 2.** Meta-analytic, disattenuated correlations between the HEXACO dimensions (H = honesty-humility, E = emotionality, X = extraversion, A = agreeableness vs. anger, C = conscientiousness, O = openness to experience) and the outcome domains exploitation, insecurity, sociality, obstruction, duty, and exploration.

**Table 4.** Overview of the Mapping Between HEXACO Dimensions and Outcome Domains

Expected mapping	$\hat{\rho}$ (SE)	HEXACO dimension and remaining outcome domains <sup>a</sup>	Outcome domain and remaining HEXACO dimensions <sup>b</sup>
Honesty-humility-exploitation	-.48 (.02)	.06 ≤   $\hat{\rho}$   ≤ .18	.02 ≤   $\hat{\rho}$   ≤ .26
Emotionality-insecurity	.27 (.04)	.01 ≤   $\hat{\rho}$   ≤ .15	.00 ≤   $\hat{\rho}$   ≤ .25
Extraversion-sociality	.53 (.03)	.02 ≤   $\hat{\rho}$   ≤ .25	.11 ≤   $\hat{\rho}$   ≤ .25
Agreeableness-obstruction	.33 (.06)	.00 ≤   $\hat{\rho}$   ≤ .26	.10 ≤   $\hat{\rho}$   ≤ .18
Conscientiousness-duty	.41 (.05)	.02 ≤   $\hat{\rho}$   ≤ .25	.03 ≤   $\hat{\rho}$   ≤ .19
Openness to experience-exploration	.38 (.02)	.11 ≤   $\hat{\rho}$   ≤ .13	.01 ≤   $\hat{\rho}$   ≤ .15

Note: HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience.

<sup>a</sup>The data in this column reflect how the HEXACO dimension in one row is related to the outcome domains in the remaining rows (e.g., how honesty-humility is related to insecurity, sociality, obstruction, duty, and exploration).

<sup>b</sup>The data in this column reflect the outcome domain in one row is related to the HEXACO dimensions in the remaining rows (e.g., how exploitation is related to emotionality, extraversion, agreeableness, conscientiousness, and openness to experience).

dimensions:  $|\hat{\rho}| \leq .13$ ). For the remaining domains, the descriptively smallest discrepancies ranged from  $|\hat{\rho}| = .15$  to  $.28$ ; the smallest discrepancy occurred for obstruction, for which we observed  $\hat{\rho} = .33$  with its counterpart dimension agreeableness, followed by  $\hat{\rho} = .18$  with (noncounterpart) honesty-humility.

Overall, these results support the idea that each HEXACO dimension captures individual differences with regard to one domain in particular, although the support for the unique mapping of emotionality onto insecurity is weak at best (and to some degree, the unique mapping of agreeableness onto obstruction is less clear compared with the other expected primary relations). Taken together, however, honesty-humility mapped best onto exploitation, emotionality onto insecurity, extraversion onto sociality, agreeableness onto obstruction, conscientiousness onto duty, and openness onto exploration. Relations between the dimensions and their noncounterpart domains were most often negligibly small. Likewise, most domains were linked far more strongly to their HEXACO counterpart dimension than to the remaining (noncounterpart) ones.

### **The HEXACO dimensions and exploitation**

Table 5 shows the disattenuated correlations between the HEXACO dimensions and exploitation, represented by the criterion classes of immoral behavior (and eight corresponding criteria within), short-term mating, dark traits (seven criteria within), active cooperation (four criteria within), and environmental behavior. Each correlation between a HEXACO dimension and exploitation was thereby based on a large number of independent samples ( $204 \leq k \leq 272$ ) and participants ( $57,951 \leq n \leq 74,688$ ), respectively.

As expected, of the six HEXACO dimensions, honesty-humility was most strongly linked to exploitation ( $\hat{\rho} = -.48$ ), followed by agreeableness ( $\hat{\rho} = -.26$ ) and conscientiousness ( $\hat{\rho} = -.24$ ), whereas emotionality ( $\hat{\rho} = -.15$ ), openness ( $\hat{\rho} = -.11$ ), and extraversion ( $\hat{\rho} = -.02$ ) showed only small links to exploitation, at best. Likewise, honesty-humility was linked substantially to all criterion classes within exploitation; indeed, among all HEXACO dimensions, honesty-humility showed the strongest relation to four of the five criterion classes. More specifically, honesty-humility was related most strongly to immoral behavior ( $\hat{\rho} = -.41$ ; the other dimensions:  $.03 \leq |\hat{\rho}| \leq .27$ ), short-term mating ( $\hat{\rho} = -.40$ ; the other dimensions:  $.01 \leq |\hat{\rho}| \leq .20$ ), dark traits ( $\hat{\rho} = -.69$ ; the other dimensions:  $.01 \leq |\hat{\rho}| \leq .40$ ), and active cooperation ( $\hat{\rho} = .32$ ; the other dimensions:  $.06 \leq |\hat{\rho}| \leq .18$ ). For environmental behavior, however, openness ( $\hat{\rho} = .54$ ) showed the strongest link, followed by honesty-humility ( $\hat{\rho} = .23$ ), whereas the other dimensions showed only small links at best ( $.04 \leq |\hat{\rho}| \leq .13$ ).

$|\hat{\rho}| \leq .16$ ). Note that for almost all analyses,  $P$  and  $Q$  indicated a high level of heterogeneity; however, this is rather typical for meta-analyses in psychological research (Stanley, Carter, & Doucouliagos, 2018).

Taken together, the findings are well in line with our expectations and provide strong support that honesty-humility specifically maps onto exploitation. Moreover, agreeableness and conscientiousness revealed noteworthy (secondary) links with this domain, although to a weaker extent.

### **The HEXACO dimensions and insecurity**

Table 6 provides an overview of the relations between the HEXACO dimensions and insecurity, represented by the criterion classes of anxiety, avoidance, risk aversion (and four corresponding criteria within), and stressors (three criteria within). Although the sample sizes were smaller compared with the analyses for exploitation, they were nonetheless substantial: On the domain level, results stem from  $32 \leq k \leq 37$  samples and  $9,103 \leq n \leq 9,783$  participants, respectively. As summarized above, emotionality showed the strongest mapping onto insecurity ( $\hat{\rho} = .27$ ), although closely followed by extraversion ( $\hat{\rho} = -.25$ ); the remaining dimensions showed only small or no links at all ( $.00 \leq |\hat{\rho}| \leq .13$ ).

Corresponding to the domain-level results, emotionality was substantially linked to all criterion classes within insecurity (i.e.,  $\hat{\rho} = .33$  with anxiety;  $\hat{\rho} = .71$  with avoidance;  $\hat{\rho} = .29$  with risk aversion; and  $\hat{\rho} = .20$  with stressors). Likewise mirroring the results on the domain level, extraversion correlated with all criterion classes within insecurity ( $.18 \leq |\hat{\rho}| \leq .40$ ). For the remaining dimensions, the pattern was more mixed, with correlations ranging between  $.05 \leq |\hat{\rho}| \leq .36$  for honesty-humility, between  $.04 \leq |\hat{\rho}| \leq .12$  for agreeableness, between  $.06 \leq |\hat{\rho}| \leq .26$  for conscientiousness, and between  $.05 \leq |\hat{\rho}| \leq .23$  for openness. Again,  $P$  and  $Q$  indicated substantial study heterogeneity with, across all analyses, the exception of the criterion class avoidance and some criteria within risk aversion.

Overall, the findings supported our central hypothesis and expectations: Emotionality was most strongly linked to insecurity, and there was a substantial but descriptively smaller secondary relation for extraversion. Moreover, there were associations between emotionality and all criterion classes and criteria representing insecurity.

### **The HEXACO dimensions and sociality**

The links between the HEXACO dimensions and sociality, including the criterion classes of social network, leadership, and positivity, are shown in Table 7. Again, findings on the domain level were based on a relatively large number of samples ( $57 \leq k \leq 61$ ) and participants

**Table 5.** Meta-Analysis of Correlations Between the HEXACO Dimensions and Exploitation

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Honesty-humility						
Outcome domain: exploitation	272	74,688	-.48*	.02	90.12	2,761.49*
Criterion class: immoral behavior	125	28,949	-.41*	.02	85.67	876.56*
Criterion: aggression	16	4,013	-.40*	.05	78.46	75.13*
Criterion: antisocial behavior	12	2,483	-.45*	.06	77.67	54.45*
Criterion: cheating/dishonesty	25	3,073	-.25*	.03	24.79	33.93
Criterion: counterproductive behavior	36	10,193	-.41*	.05	86.45	267.79*
Criterion: criminality/delinquency	17	4,552	-.39*	.04	77.03	75.51*
Criterion: low integrity	12	3,112	-.55*	.04	66.91	36.90*
Criterion: unethical decision making	8	1,686	-.51*	.08	83.54	49.07*
Criterion: immoral behavior other	12	3,607	-.43*	.11	93.29	197.04*
Criterion class: short-term mating	14	6,280	-.40*	.05	79.07	70.47*
Criterion class: dark traits	93	30,764	-.69*	.03	84.77	615.37*
Criterion: machiavellianism	40	15,225	-.68*	.02	57.98	96.79*
Criterion: materialism	9	2,394	-.63*	.06	76.04	37.98*
Criterion: narcissism	43	15,678	-.52*	.03	70.68	149.26*
Criterion: psychological entitlement	9	3,405	-.64*	.07	85.55	64.49*
Criterion: psychopathy	46	17,924	-.66*	.02	59.02	113.76*
Criterion: sadism	7	2,328	-.53*	.04	57.51	16.95*
Criterion: dark traits other	20	8,325	-.53*	.04	72.41	77.37*
Criterion class: active cooperation	74	17,129	.32*	.02	77.20	326.89*
Criterion: altruism	22	5,583	.49*	.05	86.36	164.10*
Criterion: cooperation in games	39	7,213	.25*	.02	29.84	55.78*
Criterion: social value orientation	16	3,519	.25*	.02	16.74	19.38
Criterion: active cooperation other	15	4,648	.24*	.02	35.83	23.87*
Criterion class: environmental behavior	8	3,682	.23*	.07	90.41	87.19*
Emotionality						
Outcome domain: exploitation	212	59,971	-.15*	.02	81.92	1,176.66*
Criterion class: immoral behavior	97	22,547	-.10*	.02	62.96	263.10*
Criterion: aggression	16	4,013	-.13*	.04	63.64	44.39*
Criterion: antisocial behavior	11	2,333	-.15*	.04	54.77	24.59*
Criterion: cheating/dishonesty	21	2,659	-.03	.02	0.00	12.64
Criterion: counterproductive behavior	25	6,719	-.05	.04	70.89	86.71*
Criterion: criminality/delinquency	13	3,741	-.13*	.03	58.89	32.21*
Criterion: low integrity	8	2,144	-.13*	.04	51.77	16.88*
Criterion: unethical decision making	6	1,360	-.18*	.09	83.00	35.72*
Criterion: immoral behavior other	5	2,140	-.11*	.04	44.44	9.82*
Criterion class: short-term mating	13	5,553	-.20*	.04	62.83	36.90*
Criterion class: dark traits	69	24,442	-.21*	.03	88.76	620.27*
Criterion: Machiavellianism	29	11,976	-.15*	.03	75.33	120.89*
Criterion: materialism	9	2,391	.01	.04	62.74	24.38*
Criterion: narcissism	31	11,784	-.13*	.05	85.94	227.43*
Criterion: psychological entitlement	6	2,479	-.11*	.05	57.02	14.37*
Criterion: psychopathy	36	15,105	-.36*	.04	87.33	290.95*
Criterion: sadism	4	1,744	-.35*	.09	89.42	39.29*
Criterion: dark traits other	16	7,644	-.08	.06	87.78	142.55*
Criterion class: Active cooperation	61	14,572	.14*	.03	84.05	386.19*
Criterion: altruism	18	5,033	.41*	.05	83.80	113.16*
Criterion: cooperation in games	32	5,575	.03*	.02	0.00	25.44
Criterion: social value orientation	13	3,052	-.01	.02	0.00	10.27
Criterion: active cooperation other	12	4,023	.06*	.02	15.64	14.38
Criterion class: environmental behavior	5	2,115	.04	.06	78.66	24.85*

(continued)

**Table 5.** (continued)

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{p}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Extraversion						
Outcome domain: exploitation	204	57,951	-.02	.02	79.87	1,016.73*
Criterion class: immoral behavior	90	21,267	-.03	.02	64.47	254.65*
Criterion: aggression	15	3,815	-.08*	.02	20.26	18.87
Criterion: antisocial behavior	7	1,702	-.06*	.03	0.00	5.11
Criterion: cheating/dishonesty	21	2,678	.05*	.02	4.02	21.98
Criterion: counterproductive behavior	23	6,250	-.05	.04	73.56	88.14*
Criterion: criminality/delinquency	13	3,740	.01	.03	49.83	26.35*
Criterion: low integrity	8	2,144	-.06	.07	82.67	47.27*
Criterion: unethical decision making	6	1,360	-.07	.07	74.37	23.65*
Criterion: immoral behavior other	5	2,140	.02	.05	61.66	14.67*
Criterion class: short-term mating	12	5,322	.13*	.05	75.60	53.18*
Criterion class: dark traits	65	23,189	-.01	.04	89.43	621.96*
Criterion: Machiavellianism	29	11,972	-.07	.07	93.51	461.56*
Criterion: materialism	8	2,160	.12*	.06	78.68	37.99*
Criterion: narcissism	29	10,956	.43*	.07	92.81	418.30*
Criterion: psychological entitlement	5	2,281	-.10	.09	84.27	33.17*
Criterion: psychopathy	35	14,357	-.09*	.03	81.08	189.33*
Criterion: sadism	4	1,744	-.20*	.03	0.62	4.03
Criterion: dark traits other	16	7,643	-.22*	.04	76.54	73.26*
Criterion class: active cooperation	61	14,572	.06*	.02	59.82	152.92*
Criterion: altruism	18	5,033	.20*	.03	47.44	34.59*
Criterion: cooperation in games	32	5,575	-.03*	.01	0.00	31.21
Criterion: social value orientation	13	3,052	.01	.02	0.00	9.06
Criterion: active cooperation other	12	4,023	.05	.03	52.35	26.18*
Criterion class: Environmental behavior	5	2,115	.16*	.03	34.50	7.82
Agreeableness						
Outcome domain: exploitation	218	61,871	-.26*	.02	81.80	1,201.77*
Criterion class: immoral behavior	98	23,202	-.21*	.02	73.94	377.94*
Criterion: aggression	17	4,160	-.36*	.05	84.68	112.09*
Criterion: antisocial behavior	10	2,250	-.31*	.03	0.00	9.26
Criterion: cheating/dishonesty	21	2,666	-.03	.02	0.00	16.15
Criterion: counterproductive behavior	26	7,304	-.20*	.03	59.78	65.19*
Criterion: criminality/delinquency	13	3,740	-.15*	.03	33.64	19.81
Criterion: low integrity	8	2,144	-.31*	.06	72.72	30.07*
Criterion: unethical decision making	6	1,360	-.19*	.05	45.82	11.14*
Criterion: immoral behavior other	5	2,140	-.21*	.04	45.68	10.08*
Criterion class: short-term mating	13	5,553	-.11*	.02	33.81	20.19
Criterion class: dark traits	73	25,538	-.40*	.02	79.12	352.61*
Criterion: Machiavellianism	33	13,007	-.38*	.03	75.92	140.38*
Criterion: materialism	9	2,391	-.30*	.05	71.01	31.34*
Criterion: narcissism	34	12,730	-.23*	.03	72.30	125.53*
Criterion: psychological entitlement	6	2,479	-.44*	.10	86.13	45.19*
Criterion: psychopathy	40	16,133	-.41*	.03	72.50	147.99*
Criterion: sadism	6	2,145	-.30*	.04	50.50	12.45*
Criterion: dark traits other	17	7,790	-.30*	.05	78.84	86.21*
Criterion class: active cooperation	63	15,168	.18*	.02	64.13	176.85*
Criterion: altruism	19	5,289	.35*	.02	45.78	35.34*
Criterion: cooperation in games	34	6,171	.10*	.02	7.16	36.66
Criterion: social value orientation	13	3,052	.12*	.02	0.00	4.04
Criterion: active cooperation other	12	4,023	.11*	.02	25.84	16.47
Criterion class: environmental behavior	6	2,363	.13*	.04	45.13	11.36*

(continued)

**Table 5.** (continued)

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Conscientiousness						
Outcome domain: exploitation	214	60,892	-.24*	.02	86.00	1,533.35*
Criterion class: immoral behavior	99	23,468	-.27*	.03	83.68	609.68*
Criterion: aggression	16	4,013	-.28*	.04	72.49	58.73*
Criterion: antisocial behavior	7	1,702	-.29*	.06	78.51	33.04*
Criterion: cheating/dishonesty	21	2,658	-.05*	.02	0.00	20.33*
Criterion: counterproductive behavior	28	7,668	-.38*	.04	80.70	146.64*
Criterion: criminality/delinquency	16	4,345	-.21*	.03	58.42	39.05*
Criterion: low integrity	9	2,462	-.47*	.08	88.31	78.86*
Criterion: unethical decision making	6	1,360	-.25*	.06	65.37	17.46*
Criterion: immoral behavior other	5	2,140	-.18*	.05	60.14	13.99*
Criterion class: short-term mating	12	5,322	-.16*	.04	58.97	30.79*
Criterion class: dark traits	67	24,128	-.32*	.03	87.34	534.59*
Criterion: Machiavellianism	29	11,971	-.24*	.04	84.61	193.85*
Criterion: materialism	8	2,160	-.04	.05	71.43	28.33*
Criterion: narcissism	29	10,956	-.02	.02	46.37	55.01*
Criterion: psychological entitlement	6	2,479	-.23*	.11	88.77	55.98*
Criterion: psychopathy	36	15,099	-.43*	.03	78.14	167.89*
Criterion: sadism	4	1,744	-.34*	.09	88.63	36.86*
Criterion: dark traits other	16	7,644	-.35*	.07	89.60	167.04*
Criterion class: active cooperation	61	14,572	.10*	.02	72.25	221.82*
Criterion: altruism	18	5,033	.23*	.02	24.41	23.94
Criterion: cooperation in games	32	5,575	-.02	.02	26.53	43.73
Criterion: social value orientation	13	3,052	.00	.02	0.00	5.91
Criterion: active cooperation other	12	4,023	.14*	.05	76.90	55.19*
Criterion class: environmental behavior	5	2,115	.12*	.04	57.65	12.31*
Openness to experience						
Outcome domain: exploitation	207	58,697	-.11*	.01	78.13	949.63*
Criterion class: immoral behavior	91	21,587	-.06*	.02	65.73	266.89*
Criterion: aggression	15	3,815	-.11*	.03	54.42	33.18*
Criterion: antisocial behavior	6	1,524	-.08*	.03	0.00	5.04
Criterion: cheating/dishonesty	21	2,660	-.10*	.02	0.00	17.70
Criterion: counterproductive behavior	24	6,504	-.04	.03	56.08	55.15*
Criterion: criminality/delinquency	14	4,002	.04	.04	69.98	47.57*
Criterion: low integrity	8	2,144	-.09*	.03	0.00	3.62
Criterion: unethical decision making	6	1,360	-.32*	.03	0.00	3.59
Criterion: immoral behavior other	5	2,140	.01	.06	67.57	17.52*
Criterion class: short-term mating	12	5,322	-.01	.02	29.22	17.46
Criterion class: dark traits	65	23,190	-.10*	.03	83.02	386.61*
Criterion: Machiavellianism	29	11,970	-.11*	.04	85.40	204.81*
Criterion: materialism	8	2,160	-.18*	.05	66.46	24.11*
Criterion: narcissism	29	10,953	.08*	.03	71.32	103.98*
Criterion: psychological entitlement	5	2,281	-.16	.10	85.97	37.27*
Criterion: psychopathy	35	14,357	-.08	.04	84.75	235.13*
Criterion: sadism	4	1,744	.02	.04	43.17	7.21
Criterion: dark traits other	16	7,644	-.13*	.05	77.52	76.53*
Criterion class: active cooperation	61	14,572	.15*	.01	44.42	110.38*
Criterion: altruism	18	5,033	.22*	.03	62.42	48.57*
Criterion: cooperation in games	32	5,575	.10*	.02	0.86	32.28
Criterion: social value orientation	13	3,052	.15*	.02	0.00	8.79
Criterion: active cooperation other	12	4,023	.12*	.02	27.34	16.88
Criterion class: environmental behavior	6	2,363	.54*	.05	65.98	18.67*

Note: HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience; *k* = number of statistically independent samples; *N* = total sample size;  $\hat{\rho}$  = mean true-score correlation corrected for unreliability; *SE* = standard error; *I*<sup>2</sup> = variation across samples due to heterogeneity rather than chance; *Q* = Cochran's *Q* estimate.

\**p* < .05.

**Table 6.** Meta-Analysis of Correlations Between the HEXACO Dimensions and Insecurity

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Honesty-humility						
Outcome domain: insecurity	37	9,783	.06*	.06	92.78	522.65*
Criterion class: anxiety	12	2,639	.05*	.06	81.99	67.54*
Criterion class: avoidance	5	835	.08*	.04	0.00	2.79
Criterion class: risk aversion	16	3,540	.36*	.03	52.97	35.15*
Criterion: (low) risk-taking behavioral	4	575	.18*	.05	0.00	3.86
Criterion: (low) risk-taking DOSPERT scale	6	1,719	.39*	.04	28.55	9.41
Criterion: (low) risk-taking survey	3	610	.41*	.06	36.40	4.76
Criterion: (low) sensation seeking	6	1,220	.36*	.03	0.00	2.53
Criterion Class: Stressors	9	3,790	-.16*	.10	93.16	141.36*
Criterion: job stress	6	3,133	-.20*	.11	94.06	110.97*
Criterion: psychological strain	3	1,044	-.03	.06	54.71	6.80*
Criterion: stressors other	1	128	.15*	.10	0.00	0.00
Emotionality						
Outcome domain: insecurity	32	9,327	.27*	.04	85.98	232.29*
Criterion class: anxiety	9	2,272	.33*	.07	85.10	60.95*
Criterion class: avoidance	4	787	.71*	.09	73.53	15.93*
Criterion class: risk aversion	14	3,356	.29*	.05	71.40	51.15*
Criterion: (low) risk-taking behavioral	4	575	.15*	.07	46.20	7.72
Criterion: (low) risk-taking DOSPERT scale	5	1,612	.25*	.06	53.42	13.15*
Criterion: (low) risk-taking survey	3	610	.49*	.05	0.00	0.49
Criterion: (low) sensation seeking	5	1,143	.33*	.03	0.00	3.74
Criterion class: Stressors	9	3,885	.20*	.07	87.95	78.73*
Criterion: job stress	5	2,925	.12*	.06	82.08	30.07*
Criterion: psychological strain	4	1,347	.36*	.05	46.45	7.58
Criterion: stressors other	1	128	.37*	.10	0.00	0.00
Extraversion						
Outcome domain: insecurity	32	9,103	-.25*	.05	88.14	275.22*
Criterion class: anxiety	10	2,351	-.40*	.07	87.36	80.25*
Criterion class: avoidance	4	787	-.36*	.04	0.00	0.56
Criterion class: risk aversion	14	3,356	-.18*	.05	78.17	67.18*
Criterion: (low) risk-taking behavioral	4	575	-.10*	.05	0.00	2.24
Criterion: (low) risk-taking DOSPERT scale	5	1,612	-.07*	.03	0.00	3.60
Criterion: (low) risk-taking survey	3	610	-.27*	.07	57.38	7.13*
Criterion: (low) sensation seeking	5	1,143	-.40*	.03	0.00	1.11
Criterion class: stressors	8	3,582	-.23*	.08	90.00	85.54*
Criterion: job stress	5	2,925	-.18*	.08	88.19	45.75*
Criterion: psychological strain	3	1,044	-.48*	.07	68.57	9.82*
Criterion: stressors other	1	128	-.36*	.10	0.00	0.00
Agreeableness						
Outcome domain: insecurity	32	9,327	.00	.03	80.33	165.34*
Criterion class: anxiety	9	2,272	-.04*	.05	68.50	28.78*
Criterion class: avoidance	4	787	-.06*	.06	30.01	5.87
Criterion class: risk aversion	14	3,356	.12*	.02	14.35	16.49
Criterion: (low) risk-taking behavioral	4	575	.04*	.05	0.00	2.27
Criterion: (low) risk-taking DOSPERT scale	5	1,612	.13*	.05	40.15	9.75*
Criterion: (low) risk-taking survey	3	610	.15*	.05	0.00	0.29
Criterion: (low) sensation seeking	5	1,143	.14*	.03	0.00	0.46

(continued)

**Table 6.** (continued)

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Criterion class: stressors	9	3,885	-.07*	.08	89.71	92.18*
Criterion: job stress	5	2,925	-.17*	.05	73.27	19.86*
Criterion: psychological strain	4	1,347	-.11	.16	95.42	90.58*
Criterion: stressors other	1	128	.19*	.10	0.00	0.00
Conscientiousness						
Outcome domain: insecurity	33	9,395	-.02	.05	92.02	421.85*
Criterion class: anxiety	10	2,566	-.06*	.04	70.36	33.94*
Criterion class: avoidance	5	1,081	.10*	.06	57.53	12.02*
Criterion class: risk aversion	15	3,433	.26*	.04	57.41	36.45*
Criterion: (low) risk-taking behavioral	4	575	.06*	.05	0.00	1.74
Criterion: (low) risk-taking DOSPERT scale	5	1,612	.25*	.05	38.18	9.36
Criterion: (low) risk-taking survey	3	610	.32*	.05	0.00	0.70
Criterion: (low) sensation seeking	6	1,220	.34*	.04	15.75	7.18
Criterion class: stressors	8	3,582	-.26*	.07	86.08	61.40*
Criterion: job stress	5	2,925	-.25*	.07	87.41	43.20*
Criterion: psychological strain	3	1,044	-.31*	.09	81.83	16.90*
Criterion: stressors other	1	128	-.12*	.10	0.00	0.00
Openness to experience						
Outcome domain: insecurity	32	9,103	-.13*	.04	85.05	218.31*
Criterion class: anxiety	10	2,351	-.05*	.06	81.53	54.88*
Criterion class: avoidance	4	787	-.08*	.05	0.00	2.68
Criterion class: risk aversion	14	3,356	-.23*	.07	88.99	134.18*
Criterion: (low) risk-taking behavioral	4	575	-.04*	.05	0.00	3.33
Criterion: (low) risk-taking DOSPERT scale	5	1,612	-.13*	.08	73.41	24.31*
Criterion: (low) risk-taking survey	3	610	-.36*	.10	74.78	12.13*
Criterion: (low) sensation seeking	5	1,143	-.49*	.05	47.63	9.73*
Criterion class: stressors	8	3,582	-.12*	.05	77.86	38.39*
Criterion: job stress	5	2,925	-.08*	.03	41.06	8.81
Criterion: psychological strain	3	1,044	-.03*	.04	0.00	1.11
Criterion: stressors other	1	128	.17*	.10	0.00	0.00

Note: HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience; *k* = number of statistically independent samples; *N* = total sample size;  $\hat{\rho}$  = mean true-score correlation corrected for unreliability; *SE* = standard error; *I*<sup>2</sup> = variation across samples due to heterogeneity rather than chance; *Q* = Cochran's *Q* estimate; DOSPERT = Domain-Specific Risk-Taking.

\**p* < .05.

(13,489 ≤ *n* ≤ 14,735). Supporting the main hypothesis, extraversion was linked most strongly to sociality ( $\hat{\rho} = .53$ ), followed by conscientiousness ( $\hat{\rho} = .25$ ) and agreeableness ( $\hat{\rho} = .18$ ); openness ( $\hat{\rho} = .13$ ), honesty-humility ( $\hat{\rho} = .11$ ), and emotionality ( $\hat{\rho} = -.11$ ) yielded only small relations. On the criterion-class level, extraversion was also linked most strongly to social network ( $\hat{\rho} = .35$ ; the other dimensions:  $.00 \leq |\hat{\rho}| \leq .23$ ) and positivity ( $\hat{\rho} = .56$ ; the other dimensions:  $.13 \leq |\hat{\rho}| \leq .27$ ), and it had a moderate relation with leadership ( $\hat{\rho} = .26$ ). Concerning the latter, conscientiousness yielded the strongest link overall,  $\hat{\rho} = .31$  (the other dimensions:  $.04 \leq |\hat{\rho}| \leq .12$ ). There were some noteworthy differences concerning the links of some HEXACO dimensions with the

criterion classes representing sociality. Agreeableness, for instance, had no relation to leadership but a moderate correlation with positivity, and openness had a moderate correlation with social network but small links at best to both leadership and positivity. Again, *I*<sup>2</sup> and *Q* indicated substantial study heterogeneity altogether.

Overall, the results supported the hypothesis: Extraversion mapped onto sociality. Indeed, across the domain, criterion class, and criterion level, extraversion mostly yielded substantial correlations. The relations observed for the other dimensions were typically much weaker descriptively, except for the relation between conscientiousness and leadership, which was slightly higher descriptively than the corresponding relation for extraversion.

**Table 7.** Meta-Analysis of Correlations Between the HEXACO Dimensions and Sociality

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Honesty-humility						
Outcome domain: sociality	61	14,697	.11*	.02	69.99	204.35*
Criterion class: leadership	5	854	.08	.08	68.20	15.98*
Criterion class: positivity	53	12,404	.13*	.02	64.40	149.62*
Criterion: happiness	15	3,388	.05	.04	57.12	35.30*
Criterion: positive affect	17	3,415	.07*	.03	40.28	29.08*
Criterion: satisfaction	31	8,951	.16*	.02	64.47	87.95*
Criterion: well-being	8	2,007	.22*	.03	0.00	2.81
Criterion: positivity other	2	341	.05	.10	36.93	3.27
Criterion class: Social Network	5	1,658	.00	.08	85.26	37.54*
Emotionality						
Outcome domain: sociality	61	14,735	-.11*	.02	78.32	283.27*
Criterion class: leadership	5	949	-.08*	.04	15.61	6.01
Criterion class: positivity	52	12,207	-.14*	.03	74.67	206.75*
Criterion: happiness	15	3,388	-.23*	.04	62.57	40.47*
Criterion: positive affect	18	3,668	-.15*	.06	81.26	99.65*
Criterion: satisfaction	29	8,501	-.11*	.02	65.64	85.30*
Criterion: well-being	8	2,007	-.17*	.03	0.00	4.25
Criterion: positivity other	2	341	-.34*	.07	0.00	0.03
Criterion class: Social Network	6	1,797	.06	.08	85.32	44.60*
Extraversion						
Outcome domain: sociality	57	13,949	.53*	.03	86.39	422.32*
Criterion class: leadership	5	687	.26*	.09	69.84	17.33*
Criterion class: positivity	50	12,054	.56*	.03	83.85	312.10*
Criterion: happiness	15	3,388	.73*	.05	81.72	83.09*
Criterion: positive affect	16	3,316	.55*	.04	53.03	34.96*
Criterion: satisfaction	28	8,362	.49*	.04	84.14	178.80*
Criterion: well-being	9	2,345	.58*	.04	48.05	17.85*
Criterion: positivity other	2	341	.61*	.07	0.00	1.26
Criterion class: social network	3	1,328	.35*	.11	91.53	39.61*
Agreeableness						
Outcome domain: sociality	61	14,187	.18*	.02	74.86	243.94*
Criterion class: leadership	6	990	-.04	.10	82.03	36.20*
Criterion class: positivity	52	11,758	.21*	.02	70.13	174.86*
Criterion: happiness	15	3,388	.29*	.03	48.28	29.22*
Criterion: positive affect	18	3,665	.09	.05	72.43	67.19*
Criterion: satisfaction	29	8,055	.22*	.03	64.50	82.24*
Criterion: well-being	8	2,007	.17*	.03	0.00	6.55
Criterion: positivity other	1	210	.18	.10	0.00	0.00
Criterion class: social network	5	1,654	.10*	.03	3.30	5.19
Conscientiousness						
Outcome domain: sociality	58	13,489	.25*	.02	67.32	178.39*
Criterion class: leadership	5	687	.31*	.10	74.14	20.42*
Criterion class: positivity	51	11,594	.27*	.02	55.58	115.21*
Criterion: happiness	15	3,388	.19*	.03	46.85	28.43*
Criterion: positive affect	16	3,316	.33*	.04	63.15	44.81*
Criterion: satisfaction	30	8,240	.27*	.02	56.90	70.02*
Criterion: well-being	8	2,007	.39*	.05	44.82	15.09*
Criterion: positivity other	2	341	.15	.09	40.66	3.52
Criterion class: Social Network	3	1,328	.07	.06	68.12	10.28*

(continued)

**Table 7.** (continued)

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Openness to experience						
Outcome domain: sociality	57	14,072	.13*	.02	71.27	199.79*
Criterion class: leadership	4	646	.12	.10	71.04	14.23*
Criterion class: positivity	51	12,218	.13*	.02	71.10	177.71*
Criterion: happiness	15	3,388	.13*	.04	57.03	35.21*
Criterion: positive affect	17	3,570	.20*	.03	50.30	35.06*
Criterion: satisfaction	29	8,610	.10*	.03	77.17	128.62*
Criterion: well-being	8	2,007	.21*	.04	27.34	11.30
Criterion: positivity other	2	341	.16*	.07	0.00	1.52
Criterion class: social network	3	1,328	.23*	.05	61.08	8.36*

Note: HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience; *k* = number of statistically independent samples; *N* = total sample size;  $\hat{\rho}$  = mean true-score correlation corrected for unreliability; *SE* = standard error; *I*<sup>2</sup> = variation across samples due to heterogeneity rather than chance; *Q* = Cochran's *Q* estimate.

\**p* < .05.

### The HEXACO dimensions and obstruction

The relations between the HEXACO dimensions and obstruction are reported in Table 8. Generally, the number of samples ( $18 \leq k \leq 27$ ) and participants ( $3,670 \leq n \leq 6,001$ ) was smaller compared with the analyses for the other domains considered here. In line with the hypothesis, agreeableness showed the strongest relation with obstruction ( $\hat{\rho} = .33$ ), followed by honesty-humility ( $\hat{\rho} = .18$ ). The range of relations for the other dimensions with obstruction was comparably small: emotionality,  $\hat{\rho} = -.10$ ; extraversion,  $\hat{\rho} = .14$ ; conscientiousness,  $\hat{\rho} = .11$ ; and openness,  $\hat{\rho} = .11$ . On the criterion-class level, the pattern of relations was highly similar for both insensitivity to unfairness (agreeableness,  $\hat{\rho} = .28$ ; honesty-humility,  $\hat{\rho} = .20$ ; the other dimensions,  $.06 \leq |\hat{\rho}| \leq .15$ ) and reactive cooperation (agreeableness,  $\hat{\rho} = .33$ ; honesty-humility,  $\hat{\rho} = .17$ ; the other dimensions:  $.10 \leq |\hat{\rho}| \leq .14$ ), which mirrored the results on the domain level. Study heterogeneity was again substantial for the analyses involving honesty-humility, emotionality, extraversion, and agreeableness (across the levels) but not for any analysis involving conscientiousness or openness. Overall, agreeableness mapped most strongly onto obstruction on the domain, the criterion class, and the criterion level, thus supporting our hypothesis.

### The HEXACO dimensions and duty

Table 9 shows the relations between the HEXACO dimensions and duty, for which analyses were based on a rather large number of  $46 \leq k \leq 57$  samples and  $11,743 \leq n \leq 13,985$  participants. Again, the findings were in line with the hypothesis and expectations and showed a considerable link between conscientiousness and duty ( $\hat{\rho} = .41$

as well as secondary relations of extraversion ( $\hat{\rho} = .19$ ) and honesty-humility ( $\hat{\rho} = .18$ ; the other dimensions:  $.03 \leq |\hat{\rho}| \leq .15$ ). On the criterion-class level, conscientiousness yielded substantial and indeed the strongest relations for three of the four criterion classes: achievement/performance ( $\hat{\rho} = .26$ ; the other dimensions:  $.01 \leq \hat{\rho} \leq .14$ ), perfectionism ( $\hat{\rho} = .46$ ; the other dimensions:  $.03 \leq |\hat{\rho}| \leq .38$ ), and self-control versus impulsivity ( $\hat{\rho} = .75$ ; the other dimensions:  $.13 \leq |\hat{\rho}| \leq .43$ ). For the criterion class of exercising, however, conscientiousness yielded no significant relation ( $\hat{\rho} = .09$ ), whereas extraversion yielded the only meaningful link with  $\hat{\rho} = .17$  (all other dimensions:  $.01 \leq |\hat{\rho}| \leq .16$ )—but note that the analyses for exercising as well as for perfectionism were based on a relatively small number of samples and participants, respectively (see Table 9). Considering *P* and *Q*, most analyses were based on a heterogeneous set of samples, excluding on the criterion-class level the meta-analyses between emotionality and achievement/performance, exercising, and perfectionism, as well as the meta-analyses between extraversion and both exercising and performance. Across all analyses, conscientiousness thus mapped most clearly onto duty; honesty-humility and extraversion showed secondary relations, as expected.

### The HEXACO dimensions and exploration

Finally, we linked the HEXACO dimensions to exploration, represented by the criterion classes of creativity, curiosity, conservatism (and three criteria within), and prejudice (two criteria within; see Table 10). On the domain level, analyses were again based on a large number of both samples ( $40 \leq k \leq 50$ ) and participants ( $11,822 \leq n \leq 15,997$ ). In line with the hypothesis, openness ( $\hat{\rho} = .38$ ) mapped most strongly onto exploration.

**Table 8.** Meta-Analysis of Correlations Between the HEXACO Dimensions and Obstruction

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Honesty-humility						
Outcome domain: obstruction	27	6,001	.18*	.04	78.56	128.33*
Criterion class: insensitivity to unfairness	8	1,331	.20*	.05	31.00	11.95
Criterion class: reactive cooperation	19	4,670	.17*	.05	83.10	115.29*
Criterion: forgiveness/low vengefulness	10	2,507	.31*	.05	61.10	26.84*
Criterion: reactive cooperation games	9	2,163	.01	.02	0.93	9.09
Emotionality						
Outcome domain: obstruction	18	3,670	-.10*	.05	69.03	59.93*
Criterion class: insensitivity to unfairness	5	570	-.12	.07	36.34	7.98
Criterion class: reactive cooperation	13	3,100	-.10	.06	73.42	50.87*
Criterion: forgiveness/low vengefulness	6	1,629	-.17	.09	76.41	28.71*
Criterion: reactive cooperation games	7	1,471	-.02	.05	43.45	12.91*
Extraversion						
Outcome domain: obstruction	18	3,670	.14*	.06	80.06	93.68*
Criterion class: insensitivity to unfairness	5	570	.15	.11	76.38	21.89*
Criterion class: reactive cooperation	13	3,100	.14*	.06	80.88	71.19*
Criterion: forgiveness/low vengefulness	6	1,629	.27*	.09	74.11	25.68*
Criterion: reactive cooperation games	7	1,471	.01	.05	51.27	15.29*
Agreeableness						
Outcome domain: obstruction	20	4,271	.33*	.06	84.15	129.96*
Criterion class: insensitivity to unfairness	5	570	.28*	.07	46.80	9.58*
Criterion class: reactive cooperation	15	3,701	.33*	.07	87.09	120.31*
Criterion: forgiveness/low vengefulness	8	2,230	.44*	.10	88.23	72.35*
Criterion: reactive cooperation games	7	1,471	.17*	.03	11.52	8.02
Conscientiousness						
Outcome domain: obstruction	20	4,271	.11*	.02	19.60	25.06
Criterion class: insensitivity to unfairness	5	570	.12	.07	39.13	8.34
Criterion class: reactive cooperation	15	3,701	.11*	.02	9.88	16.71
Criterion: forgiveness/low vengefulness	8	2,230	.15*	.03	0.00	3.43
Criterion: reactive cooperation games	7	1,471	.05	.03	0.00	5.12
Openness to experience						
Outcome domain: obstruction	18	3,670	.11*	.02	0.00	15.91
Criterion class: insensitivity to unfairness	5	570	.06	.05	0.00	4.78
Criterion class: reactive cooperation	13	3,100	.12*	.02	0.00	10.43
Criterion: forgiveness/low vengefulness	6	1,629	.17*	.03	0.00	1.18
Criterion: reactive cooperation games	7	1,471	.06*	.03	0.00	3.11

Note: HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience; *k* = number of statistically independent samples; *N* = total sample size;  $\hat{\rho}$  = mean true-score correlation corrected for unreliability; *SE* = standard error; *I*<sup>2</sup> = variation across samples due to heterogeneity rather than chance, *Q* = Cochran's *Q* estimate.

\**p* < .05.

Contrary to our expectations, however, conscientiousness had virtually no relation to exploration at all ( $\hat{\rho} = .03$ ), whereas extraversion had a relation ( $\hat{\rho} = .15$ ; the other dimensions:  $.01 \leq |\hat{\rho}| \leq .09$ ). Openness was also linked substantially to all criterion classes (and, indeed, all criteria) representing exploration, that is, creativity ( $\hat{\rho} = .48$ ; the other dimensions:  $.04 \leq |\hat{\rho}| \leq .29$ ), curiosity ( $\hat{\rho} = .30$ ; the other dimensions:  $.01 \leq |\hat{\rho}| \leq .34$ ), conservatism ( $|\hat{\rho}| = -.34$ ; the other dimensions:  $.00 \leq |\hat{\rho}| \leq .10$ ), and prejudice ( $\hat{\rho} = -.39$ ; the other dimensions:  $.09 \leq |\hat{\rho}| \leq .28$ ). Note that both extraversion ( $\hat{\rho} = .34$ ) and

conscientiousness ( $\hat{\rho} = .33$ ) were descriptively more strongly linked to curiosity than openness. On the domain and criterion-class level, for all except three analyses (honesty-humility-curiosity, conscientiousness-conservatism, and openness-prejudice), *I*<sup>2</sup> and *Q* indicated substantial sample heterogeneity.

## Supplemental Analyses

We conducted two sets of supplemental analyses. First, we investigated whether the assessment mode of the

**Table 9.** Meta-Analysis of Correlations Between the HEXACO Dimensions and Duty

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Honesty-humility						
Outcome domain: duty	57	13,771	.18*	.04	88.71	509.02*
Criterion class: achievement/performance	36	8,691	.10*	.04	75.91	150.86*
Criterion: academic/job performance	26	5,012	.06*	.03	68.39	83.24*
Criterion: organizational citizenship behavior	9	3,533	.15	.08	81.79	51.21*
Criterion: achievement/performance other	2	480	-.02	.08	54.34	5.16*
Criterion class: exercising	4	486	-.16	.11	50.09	10.66*
Criterion class: perfectionism	3	657	-.38*	.12	75.84	13.37*
Criterion class: self-control (vs. Impulsivity)	18	5,015	.43*	.03	50.58	37.02*
Criterion: low impulsivity	3	774	.38*	.07	20.69	4.00
Criterion: self-control	15	4,241	.43*	.03	51.36	31.45*
Emotionality						
Outcome domain: duty	52	12,611	-.03	.03	72.02	187.32*
Criterion class: achievement/performance	31	7,355	.01	.02	0.00	30.29
Criterion: academic/job performance	24	4,622	.03*	.02	0.00	23.05
Criterion: organizational citizenship behavior	7	2,733	-.03	.03	0.00	4.58
Criterion: achievement/performance other	1	334	.04	.05	0.00	0.00
Criterion class: exercising	5	740	.01	.06	27.64	7.36
Criterion class: perfectionism	3	657	.17*	.06	0.00	0.39
Criterion class: self-control (vs. Impulsivity)	17	4,937	-.13*	.06	84.72	114.28*
Criterion: low impulsivity	3	774	.25*	.08	43.63	5.99*
Criterion: self-control	14	4,163	-.20*	.04	70.98	49.53*
Extraversion						
Outcome domain: duty	46	11,743	.19*	.04	83.79	286.81*
Criterion class: achievement/performance	28	6,922	.14*	.04	78.73	133.69*
Criterion: academic/job performance	21	4,189	.09*	.04	77.36	94.49*
Criterion: organizational citizenship behavior	7	2,733	.20*	.07	69.38	24.43*
Criterion: achievement/performance other	1	334	.12*	.05	0.00	0.00
Criterion class: exercising	3	403	.17*	.06	0.00	2.10
Criterion class: perfectionism	3	657	.03	.05	0.00	0.28
Criterion class: self-control (vs. Impulsivity)	16	4,839	.28*	.06	87.52	131.97*
Criterion: low impulsivity	3	774	.08	.13	74.34	14.20*
Criterion: self-control	13	4,065	.32*	.06	85.80	94.60*
Agreeableness						
Outcome domain: duty	50	12,892	.15*	.04	88.75	448.57*
Criterion class: achievement/performance	30	7,722	.06	.04	72.66	111.05*
Criterion: academic/job performance	21	4,189	.01	.03	50.90	43.32*
Criterion: organizational citizenship behavior	9	3,533	.11	.09	86.05	67.17*
Criterion: achievement/performance other	1	334	-.18*	.05	0.00	0.00
Criterion class: exercising	4	657	-.05	.08	50.09	8.99*
Criterion class: perfectionism	3	657	-.32*	.10	65.42	9.29*
Criterion class: self-control (vs. Impulsivity)	17	4,934	.38*	.03	61.19	44.69*
Criterion: low impulsivity	3	774	.29*	.06	11.15	3.48
Criterion: self-control	14	4,160	.39*	.04	62.75	38.51*
Conscientiousness						
Outcome domain: duty	55	13,985	.41*	.05	92.46	735.71*
Criterion class: achievement/performance	34	8,737	.26*	.04	83.71	211.14*
Criterion: academic/job performance	24	4,668	.28*	.04	72.58	88.72*
Criterion: organizational citizenship behavior	9	3,533	.18*	.05	63.38	25.35*
Criterion: achievement/performance other	2	870	.38	.28	98.21	113.21*
Criterion class: exercising	3	403	.09	.10	39.09	6.47*
Criterion class: perfectionism	6	1,543	.46*	.11	87.48	48.95*

(continued)

**Table 9.** (continued)

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Criterion class: self-control (vs. impulsivity)	17	4,916	.75*	.05	82.26	98.30*
Criterion: low impulsivity	3	774	.88*	.15	78.30	16.14*
Criterion: self-control	14	4,142	.72*	.05	81.37	77.39*
Openness to experience						
Outcome domain: Duty	48	12,042	.11*	.03	79.35	234.75*
Criterion class: achievement/Performance	29	6,967	.14*	.03	63.81	81.14*
Criterion: academic/job performance	22	4,234	.13*	.04	68.01	69.89*
Criterion: organizational citizenship behavior	7	2,733	.15*	.05	49.44	14.52*
Criterion: achievement/performance other	1	334	.17*	.05	0.00	0.00
Criterion class: exercising	4	657	-.06	.11	72.31	17.08*
Criterion class: perfectionism	3	657	-.05	.09	58.11	7.59*
Criterion class: self-control (vs. Impulsivity)	16	4,839	.15*	.06	85.49	113.56*
Criterion: low impulsivity	3	774	-.17	.22	89.39	33.37*
Criterion: self-control	13	4,065	.21*	.04	73.91	51.36*

Note: HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience; *k* = number of statistically independent samples; *N* = total sample size;  $\hat{\rho}$  = mean true-score correlation corrected for unreliability; *SE* = standard error; *I*<sup>2</sup> = variation across samples due to heterogeneity rather than chance; *Q* = Cochran's *Q* estimate.

\**p* < .05.

criteria (i.e., self-reports vs. non-self-reports) moderated the relations between the HEXACO dimensions and outcomes. Specifically, we focused on the level of the criterion classes and performed moderation analyses whenever there were at least three studies on this level available in which the criterion was not based on self-report data (but on objective data, observations of behavior, or observer reports) and in which the HEXACO dimensions were assessed via self-reports. Data were sufficient for four criterion classes, namely, immoral behavior, active cooperation (both belonging to exploitation), reactive cooperation (belonging to obstruction), and achievement/performance (belonging to duty).

As summarized in Table 11, results of the moderation analyses showed noteworthy differences in some correlations depending on whether self-reported (SR) or non-self-reported (NSR) criteria were considered. Indeed, correlations were smaller for NSR criteria with their counterpart HEXACO domain in three of four cases: The correlation of honesty-humility with immoral behavior dropped from  $\hat{\rho} = -.45$  (SR) to  $\hat{\rho} = -.24$  (NSR); correlation of honesty-humility with active cooperation dropped from  $\hat{\rho} = .36$  (SR) to  $.25$  (NSR); and the correlation of agreeableness with reactive cooperation dropped from  $\hat{\rho} = .37$  (SR) to  $.10$  (NSR).<sup>8</sup> By contrast, the correlation between conscientiousness and achievement/performance did not change as a matter of the type of criterion assessment ( $\hat{\rho} = .25$  for SR vs.  $\hat{\rho} = .24$  for NSR).

In addition to the moderation by assessment of the criteria, we considered it important to complement our main analyses with analyses taking into account the overlap between the HEXACO dimensions to gain a

deeper understanding of the observed relations between the dimensions and the outcome domains. Specifically, given that the HEXACO dimensions are intercorrelated to some degree (Moshagen et al., 2019), partial correlations between a particular HEXACO dimension and a domain, controlling for the remaining dimensions, provide insights into whether a secondary relation of one dimension with a domain is (largely) due to this dimension's correlation with another HEXACO dimension.

Following this logic, we estimated partial correlations ( $\hat{\rho}_{xy.z}$ ) on the basis of the zero-order correlations between the HEXACO dimensions (*x*) and outcome domains (*y*; as reported above) and the intercorrelations between the HEXACO dimensions (*z*). The latter were meta-analytically derived on the basis of the independent samples included in the meta-analyses that reported correlations between at least two HEXACO dimensions ( $199 \leq k \leq 212$ ;  $53,571 \leq N \leq 57,429$ ); we used the same meta-analytic procedures as detailed above. The intercorrelations between the HEXACO dimensions are reported in Table O9 on the OSF. This information also allowed us to obtain *R*<sup>2</sup> estimates, which indicates the extent to which all basic personality dimensions combined can explain variance in a specific domain.

For each HEXACO dimension, the partial correlations were largest for the dimensions' counterpart domain and ranged between  $.23 \leq |\hat{\rho}_{xy.z}| \leq .46$  (Table 12). Except for the relation between extraversion and insecurity, the partial correlations revealed a strikingly clearer picture compared with the zero-order results concerning the one-to-one mapping of HEXACO dimensions onto

**Table 10.** Meta-Analysis of Correlations Between the HEXACO Dimensions and Exploration

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Honesty-humility						
Outcome domain: exploration	48	15,997	.09*	.03	87.71	395.58*
Criterion class: creativity	10	3,214	-.10*	.04	60.88	29.59*
Criterion class: curiosity	4	1,001	.17*	.04	0.00	0.15
Criterion class: conservatism	24	8,200	-.05	.04	83.35	146.37*
Criterion: conservative attitudes	3	561	.14*	.05	0.00	2.58
Criterion: political orientation	6	2,175	-.16*	.03	34.67	9.41
Criterion: right-wing authoritarianism	16	5,601	-.02	.04	83.71	100.66*
Criterion class: prejudice	13	4,538	-.28*	.03	62.09	34.48*
Criterion: low humanity	4	1,284	-.24*	.03	0.00	0.92
Criterion: prejudice	9	3,254	-.29*	.04	71.68	31.94*
Emotionality						
Outcome domain: exploration	40	11,822	-.01	.03	79.47	198.36*
Criterion class: creativity	10	3,214	-.09	.07	83.08	71.95*
Criterion class: curiosity	6	1,383	-.12*	.05	51.48	12.79*
Criterion class: conservatism	19	5,643	.02	.03	63.69	53.02*
Criterion: conservative attitudes	2	481	.12*	.06	0.00	0.91
Criterion: political orientation	5	1,448	-.13*	.03	0.00	2.88
Criterion: right-wing authoritarianism	13	3,851	.06*	.03	35.37	20.38
Criterion class: prejudice	8	2,538	-.09	.08	89.08	74.16*
Criterion: low humanity	3	727	-.16*	.05	0.00	0.99
Criterion: prejudice	5	1,811	-.07	.11	92.84	70.37*
Extraversion						
Outcome domain: exploration	40	11,822	.15*	.03	85.82	287.24*
Criterion class: creativity	10	3,214	.29*	.08	86.92	93.21*
Criterion class: curiosity	6	1,383	.34*	.10	86.68	47.76*
Criterion class: conservatism	19	5,643	-.02	.02	55.59	43.22*
Criterion: conservative attitudes	2	481	-.02	.06	0.00	0.88
Criterion: political orientation	5	1,448	.05	.03	17.86	6.16
Criterion: right-wing authoritarianism	13	3,851	-.04	.03	58.87	32.23*
Criterion class: prejudice	8	2,538	-.20*	.05	78.93	38.42*
Criterion: low humanity	3	727	-.20*	.05	0.00	1.20
Criterion: prejudice	5	1,811	-.20*	.08	86.33	36.90*
Agreeableness						
Outcome domain: exploration	42	12,650	.04*	.02	71.55	149.75*
Criterion class: creativity	10	3,214	.04	.05	63.37	31.72*
Criterion class: curiosity	6	1,383	.01	.06	55.31	14.06*
Criterion class: conservatism	19	5,643	.00	.03	64.80	54.71*
Criterion: conservative attitudes	2	481	.05	.06	0.00	0.90
Criterion: political orientation	5	1,448	-.11*	.03	0.00	4.02
Criterion: right-wing authoritarianism	13	3,851	.03	.04	64.79	37.82*
Criterion class: prejudice	10	3,366	-.13*	.04	70.88	34.53*
Criterion: low humanity	3	727	-.29*	.07	60.82	7.89*
Criterion: prejudice	7	2,639	-.09*	.03	46.95	13.22*
Conscientiousness						
Outcome domain: exploration	41	12,073	.03	.03	85.36	285.17*
Criterion class: creativity	11	3,465	.09	.07	82.14	71.93*
Criterion class: curiosity	6	1,383	.33*	.09	84.46	40.99*
Criterion class: conservatism	19	5,643	.10*	.02	11.16	21.43
Criterion: conservative attitudes	2	481	.16*	.06	0.00	0.06
Criterion: political orientation	5	1,448	.14*	.03	0.00	4.35
Criterion: right-wing authoritarianism	13	3,851	.08*	.02	2.46	13.34

(continued)

**Table 10.** (continued)

Personality dimension & outcome	<i>k</i>	<i>N</i>	$\hat{\rho}$	<i>SE</i>	<i>I</i> <sup>2</sup>	<i>Q</i>
Criterion class: prejudice	8	2,538	-.12*	.06	78.83	38.19*
Criterion: low humanity	3	727	-.18*	.05	0.00	2.07
Criterion: prejudice	5	1,811	-.10	.08	85.65	35.06*
Openness to experience						
Outcome domain: exploration	50	15,705	.38*	.02	79.00	240.90*
Criterion class: creativity	12	3,658	.48*	.06	78.52	64.10*
Criterion class: curiosity	6	1,383	.30*	.14	92.98	92.05*
Criterion class: conservatism	23	7,614	-.34*	.03	70.52	78.98*
Criterion: conservative attitudes	2	481	-.15*	.06	0.00	0.14
Criterion: political orientation	6	1,669	-.23*	.03	23.88	8.00
Criterion: right-wing authoritarianism	16	5,601	-.39*	.03	51.83	33.72*
Criterion class: prejudice	12	4,006	-.39*	.02	24.58	15.93
Criterion: low humanity	3	727	-.43*	.05	0.00	0.93
Criterion: prejudice	9	3,279	-.38*	.03	36.68	14.24

Note: HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience; *k* = number of statistically independent samples; *N* = total sample size;  $\hat{\rho}$  = mean true-score correlation corrected for unreliability; *SE* = standard error; *I*<sup>2</sup> = variation across samples due to heterogeneity rather than chance; *Q* = Cochran's *Q* estimate.

\**p* < .05.

domains. Specifically, secondary relations decreased to  $|\hat{\rho}_{xy.z}| \leq .15$ , except for extraversion, which showed a secondary relation with insecurity of  $\hat{\rho}_{xy.z} = -.20$ . Correspondingly, the (descriptive) differences between primary and secondary links were consistently larger compared with the analyses involving zero-order correlation estimates. As also shown in Table 12, the range of explained variance differed across domains. Specifically, the *R*<sup>2</sup> was .27 for exploitation, .13 for insecurity, .30 for sociality, .12 for obstruction, .19 for duty, and .16 for exploration.

## Discussion

Individual differences play an important role in all aspects of human life and affect how people perceive, act in, and shape the world. A seminal step for the understanding of individual differences has been the development of models of basic personality structure that are based on lexical studies (De Raad et al., 2014; Goldberg, 1993; Lee & Ashton, 2008; McCrae & Costa, 2008; Saucier, 2009). Such models provide a parsimonious yet comprehensive summary of the large number of (narrow) personality traits within a few basic trait dimensions. Structural models based on lexical studies are purely descriptive (e.g., Fleeson & Jayawickreme, 2015; Jayawickreme, Zachry, & Fleeson, 2019) and place labels on groups of adjectives or items. The actual constructs behind those labels, in contrast, remain somewhat vague until their nomological net is specified empirically, that is, how the conceptualized personality dimensions are related to different outcome criteria of thinking, feeling, and behaving. Stated differently, to

understand the meaning of personality dimensions at the construct level, it needs to be tested how they relate to different outcomes.

We provide the first comprehensive investigation of the nomological net of the HEXACO model of personality (Ashton & Lee, 2007; Ashton, Lee, & De Vries, 2014). We used meta-analytic techniques and linked the HEXACO dimensions to six outcome domains (comprising several criteria grouped into criterion classes), each of which should be related most strongly to a certain HEXACO dimension. We derived outcome domains from the STOA model (De Vries, Tybur, et al., 2016) and described clear and specific hypotheses about which HEXACO dimension must map onto which outcome domain in particular if the underlying conceptualization (theorizing) about the construct behind each HEXACO dimension holds. We also investigated whether the correlation between a HEXACO dimension and its theoretically relevant outcome domain is stronger than (a) the correlation of the HEXACO dimension with the five other outcome domains and (b) the correlations of the other five HEXACO dimensions with the respective outcome domain. Overall, our approach allowed specifying the nomological net of the HEXACO dimensions and the HEXACO model at large in a theory-driven way.

### How well do the HEXACO dimensions map onto outcome domains?

In a nutshell, the pattern of results yielded empirical support for the hypothesized mapping of the HEXACO dimensions onto corresponding outcome domains across

**Table 11.** Meta-Analytic, Disattenuated Correlations Between HEXACO Dimensions and Criterion Classes, Separated for Self-Reported Versus Non-Self-Reported Assessed Criteria

Criterion class and HEXACO dimension	<i>k</i>		Intercept (= SR)		Slope (= NSR)	
	SR	NSR	SE	<i>p</i>	SE	<i>p</i>
Immoral behavior						
<b>Honesty-humility</b>	<b>90</b>	<b>35</b>	<b>-.45</b>	<b>&lt; .01</b>	<b>.21</b>	<b>&lt; .01</b>
Emotionality	66	32	-.11	< .01	.08	.02
Extraversion	60	31	-.04	.03	.06	.11
Agreeableness	67	32	-.25	< .01	.18	< .01
Conscientiousness	69	31	-.31	< .01	.22	< .01
Openness to experience	60	32	-.05	< .01	-.02	.60
Active cooperation						
<b>Honesty-humility</b>	<b>42</b>	<b>33</b>	<b>.36</b>	<b>&lt; .01</b>	<b>-.11</b>	<b>.01</b>
Emotionality	35	28	.18	< .01	-.14	< .01
Extraversion	35	28	.10	< .01	-.12	< .01
Agreeableness	36	29	.21	< .01	-.09	< .01
Conscientiousness	35	28	.14	< .01	-.14	< .01
Openness to experience	35	28	.16	< .01	-.04	.13
Reactive cooperation						
Honesty-humility	12	5	.22	< .01	-.15	.18
Emotionality	9	4	-.13	< .01	.24	.02
Extraversion	9	4	.18	< .01	-.25	.04
<b>Agreeableness</b>	<b>11</b>	<b>4</b>	<b>.37</b>	<b>&lt; .01</b>	<b>-.27</b>	<b>.09</b>
Conscientiousness	11	4	.14	< .01	-.12	.04
Openness to experience	9	4	.11	< .01	-.02	.73
Achievement/performance						
Honesty-humility	22	14	.08	< .10	.02	.74
Emotionality	17	14	.01	.60	.01	.83
Extraversion	17	11	.21	< .01	-.14	.03
Agreeableness	19	11	.09	.03	-.10	< .10
<b>Conscientiousness</b>	<b>21</b>	<b>14</b>	<b>.25</b>	<b>&lt; .01</b>	<b>-.01</b>	<b>.94</b>
Openness to experience	17	12	.18	< .01	-.13	.02

Note: The boldface type indicates HEXACO counterpart dimensions. HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience; SR = self-reported; NSR = non-self-reported.

all analyses: Each dimension particularly mapped onto its specific counterpart outcome domain. That is, honesty-humility mapped onto exploitation, emotionality onto insecurity, extraversion onto sociality, agreeableness onto obstruction, conscientiousness onto duty, and openness onto exploration (see Fig. 2, Table 4). The descriptively largest discrepancy between the primary and a secondary correlation occurred for honesty-humility, which correlated  $|\hat{\rho}| = .30$  weaker with another outcome domain (obstruction and duty) compared with its theoretically compatible outcome domain (exploitation). In turn, the smallest descriptive discrepancy between the primary and a secondary correlation occurred for agreeableness, which correlated  $|\hat{\rho}| = .07$  weaker with another outcome domain (exploitation) compared with its theoretically compatible outcome domain (obstruction).

In a similar vein, each outcome domain correlated most strongly with the theoretically compatible HEXACO dimension. The descriptively largest discrepancy in correlations occurred for sociality, which correlated  $|\hat{\rho}| = .28$  larger with extraversion compared with conscientiousness, the HEXACO dimension showing the second highest correlation with sociality. The descriptively smallest discrepancy occurred for insecurity, which correlated only marginally stronger ( $|\hat{\rho}| = .02$ ) with emotionality (the theoretically compatible HEXACO dimension) than with extraversion; note, however, that the discrepancies between the emotionality-insecurity correlation and the correlations of the other HEXACO dimensions (except extraversion) with insecurity were considerably larger ( $|\hat{\rho}| \geq .14$ ). Across all six outcome domains, the discrepancy between the primary

**Table 12.** Partial Correlations and Zero-Order Correlations of the HEXACO Dimensions With Outcome Domains

	Exploitation		Insecurity		Sociality		Obstruction		Duty		Exploration	
	$\hat{\rho}_{xy.z}$	$\hat{\rho}$										
Honesty-humility	<b>-.37</b>	<b>-.48</b>	.02	.06	.05	.11	.05	.18	.03	.18	.07	.09
Emotionality	-.15	-.15	<b>.23</b>	<b>.27</b>	-.03	-.11	-.06	-.10	-.02	.03	.03	-.01
Extraversion	.03	-.02	-.20	-.25	<b>.46</b>	<b>.53</b>	.05	.14	.06	.19	.10	.15
Agreeableness	-.12	-.26	.07	.00	.06	.18	<b>.26</b>	<b>.33</b>	.07	.15	-.04	.04
Conscientiousness	-.11	-.24	.03	-.02	.11	.25	.04	.11	<b>.35</b>	<b>.41</b>	-.08	.03
Openness to experience	-.03	-.11	-.09	-.13	-.01	.13	.04	.11	.01	.11	<b>.36</b>	<b>.38</b>
<i>R</i> <sup>2</sup>		.27		.13		.30		.12		.19		.16

Note: Partial correlations ( $\hat{\rho}_{xy.z}$ ) refer to the correlation between a HEXACO dimension ( $x$ ) and an outcome domain ( $y$ ) while controlling for the remaining HEXACO dimensions ( $z$ ). See main text for details on how the partial correlations were obtained. The boldface type indicates HEXACO counterpart dimensions. HEXACO = honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience.

correlation and all other nonprimary correlations (5 per outcome domain, thus 30 in total) was  $|\hat{\rho}| = .27$  on average.

Although the results generally support the expected relations of each HEXACO dimension with theoretically relevant (classes and domains of) criteria, we observed some noteworthy differences in the strength of evidence across dimensions. In fact, the mapping between a personality dimension and its theoretically relevant outcome domain was very clear for four relations in particular: honesty-humility–exploitation, extraversion–sociality, conscientiousness–duty, and openness–exploration. By contrast, the mapping of agreeableness onto obstruction and, even more so, of emotionality onto insecurity was comparatively less clear.

With regard to the link between emotionality and insecurity, it is worth noting that there is a strong gender difference in emotionality (women score around 1 SD higher on this dimension; Moshagen et al., 2019). It can thus be plausibly argued that emotionality may not only have direct links to certain outcome criteria but that these may also depend on gender, which, in turn, obscures the mapping between this dimension and insecurity. In addition, it should be noted that the secondary relation of extraversion with insecurity is in the same range as the secondary relations of agreeableness (with exploitation) and conscientiousness (with sociality), whereas the primary relation of emotionality with insecurity is the weakest of all primary relations. Thus, it appears that the mapping of emotionality onto insecurity is less unique because of relatively small relations between emotionality and the outcome criteria but not because of a particularly strong secondary relation.

With regard to the agreeableness–obstruction link, we can only speculate why this mapping turned out less clear. One potential explanation might be that criteria representing obstruction typically involve reactions to

*exploitative* acts, and thus it is difficult to find and assess criteria representing obstruction in isolation without any link to exploitation. Support for this reasoning can be gleamed from the finding that honesty-humility showed the highest secondary relation to obstruction. We therefore suspect that some criteria representing obstruction might be blurred by exploitative aspects to some extent, which renders the agreeableness–obstruction mapping less clear in comparison. However, the finding that the mapping between the HEXACO dimensions (including honesty-humility and agreeableness) and their counterpart domains became clearer once taking the intercorrelations between the dimensions into account (i.e., partial correlations) supports that honesty-humility and agreeableness both encompass a unique set of individual differences, which is relevant for the prediction of a specific outcome domain in particular (exploitation vs. obstruction). These potential explanations notwithstanding, it should be noted that our analyses concerning obstruction were based on the smallest number of studies among all six outcome domains. Consequently, more research is needed to provide further evidence on the double dissociation of honesty-humility and agreeableness, especially because these two dimensions are theoretically and empirically related to each other. That is, they represent complementary aspects of reciprocal altruism (Ashton, Lee, & De Vries, 2014), and they show the strongest intercorrelation among all HEXACO dimensions (Moshagen et al., 2019).

Regarding secondary relations between the HEXACO dimensions and outcome domains, we observed that whenever these were substantial, they almost always followed the a priori expectations (see Fig. 1). Of the 10 expected secondary relations, only the link between conscientiousness and exploration was nonsignificant ( $\hat{\rho} = .03$ ), whereas all other secondary relations were

substantial ( $.11 \leq |\hat{\rho}| \leq .26$ ). Such secondary relations can be expected because the HEXACO dimensions overlap to some degree because variance in criteria may be determined by (interactions between) several person and situation factors and because some criteria across outcome domains arguably overlap.

The secondary relations were much weaker once considering the partial correlations of each HEXACO dimension with the outcome domains controlled for the remaining HEXACO dimensions. Specifically, all secondary relations between a HEXACO dimension and an outcome domain except for extraversion-insecurity were small at best ( $|\hat{\rho}_{xy.z}| \leq .20$  for insecurity;  $|\hat{\rho}_{xy.z}| \leq .15$  for exploitation; and  $|\hat{\rho}_{xy.z}| \leq .11$  for sociality, obstruction, duty, and exploration). Even the  $10$  a priori expected secondary relations diminished to  $|\hat{\rho}_{xy.z}| = .085$  on average. In turn, four of the six HEXACO dimensions—honesty-humility, agreeableness, conscientiousness, and openness—showed maximally small secondary relations in general (all  $|\hat{\rho}_{xy.z}| \leq .12$ ). Overall, the mapping between one HEXACO dimension and one outcome domain was thus even clearer and more consistent once focusing on the unique variance of the personality dimensions.

In conclusion, the expected secondary relations were limited in strength, especially in comparison with the associations of the HEXACO dimensions with their respective counterpart domain. Thus, when considering main effects of basic (HEXACO) personality dimensions on diverse outcomes, variance in criteria seems to be attributable to one class of traits in particular that are summarized in one (lexically derived) personality dimension. That is, whereas the plain meta-analyses provided support for most of the secondary relations that can be expected on a priori theoretical grounds, the partial correlations show that the majority of these can be attributed to the overlap between personality dimensions.

### ***Relations on the level of criterion classes and criteria***

The pattern of correlations between the HEXACO dimensions and the criterion classes and criteria representing the six outcome domains largely mirrored the picture on the domain level. Specifically, honesty-humility was substantially linked to all five criterion classes and all 19 criteria within exploitation ( $.23 \leq |\hat{\rho}| \leq .69$ ). Emotionality was substantially linked to all four criterion classes and six criteria within insecurity ( $.15 \leq |\hat{\rho}| \leq .71$ ), and it was weakly related to only one criterion: job stress ( $\hat{\rho} = .12$ ). Extraversion was substantially linked to all three criterion classes and all five criteria within sociality ( $.26 \leq |\hat{\rho}| \leq .73$ ). Agreeableness was

substantially linked to both criterion classes and both criteria within obstruction ( $.17 \leq |\hat{\rho}| \leq .44$ ). Conscientiousness was substantially linked to three criterion classes and all five criteria within duty ( $.18 \leq |\hat{\rho}| \leq .88$ ), and it was weakly related to only one criterion class: exercising ( $\hat{\rho} = .09$ ). Finally, openness was substantially linked to all four criterion classes and all five criteria within exploration ( $.15 \leq |\hat{\rho}| \leq .48$ ).

Although the HEXACO dimensions were thus substantially linked to most criterion classes and criteria within their respective counterpart outcome domain, it should be noted that the strongest relation of a criterion class or criterion did not always occur with the counterpart HEXACO dimension. Thus, the relatively clear one-to-one mapping between HEXACO dimensions and outcome domains cannot simply be transferred to a more narrow level of criterion classes or criteria—although the mapping *across* criterion classes and criteria within one domain mirrored the hypothesized mapping on the domain level more clearly.

Two additional findings regarding the criterion classes are noteworthy. One concerns the criterion class of environmental behavior within exploitation. Although honesty-humility showed a small- to medium-sized correlation with environmental behavior in line with expectations, the strongest correlation occurred for openness, yielding a large effect size ( $\hat{\rho} = .54$ ). Indeed, environmental attitudes and behavior were conceptualized as instances of nonselfishness and cooperativeness, respectively (Hilbig, Zettler, Moshagen, & Heydasch, 2013), and thus arguably as a matter of honesty-humility in particular. This conceptualization was shown to hold for only a subset of environmental behaviors, whereas others actually require noncooperation (Klein, Hilbig, & Heck, 2017). Moreover, a variety of socio-political attitudes and values beyond cooperativeness were linked to environmentalism (Ojea & Loureiro, 2007; Reese & Kohlmann, 2015; Renger & Reese, 2017). Thus, environmental behavior can fall within the domain of exploitation, but it may just as well represent exploration, alongside other socio-political attitudes and behaviors such as (low) conservatism and prejudice.

Another noteworthy observation is that the criterion class of exercising within the domain of duty did not correlate substantially with conscientiousness. This finding is in contrast to previous meta-analyses linking the Big Five personality dimensions, which contain a very similar representation of conscientiousness as the HEXACO model (Ashton, Lee, & De Vries, 2014), to physical activity (Rhodes & Smith, 2006; Sutin et al., 2016). Note, however, that the current meta-analyses concerning exercising were based on a relatively small number of studies and participants. So, more studies

are needed to clarify the relation of the HEXACO dimensions in general—and conscientiousness in particular—to exercising.

### **Strength of observed effects**

Although our results overall support a theory-consistent mapping of basic (HEXACO) personality dimensions onto specific outcome domains, some thoughts on the observed effect sizes seem in order. In absolute terms—that is, how much variance in outcomes (outcome domains, criterion classes, or criteria) is explained by one HEXACO dimension—most of the observed effects would typically be characterized as medium-sized at best (when referring to Cohen, 1988). For example, considering the (lower-bound) extreme as observed for the mapping of emotionality onto insecurity implies that only around 7% of the variance in insecurity can be attributed to a direct effect of emotionality.

Moreover, results from the moderation analyses for the assessment mode of criteria suggest that (some of) the observed effect sizes may be positively inflated. Specifically, in three of the four moderation analyses, the size of the correlation between a (self-reported) HEXACO dimension and a “counterpart” criterion class dropped substantially when considering non-self-reported criteria. At least to the extent that one would consider observer reports and, in particular, observations of behavior and objective data less biased in terms of the overlap in method variance with personality self-reports, this finding suggests that in absolute terms, the direct effect of any one basic (HEXACO) personality dimension on some outcome is medium-sized at best.

In any case, the results of the moderation analyses substantiate previous calls emphasizing the need to rely more on non-self-report data in (personality) psychology (Baumeister, Vohs, & Funder, 2007; Furr, 2009; King, 2010). Indeed, non-self-report data may often provide more realistic estimates of the strength of effects of personality dimensions on “real-life” outcome criteria. That is, self-reported criteria—similar to self-reports of personality traits—may be prone to socially desirable responding and other response biases (e.g., Dunning, Heath, & Suls, 2004; Robins & John, 1997) and potentially result in overestimation of “true” effect sizes. By implication, this situation will most likely occur when personality traits and outcomes are both assessed via self-reports.

Although these thoughts regarding the observed effect sizes imply rather moderate main effects of basic (HEXACO) personality dimensions on outcomes, Funder and Ozer (2019) recently proposed alternative ways on how to meaningfully interpret effect sizes by referring to either benchmarks (e.g., comparisons with

“all” studies) or consequences (e.g., long-term effects). Indeed, concerning the former (benchmark) interpretation, recent estimates of average effect sizes in (social and personality) psychology research show that (uncorrected) correlations of around  $r = |.20|$  can be considered typical (Gignac & Szodorai, 2016; Richard, Bond, & Stokes-Zoota, 2003). Thus, from a relative perspective, most of the effects observed in our meta-analyses for relations between the HEXACO dimensions and their counterpart domains are arguably substantial. For instance, considering all (uncorrected) relations between the HEXACO dimensions and the respective counterpart criterion classes (e.g., between honesty-humility and the five criterion classes belonging to exploitation) shows that 20 (of 22) relations are  $r \geq |.20|$ . In fact, 10 of these relations are  $r \geq |.30|$ , which implies a comparatively large effect according to the suggestions by Funder and Ozer.

Finally, we want to stress that the effect sizes observed in our meta-analyses must also be considered in relation to the criteria in question. That is, some criteria are inherently more difficult to account for (by basic personality dimensions) than others, and thus the same absolute effect-size estimate may carry very different implications: Some criteria may simply be more proximal to basic personality dimensions in terms of construct content. For instance, it might appear less surprising that personality traits are relatively closely linked to (self-reported) socio-political attitudes (e.g., openness and right-wing authoritarianism), whereas criteria such as actual cheating behavior are arguably more distal. In this regard, it should also be noted that we focused on the influence of broad, *basic* personality dimensions on *aggregate* classes of outcomes, whereas links between more narrow personality aspects (e.g., trait facets) and more specific criteria can generally be expected to be larger (e.g., Ashton, Paunonen, & Lee, 2014; McAbee, Oswald, & Connelly, 2014; Steel, Schmidt, Bosco, & Uggerslev, 2018). Independent of the challenging issue of how to substantively interpret effect sizes, the latter certainly provide a useful basis for a priori power analyses in future studies targeting the effect of basic (HEXACO) personality dimensions on certain criteria.

### **Strengths, limitations, and future research**

The main strength of our investigation is the large-scale approach linking six basic personality dimensions to criteria and criterion classes representing six broad outcome domains. This approach allowed us to provide uncommonly comprehensive support that the nomological net of the HEXACO model matches its theoretical conceptualization very well: On the aggregated domain level—and

also mirrored on the narrower criterion classes and criterion levels—each HEXACO dimension was linked primarily to one set of outcomes reflecting the theoretically implied construct behind each dimension.

Beyond providing support for the one-to-one mapping between HEXACO dimensions and outcome domains, our study extends current knowledge about consistent effects of (basic) personality dimensions on diverse outcome criteria. Specifically, previous meta-analyses already provided substantial support for the predictive validity of personality traits for outcomes such as clinical disorders (e.g., Malouff, Thorsteinsson, & Schutte, 2005), job performance (Chiaburu, Oh, Berry, Li, & Gardner, 2011), parenting (e.g., Prinzie, Stams, Deković, Reijntjes, & Belsky, 2009), political attitudes (e.g., Sibley, Osborne, & Duckitt, 2012), and longevity (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Thus, our investigation complements previous evidence showing that personality traits can account for variance in diverse outcome criteria (e.g., Ozer & Benet-Martinez, 2006), including a recent large-scale replication project suggesting a comparatively high level of replicable trait-outcome associations (Soto, 2019). In other words, relations between personality traits and outcomes might typically be limited in terms of effect sizes, but they appear to be robust in the sense of consistency across virtually all domains of thoughts, feelings, and behavior.

Notwithstanding these advantages, we must acknowledge as a limitation that there might be different ways on how to structure criteria into criterion classes and the latter into domains, respectively. We used the STOA framework (De Vries, Tybur, et al., 2016) as a starting point because it argues that each HEXACO dimension should be theoretically linked to a specific set of (behaviors in) situations. Thus, relying on the STOA framework provided an optimal (theory-driven) testbed for examining the nomological net of the HEXACO dimensions and, in fact, allowed us to derive and test clear *a priori* hypotheses about which HEXACO dimension should be related to which outcome domain in particular. However, other classifications of situations have been introduced (e.g., Brown, Neel, & Sherman, 2015; Kelley et al., 2003; Parrigon, Woo, Tay, & Wang, 2017; Rauthmann et al., 2014; Rauthmann & Horstmann, 2018; Rauthmann & Sherman, 2018; Reis, 2018; Saucier, Bel-Bahar, & Fernandez, 2007; Ten Berge & De Raad, 2001, 2002) and might, for other purposes, also be useful to structure criteria into classes and domains, respectively.

Irrespective of how criteria are grouped into criterion classes and domains, another limitation of our investigation is the nature of the available data linking HEXACO personality dimensions to different criteria. First, the vast majority of studies (95%) assessed the

HEXACO dimensions via self-reports only. Although studies have indicated a relatively strong correspondence between self-report and observer reports of personality traits in general (Connolly, Kavanagh, & Viswesvaran, 2007), and of the HEXACO dimensions in particular (Moshagen et al., 2019), research also indicated some differences in personality judgments according to the rating source (e.g., Connnelly & Ones, 2010; Vazire, 2010). The trait-reputation-identity model (McAbee & Connnelly, 2016), for instance, “separates personality variance into consensus about underlying traits (Trait), unique self-perceptions (Identity), and impressions conveyed to others that are distinct from self-perceptions (Reputation)” (McAbee & Connnelly, 2016, p. 569), which implies that the self and others may have unique insights into one’s personality. Furthermore, some meta-analyses indicated different links between personality traits and criteria depending on the rating sources of both the personality traits and the criterion of interest (e.g., Berry, Carpenter, & Barratt, 2012). Future research might therefore rely more strongly on observer ratings—at least as a complement to self-ratings—when assessing HEXACO trait levels.

Second, as discussed above, self-reports also dominated the assessment of the criteria, and moderation analyses testing the influence of the type of assessment of the criteria on the relation between HEXACO dimensions and counterpart criterion classes showed considerable differences for three of the four criterion classes for which sufficient data were available. Overall, we therefore echo previous calls (e.g., Baumeister et al., 2007; King, 2010) emphasizing the necessity to collect data across different rating sources and assessment modes.

Finally, it was not possible to control for the potential overlap in criteria across criterion classes and outcome domains, simply because only very few studies assessed multiple criteria belonging to different criterion classes or outcome domains. As demonstrated by the partial correlation analyses (taking the HEXACO intercorrelations into account), controlling for the interrelations between criteria as well might have provided interesting additional insights, for example for the distinction between the domains of obstruction as opposed to exploitation (see above). It might thus be promising for future research to consider the overlap of a criterion under scrutiny with other (more or less related) criteria.

## Conclusion

Our large-scale meta-analytic investigation on the links between the HEXACO personality dimensions and six distinct outcome domains specified the nomological net of the HEXACO model. Indeed, it provided strong support for the theoretical conceptualization of each

HEXACO dimension on the construct level: honesty-humility explained variance in diverse criteria representing exploitation, emotionality in criteria representing insecurity, extraversion in criteria representing sociality, agreeableness in criteria representing obstruction, conscientiousness in criteria representing duty, and openness in criteria representing exploration. Moreover, we demonstrated that each HEXACO dimension primarily maps onto one specific outcome domain, which supports the notion that each HEXACO dimension subsumes a unique class of personality traits related to a specific set of criteria. To the best of our knowledge, this investigation represents the most comprehensive empirical attempt to specify the nomological net of the HEXACO model, providing a framework for future research that aims at understanding and investigating individual differences based on these basic, lexically derived personality dimensions.

## Transparency

*Action Editor:* Richard Lucas

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*Author Contributions*

I. Zettler and I. Thielmann contributed equally to this work. All of the authors approved the final manuscript for submission.

### Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

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Additional materials (including the data, complementary analyses, and analysis scripts) are available online at Open Science Framework (OSF) and can be accessed at <https://osf.io/3ykq8>.

## Supplemental Material

Additional supporting information can be found at <http://journals.sagepub.com/doi/suppl/10.1177/1745691619895036>

## Notes

1. For comparisons between the HEXACO model and similar six-factor models of personality see, for example, Thalmayer et al. (2011) and Thielmann, Hilbig, Zettler, and Moshagen (2017).

2. Because the HEXACO-PI-R and its predecessor, the HEXACO Personality Inventory (HEXACO-PI; Lee & Ashton, 2004), are very similar, we exclusively use the abbreviation HEXACO-PI-R in what follows, although we also include studies using the HEXACO-PI in our meta-analyses.

3. Note that there are different five-factor/Big Five models (Digman, 1990; Goldberg, 1990, 1993; McCrae & Costa, 2008), which we treat as largely interchangeable.

4. De Vries, Tybur, et al. (2016) proposed gender as a common example for testing the mapping between emotionality and insecurity. A recent meta-analysis based on the psychometric properties of the HEXACO-PI-R (Moshagen et al., 2019) found large gender differences in emotionality; women scored around 1 SD higher than men.

5. Originally, we aimed to also include studies using the Brief HEXACO Inventory (BHI; De Vries, 2013) or HEXACO scales based on the International Personality Item Pool (IPIP-HEXACO; Ashton et al., 2007). In the process of coding, however, it soon became obvious that the vast majority of relevant studies used the HEXACO-PI-R. We thus decided to neglect findings based on the BHI or the IPIP-HEXACO to obtain more straightforward results that do not bear the danger of biases attributable to outliers produced by other inventories.

6. Sample/data overlap was particularly present for two large samples: a student sample (based on several cohorts) by Ashton and Lee and the Eugene-Springfield Community Sample. We thank Michael Ashton and Kibom Lee for providing us with these data sets for the present meta-analysis, as well as for clarifying sample/data overlap based on these samples.

7. We relied on Cronbach's  $\alpha$  as a measure of reliability because it is routinely reported (unlike, e.g., retest-reliabilities). However, given that Cronbach's  $\alpha$  is a lower-bound estimate of reliability, it is possible that the disattenuated correlations overestimate the true effect sizes.

8. Given the small sample size ( $k = 11$  for SR and  $k = 4$  for NSR), the moderation analysis concerning agreeableness-obstruction was not statistically significant.

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