Development and Validation of an Implicit Test of the HEXACO Honesty-Humility Scale

Yolandi-E Janse van Rensburg

Supervisor: Prof. Dr. Eva Derous
Co-supervisor: Prof. Dr. François De Kock

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Doctor of Psychology

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by Yolandi-Eloise Janse van Rensburg, dd 06/06/2019

Honesty-humility, a personality trait in the self-report HEXACO personality inventory outperforms all the traits (also those in the traditional five-factor model) in predicting integrity-related behavior. However, concerns exist that self-report personality measures are vulnerable to socially desirable responding, self-report bias, faking and being prone to test-takers’ lack of introspective accuracy. Therefore, researchers have started using implicit tests to assess personality, as it is more difficult to fake responses. The main goal of this research was to develop and validate an implicit measure for honesty-humility (IAT-HH). Chapter 2 presents the findings of a literature overview, which determined which types of implicit measures can be distinguished, how implicit constructs are operationalized and how implicit tests could be applied in practice. Prior to validating a test, establishing how the construct (predictor) relates to outcomes (criteria) is essential. Therefore, an empirical study was conducted amongst students from a South African university (N = 308). Chapter 3 reports how explicit honesty-humility and the narrow facets it comprises, relate to academic dishonesty criteria (i.e., counter-academic criteria and collegiate cheating). Results found that fairness predicted counter-academic behavior, whilst greed avoidance predicted cheating. Chapter 4 presents the findings of how the IAT-HH was developed, and the results of a second empirical study, which investigated the construct validity of the IAT-HH. In this study, data were collected amongst students from a Flemish university (N = 178) and convergent and discriminant validity were investigated (with explicit honesty-humility, social desirability, ability to identify criteria and cognitive ability). Chapter 5 reports on the criterion-related validity of the IAT-HH. Overall, results showed limited construct validity and negligible criterion-related and incremental validity and, as such, the implicit measurement of honesty-humility remains an elusive goal. Chapter 6 summarizes the key findings and implications of the research. Finally, recommendations for researchers and practitioners, who wish to employ implicit measures of honesty-humility, are outlined.

1 Although this dissertation reflects the individual work of the PhD candidate, first person pronouns (plural) are used as the standard American Psychological Association (APA) writing convention, specifically in the chapters that were published, or that are in preparation for publication.
CHAPTER 1

INTRODUCTION

Implicit personality assessments are becoming more popular, because their scores may give insight into the underlying motives that drive behavior. Consequently, researchers from all spheres are investigating how implicit tests can be applied to predict important behavioral criteria. The general project goal (as presented in the current dissertation) was to develop and validate an implicit association test for honesty-humility (IAT-HH). This research is novel to the field of testing implicit personality, because no other published literature reports to have developed an IAT based on honesty-humility (deriving from the revised HEXACO personality inventory) which also represent the narrow facets it comprises (i.e., fairness, sincerity, greed avoidance and modesty). As self-report measures of honesty-humility relate to integrity-related behavior, the ultimate objective (as presented in Chapter 5) was to establish whether the IAT-HH could be used to predict integrity-related behavior. The dissertation is introduced (in this chapter) by a discussion of the rationale for developing the IAT-HH, which is founded on four pillars: the background of explicit honesty-humility, general concerns associated with integrity testing, the theoretical framework underlying implicit/explicit measurement and the difference between implicit and explicit measurement. Next, each chapter is briefly introduced. The second chapter presents an overview of implicit tests, outlining which implicit measures can be distinguished and how implicit constructs can be operationalized (Chapter 2). In the third chapter, results of an empirical study are provided to enhance the understanding of how explicit (or self-reported) narrow facets of honesty-humility relate to dishonest criteria (Chapter 3). The next chapter describes the development of the IAT-HH and reports the findings of a second empirical study which was conducted to investigate the construct validity (Chapter 4) as well as criterion-related validity of the IAT-HH (Chapter 5). In the final chapter (Chapter 6) the general findings are summarized and discussed. Finally, ideas are presented on how future researchers and practitioners can employ and further validate implicit measures of honesty-humility.
CHAPTER 1

Introduction

Honesty-humility, a personality trait in the HEXACO model has been receiving increased attention in both academic and organizational settings (De Vries, De Vries, & Born, 2011; De Vries & Van Gelder, 2015; Lee & Ashton, 2004). The reason is researchers have been able to use honesty-humility measures to increase the prediction of counter-productive behavior in the workplace (Lee, Ashton, & De Vries, 2005; Lee, Ashton, & Shin, 2005), counter-academic behavior (De Vries et al., 2011) and cheating amongst university students (Hilbig & Zettler, 2015; Zettler, Hilbig, Moshagen, & De Vries, 2015). In fact, honesty-humility shows a significant, positive relation to that of overt integrity measures (Catano, O'Keefe, Francis, & Owens, 2018) and is therefore said to be the “quintessential basic trait to account for individual differences in ethical behavior” (Hilbig & Zettler, 2015, p. 85). Today, researchers have come to realize that by including honesty-humility in the assessment of personality, it outperforms all HEXACO traits (also the traditional five-factor personality traits) in predicting dishonest behavior (Ashton & Lee, 2007; Pletzer, Bentvelzen, Oostrom, & De Vries, 2019).

However, concerns exist that self-report personality measures are vulnerable to socially desirable responding, self-report bias, faking and being prone to test-takers’ lack of introspective accuracy (Fan et al., 2012; Gawronski & De Houwer, 2011; Schnabel, Asendorpf, & Greenwald, 2008; Steffens & Schulze König, 2006). Hence, developing and validating alternative ways to assess personality, that are less subject to voluntary control and faking, are warranted. One alternative way to obtain measurement outcomes is by means of implicit measures (Perugini & Banse, 2007). Whereas explicit measures refer to deliberate, fully considered, self-report assessments of an attitude, personality traits, or motives, implicit measures are used to assess people’s instinctive performance (e.g., an individual’s instinctive reaction by means of selection or physical responses to latent reaction-timed tasks). When assessing constructs with implicit measures, the researcher must interpret the spontaneous reaction of the test-taker, in order to attain measurement scores, which, in turn, can be interpreted into meaningful results (De Houwer & Moors, 2010; De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009; Gawronski & Bodenhausen, 2006).

However, despite the compelling evidence that honesty-humility is an important predictor of integrity-related behavior, and that implicit tests avoid the many problems of self-report measures, up to now, no implicit measures of honesty-humility have been developed. Given that an implicit test to measure honesty-humility is novel, what is unknown is which type of implicit measure could be the best method to gauge honesty-humility. What also needs
to be established, is how explicit honesty-humility and its narrow facets relate to specific outcomes, given that this knowledge is needed prior to validating a psychometric test (Farr & Tippins, 2013). Finally, whether such an implicit test of honesty-humility is a valid measure, showing construct validity, also needs to be determined. Growing evidence suggests that implicit measures provide insight into underlying motives that may affect behavior (Kurdi et al., 2018). Therefore, a valid implicit measure of honesty-humility should be useful in predicting honesty-related criteria (i.e., criterion-related validity), in the same way that explicit honesty-humility does. Therefore, the main aim of this research was to develop and validate an implicit test to assess honesty-humility (IAT-HH), which can be utilized as a psychological test to predict integrity-related behavior. With this main goal in mind, five broad research objectives were set.

**Main Research Goal and Broad Objectives**

In achieving the main goal of developing and validating the IAT-HH, five key research objectives were set. The first objective was to conduct a comprehensive literature review to establish the most noteworthy implicit measures of personality. Subsequently, the psychometric properties of three widely held implicit tests were evaluated (e.g., how they work, application areas, psychometric properties, perception of fairness and faking potential) to determine whether implicit tests are adequate for quality assessments within organizational settings. A second objective was to gain a deeper understanding of how explicit honesty-humility relates to both general and more specific dishonesty criteria (i.e., cheating and counter-academic behavior), because narrow facets of personality might predict context-specific behavior with higher accuracy, compared to global traits (Soto & John, 2017). The third objective was to develop an implicit association test for honesty-humility, based on the HEXACO model (referred to as the IAT-HH), whilst the fourth objective was to test the general construct validity of the IAT-HH. Finally, the fifth objective was to investigate whether the IAT-HH predicts desirable and undesirable academic criteria in the same way that explicit honesty-humility does (i.e., criterion-related validity).

The study has various potential implications for practice and theory. Should the IAT-HH be found to be a valid measure of honesty-humility, practitioners and researchers might utilize this test to envisage which individuals may be prone to dishonest behavior. Individuals with the potential to engage in deviant behavior could be sensitized about themes related to integrity, morality and ethics, because knowledge about these topics might alter behavior in a desirable way (McCabe, Butterfield, & Trevino, 2012; McCabe, Feghali, & Abdallah, 2008). Especially because dishonest students are more likely to become dishonest employees later in
life, addressing dishonesty already at university level is relevant (Nonis & Swift, 2001). Further, a valid IAT-HH might also be utilized for personality measurement in organizational settings (e.g., for human resource management decisions such as selection, talent management or employee development). Moreover, a valid IAT-HH may overcome the limitations associated with self-report measures (e.g., socially desirable responding), because it is more difficult for test-takers to fake responses. Additionally, because implicit and explicit measures measure different underlying cognition, implicit tests might even enhance the prediction of integrity-related behavior (i.e., incrementally) over and above that of self-report tests of honesty-humility. Furthermore, a valid IAT-HH could potentially give more insight into how implicit personality (when measured indirectly) is different from explicit personality (when assessed with self-report measures), and how these measures differentially predict behavior. Such insight may be valuable to both research and practice, since the relationship between implicit and explicit measures and behavioral criteria is not fully established in literature yet (James et al., 2005; Perugini, Richetin, & Costantini, 2018; Perugini, Richetin, & Zogmaister, 2010).

In the current chapter, the rationale for undertaking the research is first addressed. The idea of developing and validating an implicit association test for honesty-humility (IAT-HH) rests on four theoretical pillars.

**The Importance of Assessing Honesty-Humility with an Implicit Measure**

This chapter reports on four pillars that support the rationale for developing an implicit measure of honesty-humility, subsequently referred to as `implicit honesty-humility`.¹ In doing so, a short background of the personality trait honesty-humility and the HEXACO Personality Inventory (Lee & Ashton, 2004, 2016) is presented. Second, general concerns associated with self-report testing (specifically to predict integrity-related outcomes) are briefly considered. Third, as the broader theoretical framework of this dissertation, dual processing theory is used to integrate implicit and explicit cognition, because both seem important to predict behavior (especially related to integrity). Finally, the differences between implicit versus explicit measurement of psychological constructs are summarized.

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¹ In the current dissertation, the term `implicit honesty-humility` refers to a context where the construct `honesty-humility`, is measured with an implicit association test (i.e., indirect assessment), whereas `explicit honesty-humility` refers to where honesty-humility is assessed with a self-report (i.e., direct assessment) measure. These terms are clarified in section IV - Differentiating between Implicit and Explicit Measurement.
I - The History of Honesty-Humility

Designating personality with five factors has dominated research since the 1980s. However, this five-factor structure of personality was initially derived from psycholexical studies using American English (see Wiggins, 1996 for discussion on Costa and McCrae's Five Factor Model and Goldberg's Big Five). By reviewing psycholexical studies, done in various languages, Ashton and Lee (2001) found that personality structure involved not five, but six dimensions. Lexical studies (i.e., studies of laypersons’ trait vocabularies in different languages) are a source of useful information about cultural differences in the conceptualization of personality (McCrae, Gaines, & Wellington, 2012). By conducting cross-cultural studies in at least twelve highly diverse languages (from different branches of the Indo-European language family, namely Germanic, Romanic, Slavic, but also other languages like Hungarian and Korean), factor analyses made it evident that a comprehensive framework of personality is six-dimensional (Ashton & Lee, 2007; Ashton et al., 2004). Even reanalyzing Goldberg’s original data, a sixth-factor structure of personality was revealed (Ashton, Lee, & Goldberg, 2004). Today, this six-factor construction of personality is known as the revised HEXACO model (Honesty-Humility, Emotionality, eXtraversion, Agreeableness, Conscientiousness, Openness to Experience; Lee & Ashton, 2004, 2016). The most predominant difference between the five-factor structure of personality and the HEXACO model, is the inclusion of honesty-humility.

Honesty-humility, which is associated with integrity-related values, is described using adjectives such as trustworthy, integrity, morality, unassuming, faithful versus deceitful, hypocrisy, sly and pretentiousness and comprises four subscales (Ashton et al., 2004). As illustrated in Table 1.1, two sub-scales suggest honesty (Leone, Desimoni, & Chirumbolo, 2012): being genuine in interpersonal relations (sincerity) and avoiding fraud and corruption (fairness). The other two subscales suggest humility: being uninterested in possessing lavish wealth, luxury goods, and signs of high social status (greed avoidance) and not feeling entitled to any special treatment and being seen as an ordinary person (modesty). Taken together, individuals who have low scores on honesty-humility will flatter others to get what they want, and they tend to break rules for personal profit. These individuals are also motivated by material gain and have a sense of self-importance (Lee & Ashton, 2004).
Table 1.1
Illustration of honesty-humility and definitions of the narrow facets (Lee & Ashton, 2004, p. 334)

<table>
<thead>
<tr>
<th>Elements</th>
<th>Narrow Facets</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honesty</td>
<td>Sincerity</td>
<td>To be genuine in interpersonal relations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low scorers will flatter others or pretend to like them in order to obtain favors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High scorers are unwilling to manipulate others.</td>
</tr>
<tr>
<td>Fairness</td>
<td></td>
<td>To avoid fraud and corruption.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low scorers are willing to gain by cheating or stealing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High scorers are unwilling to take advantage of other individuals or of society at large.</td>
</tr>
<tr>
<td>Humility</td>
<td>Greed avoidance</td>
<td>To be uninterested in possessing lavish wealth, luxury goods, and signs of high social status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low scorers want to enjoy and to display wealth and privilege.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High scorers are not especially motivated by monetary or social-status considerations.</td>
</tr>
<tr>
<td>Modesty</td>
<td></td>
<td>To be modest and unassuming.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low scorers consider themselves as superior and entitled to privileges that others do not have.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High scorers view themselves as ordinary people without any claim to special treatment.</td>
</tr>
</tbody>
</table>

By including honesty-humility in the assessment of personality, this trait outperforms the five-factor personality structure in predicting important workplace behavior (Pletzer et al., 2019), such as delinquency (Ashton & Lee, 2007; Lee & Ashton, 2004) and counter-productive work behavior (Lee et al., 2005). Also, by including honesty-humility in assessments, one may identify individuals who are likely to engage in sexual harassment (Ashton & Lee, 2007), susceptible to organizational politics (Wiltshire, Bourdage, & Lee, 2014; Zettler & Hilbig, 2010), and show anti-social behavior (Lee et al., 2005). Further, honesty-humility incrementally predicts constructs related to low sociability, such as Machiavellianism, psychopathy and narcissism (Ashton, Lee, & Son, 2000; Lee et al., 2013) and positively relates to organizational citizenship behavior and job performance (Coyne, Gentile, Born, Ersoy, & Vakola, 2013; Oh et al., 2014; Ones, Viswesvaran, & Schmidt, 1993). Finally, honesty-humility explains variance in overt integrity tests (Catano et al., 2018; Marcus, Lee, & Ashton, 2007).
In the academic sphere, honesty-humility is useful in predicting counter-academic behavior (e.g., plagiarizing, cheating and tardiness) and academic performance, such as grade point averages (De Vries et al., 2011; Holtrop, Born, De Vries, & De Vries, 2014). Honesty amongst students is relevant, because multi-campus investigations found a significant link between being dishonest as a student and becoming a dishonest employee (Nonis & Swift, 2001). Additionally, students’ university experience may have an enduring effect on personal norms, values and morals later in life (Wangaard, 2016). Therefore, it remains essential that issues, related to dishonesty, be addressed during phases of educational development. Also, by anticipating which students could be more vulnerable to counter-academic behavior, special attention and mentoring could be given to such students, since awareness training could significantly influence students’ moral reasoning and integrity-related behavior (McCabe, Trevino, & Butterfield, 2001; Vandehey, Diekhoff, & LaBeff, 2007).

II - General Concerns Associated with Self-Report Integrity Testing

To understand integrity better and to grasp how this concept is relevant to the current research, it is necessary to mention that two general types of integrity tests exist: overt tests directly ask whether one has ever engaged in specific deviant behavior (e.g., I have never been convicted of a crime). Covert tests are used to assess deviant behavior indirectly by using items or subscales from personality tests, for example I like to take risks (Karren & Zacharias, 2007; Wanek, 1999). Given that the purpose of the covert test is disguised, these tests are expected to be less susceptible to socially desirable responding (Catano et al., 2018). However, two major criticisms are associated with self-report integrity testing (Karren & Zacharias, 2007). The first criticism relates to the tendency of integrity tests to detect false negatives also, namely dishonest applicants who misrepresent themselves as being honest. This is due to deliberate faking, coaching or the retaking of self-report tests (e.g., multiple re-applications for positions after being unsuccessful). Faking on these tests might result in lower criterion-related validities and an increase in decision errors.

2 While integrity refers to “the quality of being honest and having strong moral principles” (Kaiser & Hogan, 2010, p. 217), honesty is “the refusal to pretend that facts of reality are other than what they are” (Becker, 1998, p. 158). Therefore, honesty is a necessary, but not a sufficient condition for integrity. Further, integrity is multi-dimensional and may include various dimensions relevant to certain work environments, work values, customer service, drug avoidance and fraud (De Meijer, Born, Van Zielst, & Van der Molen, 2010). Additionally, it should be noted that honesty-humility could also have been appropriately named “morality, sincerity or integrity”, because the trait captures integrity-related values (Ashton et al., 2004, p. 362). However, this double-barrel term (i.e., honesty-humility) is best suited, given that it encapsulates two elements associated with this personality trait.
The second concern relates to the fact that integrity measures are often criterion-focused. Thus, integrity test items are retained on the basis of predictive relationships with specific criteria, for example absenteeism or theft (Berry, Sackett, & Wiemann, 2007). Therefore, researchers have also recommended considering the construct validity of integrity tests to establish what an overall integrity test score actually measures (Karren & Zacharias, 2007), because including various items to assess multiple traits within integrity tests may result in low internal consistency when facets within the test do not covary. For instance, covert integrity tests may include items of different personality traits such as conscientiousness, agreeableness and emotional stability. Hence, integrity is also referred to as a compound trait (Berry et al., 2007), which raises issues in terms of what integrity tests actually measure (i.e., construct validity).

Contrary, honesty-humility consists of four narrow facets that covary and show good internal consistency (i.e., alpha reliabilities averaging above .70 for the global trait and ranging between .50 to .80 for narrow facets; Lee & Ashton, 2016). Additionally, researchers have found that honesty-humility incrementally predicts counter-productive work behavior (above that of traditional overt integrity tests), showing a medium to strong correlation ($r = -.40$) (Catano et al., 2018; Marcus et al., 2007). Therefore, honesty-humility (which is one coherent construct) might be used as a predictor of integrity-related behavior.

**Using an implicit association test to overcome the challenges of self-report.** By developing an implicit measure of honesty-humility, one might be able to address the two above-mentioned concerns related to self-report integrity testing. First, the potential problem of faking on self-report tests might be diminished by using the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). Researchers have shown that IATs can be used to assess socially sensitive attributes, given that it is more difficult for test-takers to fake compared to self-report measures (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). It is for this reason that the IAT has become very popular in both the research and applied psychological domains. Within the first ten years after the initial publication (Greenwald et al., 1998), the IAT was administered in roughly 300 published studies and cited in over 800 articles (Azar, 2008). In fact, the IAT has been administered over a million times (Blanton, Jaccard, & Burrows, 2015; Friese, Hofmann, & Wänke, 2008; Ledesma et al., 2015).

A personality IAT can be used to assess a personality trait such as extraversion. This is done by taking the difference in response times for pairs of target concepts and attributes that are paired with each other (called the compatible block, e.g., *I make the first move in social*
INTRODUCTION

situations) and the pair of target concepts and attributes that seem incompatible with each other (the incompatible block, e.g., *I enjoy being alone*). For individuals who favor extrovert behavior over introvert behavior, reaction times for the compatible block will be faster as compared to the incompatible block. This is also known as the *IAT-effect*. Faking the IAT-effect requires knowledge of the rationale of the test, following a specific strategy of slowing down on congruent trials and speeding up on incongruent trials (Greenwald et al., 2009; Kim, 2003; Sartori, Agosta, Zogmaister, Ferrara, & Castiello, 2008).

To illustrate that IATs are more difficult to fake, one study (Vecchione, Dentale, Alessandri, & Barbaranelli, 2014) found that participants in high-stake, evaluative testing conditions scored significantly higher on self-report measures of performance-related personality traits, compared to volunteers in a low-stake conditions. In comparing these two groups, there were no significant differences in their IAT personality scores. Therefore, it should be more difficult for dishonest test-takers to fake an IAT measuring honesty-humility, compared to self-report measures. Additionally, various meta-analyses have found that IATs can be applied to predict real-life behavior (Greenwald, Banaji, & Nosek, 2015; Kurdi et al., 2018), and that it is also a valid method to assess personality traits, such as extraversion and agreeableness (Aidman & Carroll, 2015; De Cuyper et al., 2017; Franck, De Raedt, Dereu, & Van den Abbeele, 2007; Gawronski & De Houwer, 2014; Steffens & König, 2006; Wong et al., 2017).

Moreover, the IAT measurement method, also shows good internal consistency, falling in the range of $r = .70$ to $r = .90$ (Gawronski & De Houwer, 2014). Therefore, since both the construct (honesty-humility) and the method (IAT) both show to have good internal consistency and are more difficult to fake (as compared to self-report overt integrity tests), developing an IAT to assess honesty-humility might be a useful starting point to predict integrity-related behavior.

III - Theoretical Framework Underlying Implicit and Explicit Cognition

The dual-process system which underlies implicit and explicit cognition, may aid in the understanding and in the prediction of integrity-related behavior, such as risk-taking or criminal acts (Van Gelder & De Vries, 2014; Van Gelder, De Vries, & Van Der Pligt, 2009). More specifically, researchers have found that integrity-related behavior is not only based on rational theories of morality, but also on snap-judgments and intuition (Dinh & Lord, 2013). In fact, across cognitive and social psychology domains, there is a great amount of research suggesting that reasoning, judgment and even personality emanate from a dual-process system underlying
cognition (Christiansen & Tett, 2013; Ortner & Van de Vijver, 2015). Although this dual-process system has been defined in various ways, in this dissertation, the dual-process system is defined as: “the assumption by many theorists that cognitive tasks evoke two forms of processing that contribute to observed behavior” (Evans & Stanovich, 2013, p. 225). Further, this dual-process system is being acknowledged and researched in a vast array of domains (Christiansen & Tett, 2013). Even though various labels have been associated with the core idea of dual-process(es), these systems are not necessarily identical. Table 1.2 illustrates the theoretical framework underlying the idea of dual process(es). Evans (2008) aimed to align the disconnected literature, by presenting a generic dual-system theory under two main headings: System 1 and System 2.

Table 1.2

<table>
<thead>
<tr>
<th>Labels Associated with the Dual Process(es) Underlying Human Cognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptions associated with the dual-system</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Automatic/controlled</td>
</tr>
<tr>
<td>Implicit/self-attributed motives</td>
</tr>
<tr>
<td>Motivation/opportunity</td>
</tr>
<tr>
<td>Experiential self-theory</td>
</tr>
<tr>
<td>Implicit/explicit</td>
</tr>
<tr>
<td>Affective/cognitive system theory</td>
</tr>
<tr>
<td>System 1/System 2</td>
</tr>
<tr>
<td>Thinking fast/thinking slow</td>
</tr>
<tr>
<td>Impulsive/reflective</td>
</tr>
<tr>
<td>Associative/propositional</td>
</tr>
<tr>
<td>Reflexive/reflective</td>
</tr>
<tr>
<td>Impulse/self-control</td>
</tr>
<tr>
<td>Spontaneous/fully considered cognition</td>
</tr>
</tbody>
</table>

In this dissertation, the idea of one generic version of the dual-process system is not necessarily claimed. However, what is supported is the theoretical idea that human cognition is driven by two processes: implicit cognition, which is rapid, autonomous and assumed to yield default responses; and explicit cognition, which involves higher-order reasoning processes, loading heavily on working memory and supporting hypothetical thinking (Evans & Stanovich, 2013). Further, it is proposed that a dual-process system, irrespective of a given description or definition, underlies behavioral tendencies (McClelland et al., 1989). This framework illustrates that implicit cognition could be described as reflexive or spontaneous activation of
behavior but does not imply being unconscious or unaware of the underlying attributes. Thus, *implicit cognition* requires some degree of introspective awareness, but avoids the direct influence of deliberate processing. While *explicit cognition* refers to self-reported attitudes that are *reflective* or *fully considered attitudes* and activates controlled thoughts about cognition, needs, affect, values, attitudes, and behavior (Hahn, Judd, Hirsh, & Blair, 2014; Leavitt, Fong, & Greenwald, 2011; Ranganath, Smith, & Nosek, 2008).

Furthermore, the two systems (i.e., implicit versus explicit) appear to be distinct, but related through a processes of mutual influence, affecting daily behavior (Vasilopoulos, Siers, & Shaw, 2013). Thus, humans may have different (implicit versus explicit) evaluations toward the same object/attitude, which may be influenced by their cognitive capacity at a given moment (Wilson, Lindsey, & Schooler, 2000). Thus, human behavior is not always rational and initiated by fully-considered decisions alone (Cropanzano & Becker, 2013; Pratt & Crosina, 2016). To illustrate this, a relevant example is provided (Vasilopoulos et al., 2013). A consultant, who has a negative implicit belief about himself, has a dispute with an angry client, who is having a bad day. The consultant perceives the client’s behavior as criticizing his abilities, which leaves him feeling threatened and insecure, and he consequently apologizes profusely to protect his self-esteem. Although the consultant did not do anything wrong, the situation created a high state of arousal, leaving him exposed to the implicit system as the primary driver of his behavior. By rationally evaluating his situation (handled by the explicit system), he might have handled the situation more professionally.

Therefore, implicit cognition may interfere with one’s ability to act in an appropriate way in everyday life (Bing, LeBreton, Davison, Migetz, & James, 2007). Kahneman (2003) observed that human cognition involves both a fast/automatic/implicit and slow/deliberative/explicit knowledge system and that both systems predict behavior. Kahnemann received a Nobel Prize for his work, because his findings provide better insight into understanding the psychology of decision-making. Also, meta-analytic research ($N = 36,071$; Kurdi et al., 2018) revealed that implicit cognition (i.e., aspects of human thought relatively less accessible to conscious awareness) may influence explicit/fully considered cognition and, in turn, predict behavior. One way to gain access to implicit cognition is by using implicit measures to assess various psychological constructs, as discussed in the next section.
IV - Differentiating between Implicit and Explicit Measurement

Explicit cognition is usually assessed using deliberative, fully considered, self-reported evaluations (De Houwer & Moors, 2010; Gawronski & Bodenhausen, 2006), whereas implicit cognition can typically be inferred from people’s performance (i.e., their spontaneous behavior) on implicit tests. In this dissertation, explicit measurement refers to fully considered, self-report assessments, whereas implicit measurement denotes assessing attitude, personality, motives which are inferred from indirectly examining its effect, which is based on spontaneous behavior. Further, direct and indirect measurement processes refer to the complexity of the processes underlying the expression of an attribute measured (De Houwer & Moors, 2010). Direct measurement implies a less complex measuring process, as compared to indirect measurement, where the researcher must first interpret the spontaneous reaction of the test-taker to attain measurement scores, which can be interpreted into meaningful results.

To summarize, given that honesty-humility shows the greatest predictive validity in predicting integrity-related behavior (as compared to other personality traits) and that measuring both implicit and explicit cognitions are important in the assessment of personality and the prediction of behavior, the main goal of this dissertation was to develop and validate an implicit test for honesty-humility. In doing so, several research objectives were set.

Overview of the Chapters

As a basis for this dissertation Chapter 1 (Introduction) provides the context and rationale for conducting the current research reported in this dissertation. This chapter focused on the main goal (i.e., developing and validating an implicit measure of honesty-humility) by highlighting the research objectives presented in each chapter. Although each chapter can be read independently, some overlap may occur in the literature and the theoretical background as the research objectives are linked. In support of achieving the main goal, specific questions are proposed in each chapter. The current chapter addressed:

Research Question 1: Why is the implicit assessment of honesty-humility important?
Chapter 2 (Going implicit: Using implicit measures in organizations) considers empirical evidence to provide insight to practitioners who are considering adopting implicit measures in organizations. In this chapter, the main aims of the research are discussed:

Research Question 2: Which types of implicit measures can be distinguished?
Research Question 3: How are implicit constructs operationalized?
Research Question 4: How can implicit tests be applied in practice?

To organize the literature field, a comprehensive review was done by composing a large-scale taxonomy of implicit measures by integrating available paradigms on implicit measures. Findings presented in Appendix A (the taxonomy of implicit tests grouped according to implicit assessment techniques) were built on the implicit measurement taxonomy presented by Uhlmann et al. (2012). In this taxonomy, implicit measures are clustered into three broader classes (i.e., based on the theoretical frameworks underlying each, namely automaticity, projection, or justification). To illustrate the psychometric properties of implicit measures, one exemplar from each of the broader cluster is selected: The Implicit Association Test (IAT) (based on latent reaction mental association), the Conditional Reasoning Test (CRT) (justification/defense mechanisms by reasoning), and the Picture Story Exercise (PSE) (projection by means of construction). Each exemplar is then evaluated against the following criteria: how each test works, areas of application, psychometric properties (reliability and construct/criterion validity), perceptions of fairness and faking potential.

With better understanding about implicit measures (types that exist and types that are most cited, reliable, valid, easy to develop, administer and score), the IAT was selected as the most appropriate method to assess the construct honesty-humility. However, before developing an IAT to assess honesty-humility, it was also important to understand how honesty-humility predictor measures relate to external integrity-related criteria (i.e., criterion-related validity; Farr & Tippins, 2013).

Therefore, Chapter 3 (Narrow facets of honesty-humility predict collegiate cheating) provides the results how the main predictor (honesty-humility as part of the HEXACO model) and criteria (dishonest behavior) relate (De Vries et al., 2011; Hilbig & Zettler, 2015). Specifically, in the personality literature it is suggested that narrow facets of personality traits may predict context-specific behavior with higher accuracy compared to global traits (Soto &
Therefore, in the light of predictor specificity (i.e., that narrow facets predict criteria with higher accuracy), the chapter addresses:

*Research Question 5:* How does the explicit narrow facets of honesty-humility relate to criteria, namely general counter-academic behavior (which includes several, varied outcomes) and more specific academic dishonesty (i.e., collegiate cheating)?

Against this background, it was decided to develop an Implicit Association Test (i.e., IAT as the method) to capture honesty-humility (the construct), as reported in Chapter 4 (*Development and construct validation of the implicit association test for honesty-humility*). Two research objectives are addressed in this chapter. First, this chapter describes how the IAT-HH was developed (e.g., how stimuli were selected and pilot tested) and second, reports on the findings related to construct validity issues:

*Research Question 6:* What does the IAT-HH measure (determining the construct validity of the IAT-HH)?

In doing so, the convergent and discriminant validity is discussed (with explicit honesty-humility, social desirability, ability to identify criteria, and cognitive ability). By building on the findings of a subsequent empirical study, the research continued in order to establish whether the IAT-HH could predict relevant dishonesty criteria. Thus, Chapter 5 (*Criterion-related validity of an implicit association test for honesty-humility*) reports on:

*Research Question 7:* Can the IAT-HH predict desirable academic criteria (grade point average scores) and undesirable academic criteria (i.e., counter-academic behavior, objective cheating and self-confessed cheating) in the same way as explicit honesty-humility does?

Based on the research questions addressed in each of the chapters, Chapter 6 (*Summary and general discussion*) provides a broad research overview of lessons learned and the way forward. This chapter summarizes the main findings, study limitations, and practical implications. Finally, based on the knowledge gained during developing and validating the IAT-HH during this project, we conclude our research by addressing:
Research Question 8: How should future researchers and practitioners proceed in assessing implicit honesty-humility?

Figure 1.1 provides a graphical illustration of each chapter, how each study was conducted, where data were collected, and a timeline presenting the order in which measures were administered.\(^3\)

\(^3\) In conducting this research over the past 58 months, data were collected in South Africa and Belgium by using Qualtrics (2018).
Summary and discussion (Chapter 6): Lessons learned, theoretical and practical implications and future research

Data from University of Cape Town, South Africa

Data from Ghent University, Belgium

Empirical study I (Chapter 3):
How does explicit broad and narrow facets of honesty-humility relate to criteria?

Pre-pilot item-sensitivity review

\[ N = 16 \]

IAT-HH
Explicit honesty-humility
Cheating Task

(Cross-sectional Study)

\[ N = 304 \]

Time 1
Explicit honesty-humility
Counter-academic behavior
Self-confessed cheating

Pilot study to test for valence

\[ N = 35 \]

Time 2
(five weeks later)

IAT-HH
Expanding Task

Developing the IAT-HH

Pre-pilot study

\[ N = 7 \]

Time 1
IAT-HH

Empirical study II (Chapter 4):
Developing the IAT-HH and determining what the IAT-HH measures (i.e., construct validity)

Time 2
(five weeks later)

IAT-HH
Explicit HH
Cheating task (objective)

Empirical study II cont. (Chapter 5):
Can the IAT-HH predict (counter-) academic criteria (i.e., criterion-related validity)?

Time 3
(two weeks later)

Counter-academic behavior
Cheating (self-confessed)

Empirical Study, \( N = 178 \)

Time 4
(eight weeks later)

Grade point average (GPA)

Ability To Identify Criteria (ATIC) Question 1-6

Ability To Identify Criteria (ATIC) Question 7

Literature overview (Chapter 2): Which implicit tests exist, how do they operationalize constructs and how can they be applied in practice?

Introduction (Chapter 1): Why should we develop an implicit test for honesty-humility? The foundation on which the main project goal rests

**Figure 1.1.** Schematic illustration of the main objective in each chapter and how data were collected for each study in the dissertation
Implicit tests are increasingly being used and discussed in the field of industrial/organizational psychology. Despite their growing popularity, little is known about the types of implicit tests that exist, how they operationalize constructs, and how to improve their usefulness to predict relevant organizational behavior. We provide a timely contribution to practitioners and scholars who are considering adopting implicit measures in their organizations. By drawing on dual-processing theory, we reviewed the most prevalent implicit tests (Implicit Association Test [IAT], Picture Story Exercise [PSE], and Conditional Reasoning Test [CRT]), and evaluated each against the following criteria: how they work, application areas, psychometric properties, perceptions of fairness, and faking potential. Based on prior empirical evidence, we provide ideas to improve these measures, how they may be applied in practice, and which avenues deserve future research. Together, these recommendations may enhance the value of implicit measures in organizations.

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Introduction

Implicit measures have received much attention in the recent scientific and popular press (e.g., Sackett, Lievens, Van Iddekinge, & Kuncel, 2017; Yen, Durrheim, & Tafarodi, 2018). Especially over the past two decades, active research, increasing publications, and interdisciplinary cross-talk on implicit measures have evoked scholarly conversations about the usefulness of such measures (Zedeck, 2017). However, despite their increasing popularity, questions remain about various aspects of implicit measures, such as why implicit assessment is important, the types of implicit measures that can be distinguished, which constructs are operationalized with implicit tests, and how these can be applied in practice. Each of these aspects are introduced briefly and explained in the remainder of this article.

Therefore, this article is focused on making implicit measures more explicit, especially towards organizational researchers and practitioners. First, by looking at why implicit assessment might be important, we start with outlining the theoretical foundations of implicit assessments, given that dual-processing theory has the potential to provide novel insight into issues and practices related to organizational behavior (OB). Second, our study shed some light on which type of implicit tests can be distinguished, and how constructs are operationalized. By giving an integrated overview of the current available paradigms on implicit measures, we broaden the taxonomy presented by Uhlmann et al. (2012). Specifically, whereas the classification of Uhlmann et al. (2012) addresses which specific implicit content is tapped, our taxonomy adds to how implicit content is captured. Additionally, we add 26 measures to the implicit toolbox. We then illustrate and discuss in depth prevalent exemplars, namely the Implicit Association Test (IAT), the Picture Story Exercise (PSE), and the Conditional Reasoning Test (CRT). Third, for operational utility in organizations, implicit measures must meet stringent criteria (e.g., reliability, validity, fairness; American Educational Research Association [AERA], American Psychological Association [APA] & National Council on Measurement in Education [NCME]; 2014; Evers, Sijtsma, Lucassen, & Meijer, 2010) just like any other traditional assessment measures (e.g., cognitive ability tests, interviews). Therefore, to assess whether implicit measures show to be reliable and valid, we considered each exemplar against the following criteria that are also used by the COTAN (Commissie Testaangelegenheden Nederland): psychometric properties (reliability, construct and criterion validity), perceptions of fairness and procedural justice, and faking potential. By weighing the evidence on each of these criteria, our study provides a timely contribution to practitioners who are considering adopting implicit measures in their organizations. Finally, we provide
recommendations for practice and future research on how to improve validation and future utilization of implicit measures in organizations.

**Dual-Processing and Implicit Measures**

Across cognitive and social psychology domains, there is a vast amount of research suggesting that social cognition, reasoning, judgment and even personality emanate from a dual process. For instance, psychologists have relied on the dual-process system for a better understanding of personality (affective/cognitive system theory; Mischel & Shoda, 1995) and decision-making (thinking fast/thinking slow; Kahneman, 2003). Dual-processing refers to “the assumption by many theorists that cognitive tasks evoke two forms of processing that contribute to observed behavior” (Evans & Stanovich, 2013, p. 225). Today, growing evidence suggests that both a spontaneous (implicit) and a fully considered (explicit) cognition influence organizational behavior (Pratt & Crosina, 2016). Implicit cognition specifically refers to the spontaneous activation of behavior, whilst explicit cognition denotes fully considered, controlled thoughts, which require introspective awareness about one’s motives and attitudes. In particular, implicit measurement denotes assessing attitude, personality and motives, which are inferred from indirectly examining results, based on spontaneous behavior, whereas explicit measurement refers to fully considered, self-report assessments (De Houwer & Moors, 2010). Meta-analytic research ($N = 36,071$; Kurdi et al. 2018) found that implicit cognition may influence fully considered cognition (explicit) and, in turn, predict behavior. As such, insight into both implicit and explicit cognition may be essential to understand or predict work-related behavior fully (Christiansen & Tett, 2013; Ortner & Van de Vijver, 2015). In fact, implicit measures have been applied to gain deeper insight into health-related behavior, consumer choices, political preferences, pathology and many other areas of psychology to evaluate attitudes, personality, stereotypes and prejudices (Hahn & Gawronski, 2015; Uhlmann et al., 2012). This explains why practitioners and researchers have shown interest in the potential usefulness of implicit measures in organizations (Lievens & De Soete, 2011). Next, we explain what implicit measures are and what they measure.

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2 Evans (2008) presents a generic dual-system theory under two main headings: System 1 (i.e., implicit, impulsive, reflexive, spontaneous) and System 2 (i.e., explicit, reflective, self-controlled, fully considered).
Implicit Measures: Categories, Exemplars, and Application

Overall, implicit measures can be categorized according to three broad psychological assessment techniques, namely evaluation by means of automaticity, projection or justification. Whereas Appendix A outlines a taxonomy of implicit measures, listing 26 automaticity-, 20 projective- and 3 justification-based tests, below we summarize the theoretical origins underlying each class.

Automaticity-Based Measures

Automaticity-based measures might be defined as (computerized) tests, which are used to assess respondents’ instinctive reaction (by means of selection or physical responses to latent reaction-timed tasks) towards either multiple concepts (connected as part of a cognitive schema) or individual concepts to establish how target concepts are linked in stored memory (De Houwer et al., 2009). According to Gawronski and De Houwer (2014), implicit tests based on automaticity originated from the theoretical work of Fazio, Sanbonmatsu, Powell, and Kardes (1986) and Gaertner and McLaughlin (1983) who studied the automatic activation of attitudes and stereotypes. Automaticity-based measures typically assess the automatic activation of attitudes, stereotypes, preferences, and can be subdivided into two types, based on the specific implicit content they capture, namely association-based measures (like the implicit association test; Greenwald et al., 1998) and accessibility-based measures (like the Modified Stroop Task; Mathews & MacLeod, 1985). Association-based measures refer to implicit tests that determine whether multiple target concepts are linked (e.g., for detecting racial bias towards White versus Black), whereas accessibility-based measures refer to implicit tests that assess spontaneously activated single-target concepts (e.g., detecting state anxiety). Of all automaticity-based tests, the Implicit Association Test (IAT) is by far the most popular (Gawronski & De Houwer, 2014), as judged by the number of citations.

The IAT has been used to measure various personality traits (De Cuyper et al., 2017), different forms of stereotypes (Jones et al., 2017) and work-related outcomes, such as driving or flight behavior (Bıçaksız, Harma, Doğruyol, Lajunen, & Özkan, 2018). For example, the IAT-racial prejudice (Greenwald et al., 1998) is typically used to assess people’s racial prejudice by the association of two contrasting target concepts (e.g., pictures of White/Black faces) with an attribute (e.g., pleasant versus unpleasant words). In short, racial prejudice can be detected through the difference in response time for pairs of target concepts and attributes that are paired with each other. A so-called ‘compatible block’ is found where pictures of White faces are paired with positive words such as pleasant, and Black faces are paired with negative
words, such as unpleasant, or in the case of a pair of target concepts and attributes that seem incompatible with each other. This is the so-called ‘incompatible block’ of stimuli, such as when pictures of White faces are paired with negative words, such as unpleasant and Black faces are paired with positive words, such as pleasant. For individuals who favor White people over Black people, reaction times for the compatible block will be faster compared to the incompatible block, also known as the ‘IAT-effect’ (Greenwald et al. 1998). Thus, the IAT-effect represents prejudice attitudes towards Black persons. Table 2.1 presents the IAT racial prejudice in a schematic way.

Table 2.1

<table>
<thead>
<tr>
<th>Sequence (Steps)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task description</strong></td>
<td>Initial target-concept discrimination</td>
<td>Associated attribute discrimination</td>
<td>Initial combined task</td>
<td>Reversed target-concept discrimination</td>
<td>Reversed combined task</td>
</tr>
<tr>
<td><strong>Task instructions</strong></td>
<td>• BLACK • WHITE •</td>
<td>• Pleasant Unpleasant •</td>
<td>• BLACK • pleasant WHITE • Unpleasant •</td>
<td>BLACK • • WHITE •</td>
<td>BLACK • • WHITE • unpleasant •</td>
</tr>
<tr>
<td><strong>Sample stimuli</strong></td>
<td>MEREDITH o LATONYA o</td>
<td>o lucky o honor</td>
<td>o JASMINE o pleasure</td>
<td>o COURTNEY oSTEPHANIE LATISHA o</td>
<td>o peace</td>
</tr>
<tr>
<td></td>
<td>o SHAVONN HEATHER o</td>
<td>poison o grief o</td>
<td>PEGGY o evil o</td>
<td>SHEREEN o SUE-ELLEN o LAUREN</td>
<td>filth o</td>
</tr>
<tr>
<td></td>
<td>o TASHIKA KATIE o</td>
<td>o gift disaster o</td>
<td>COLLEEN o miracle</td>
<td>TIA o SHARISE o SHANISE o</td>
<td>o rainbow</td>
</tr>
<tr>
<td></td>
<td>BETSY o EBONY o</td>
<td>o happy hatred o</td>
<td>o TEMEKA bomb o</td>
<td>o MEGAN o NICHELLE o</td>
<td>accident o NANCY</td>
</tr>
<tr>
<td><strong>Blocks and trials</strong></td>
<td>Practice block (20 trials)</td>
<td>Practice block (20 trials)</td>
<td>Practice block (20 trials)</td>
<td>Practice block (20 trials)</td>
<td>Practice block (20 trials)</td>
</tr>
<tr>
<td></td>
<td>Test block (40 trials)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** Categories for each of these discriminations are assigned to a left or right response key, indicated by the black circles. Stimuli for the tasks are indicated with correct responses, indicated as open circles.
The IAT procedure (Greenwald et al., 1998) is best applied in organizational settings to measure constructs, such as attitudes (e.g., racial, gender, or weight prejudice; Agerström & Rooth, 2011), personality traits (e.g., assessing the Big Five traits, shyness, aggression, altruism; De Cuyper et al., 2017; Vecchione et al., 2017), and achievement orientation (Dietl, Meurs, & Blickle, 2017). IATs comprise both pictorial and textual stimuli (Nosek et al., 2007), which are easily changed. The typical IAT procedure consists of five sequential steps, in which 180 trials are presented in seven blocks (five practice blocks consisting of 20 trials each and two test blocks with 40 trials each). IATs are not specifically timed; however, data of respondents with 10% reaction time faster than 300 ms and fewer than 160 completed trials are considered erroneous and should not be included for interpretation. Furthermore, IATs can be administered successfully in a laboratory setting or online (Hilbig, 2015) – both as a computerized or pencil-and-paper test (Lemm, Lane, Sattler, Khan, & Nosek, 2008). Furthermore, Gawronski and De Houwer (2014) recommend easy, readily available instructions about IATs (Sekaquaptewa, Vargas, & Von Hippel, 2010). Examples can be obtained easily online (e.g., at http://www.millisecond.com/download/library/iat or http://www.projectimplicit.net) and the way to score the IAT is thoroughly explained in Greenwald, Nosek, and Banaji (2003).

Projection-Based Measures

Implicit cognition can also be assessed by means of projection-based measures, which might be defined as tests that require respondents to generate responses by using association, construction, completing, arrangement and expression, which reveal aspects of their personality by disambiguating unstructured test stimuli (Lilienfeld, Wood, & Garb, 2000). The development of projective measures can be traced back to the psychoanalytic theory of Sigmund Freud (Uhlmann et al., 2012). Projective techniques, originally developed for clinical screening, gauge implicit cognition by how respondents describe graphic stimuli presented to them, and are categorized according to five types, depending on how implicit content is captured (Lindzey, 1959): creating a story (construction), responding with the first word that comes to mind (association), arranging stimuli (arrangement), completing unfinished words or sentences (completion), or expressing oneself.

According to Carter, Daniels, and Zickar (2013), Thematic Apperception Tests (TAT; Morgan & Murray, 1935) are mostly used in organizational settings. What was originally termed ‘the TAT’ was later (synonymously) referred to as the ‘Picture Story Exercise’ (PSE) (Chasiotis, 2015; Slabbinck et al. 2018). Although there are various construction-type tests (as
seen in Appendix A), we will explain the PSE (McClelland et al., 1989; Schultheiss & Pang, 2007), which is said to be the oldest, most valid and most popular approach to assess implicit motives, such as achievement orientation, need for power, or fear of failure (Schüler, Brandstätter, Wegner, & Baumann, 2015).

The PSE is founded on the motive theory of Morgan and Murray (1935), and is based on the psychoanalytic principle of projection (simply stated as the cognitive bias of seeing one’s own qualities in others; Baumeister, Dale, & Sommer, 1998). Respondents view motivationally arousing images, displaying people in various social situations, and then have to write stories (unrelated to themselves) about the pictorial stimuli (Schüler et al., 2015). Trained psychologists then use the empirically derived, psychometrically validated, running text scoring manual (Winter, 1994) to evaluate responses.

In the instructions, there are some guiding questions, for example:

- a) What is happening?
- b) Who are the people?
- c) What happened before?
- d) What are the people thinking about and feeling?
- e) What do they want?
- f) What will happen next?

However, these questions only guide the test-taker to invent his or her own story and the test-taker does not have to answer the questions specifically. Test-takers should write whatever story comes to their mind in the space provided.

Figure 2.1. Example of a Picture Story Exercise Image to assess the Need for Power (Schüler et al., 2015)

Figure 2.1 illustrates an example of the PSE, which is typically used to capture individuals’ implicit needs (e.g., achievement, power, affiliation, fear; Hofer & Busch, 2011), and may affect long-term organizational outcomes, such as wellbeing (McClelland et al., 1989). PSEs normally consist of four to eight pictures, because too few pictures may result in reduced variance and too many pictures may decrease test validity due to fatigue (Schultheiss & Pang, 2007). Each picture is presented for 10–15 seconds, and respondents then construct imaginative stories with some guiding questions included in the instructions. Respondents
usually have five minutes to write one story; however, test time could be adjusted or untimed. Each motive (e.g., achievement, power, affiliation) has a different coding system, with differing subcategories. Typically, experienced coders need about 16–40 hours to score a six-image PSE for 80 people (Schultheiss & Pang, 2007).

Step-by-step, detailed instructions on how to conduct and score a PSE can be found in numerous sources (Smith, 1992; Winter, 1994). The PSE can be administered both online (see http://www.millisecond.com/download/library/picturestoryexercise) or in a laboratory setting (Bernecker & Job, 2010). The computerized PSE shows advantages over the pencil-and-paper format: instructions are standardized, respondents complete the test on their own, which minimizes experimenter effects, and typed stories tend to be longer by more than one third; thus, providing more scorable information. Scoring time is also considerably reduced, because transcribing for electronic analyses and archiving is eliminated (Schultheiss, Liening, & Schad, 2008).

**Justification-Based Measures**

Finally, implicit cognition can also be captured through justification-based measures, which can be defined as tests that use scenarios or situations to assess what a test respondent would think is a reasonable way to act. Implicit tests, using justification as means of assessment, work on the assumption that individuals will project their own worldview on situations offered, by making judgments that support it. Rationalization, which stems from psychoanalytic theory, refers to justification mechanisms (a specific facet of the defense mechanisms), which implicitly shape one’s judgment towards the outer world, justifying behavior by substituting acceptable reasons for real motives (such as aggression, achievement orientation, fear of failure, etc.). Thus, mechanisms of justification are used to enhance the rational appeal of behavior, for example aggressive people might express a desire to inflict harm on others (James, McIntyre, Glisson, Bowler, & Mitchell, 2004).

The Conditional Reasoning Test (CRT; James, 1998) is considered “the groundbreaking method of implicit personality assessment by the American Psychological Association” (Galić, 2016, p. 24). Various researchers have pointed out that the CRT shows the most potential for measuring organization-related criteria, because it is scored quantitatively and thus considered to be more objective than other related measures (Christiansen & Tett, 2013; Uhlmann et al., 2012). The CRT is based on the notion that people with a strong desire to engage in behavior will develop biased ways of reasoning to make the
behavior seem rational (e.g., individuals with underlying aggression will find ways to justify why they engage in counter-productive behavior at work).

The Conditional Reasoning Test (CRT; James, 1998) is presented as a test of logical reasoning ability, consisting of various inductive reasoning problems to be solved. However, these measures tap into respondents’ underlying needs and motives, such as achievement motivation or underlying aggression. Building on the theory of McClelland et al. (1989), CRTs are based on the idea that the cognitive reasoning process may reflect individuals’ underlying psychological motives. Motives (such as achievement) are further considered to be linked to different cognitive biases, called “justification mechanisms” (James et al., 2004). Justification mechanisms influence one’s reasoning and enhance the rational appeal of behaving in a manner consistent with latent motives (James & LeBreton, 2012). Therefore, CRTs use reasoning problems to elicit implicit biases that justify a certain behavior (like counter-productive work behavior; James et al., 2004). The term ‘conditional’ refers to the reasoning that is dependent on the latent motive of the individual and how he or she justifies behavior. An aggressive versus a socially adaptive respondent will differ in how he or she judges behavior to be rational; thus, selecting a response most suited in justifying what he or she thinks is reasonable behavior. Although the CRT can be used to capture various constructs, the most published research is on the CRT for aggression (CRT-A test manual; James & McIntyre, 2000), and this measure consequently best illustrates how defense mechanisms function, as illustrated below.

Table 2.2

**Illustrative Conditioning Reasoning Problem for Measuring Aggression in the Conditional Reasoning Test (James & McIntyre, 2000)**

<table>
<thead>
<tr>
<th>Question: The old saying, an eye for an eye, means that if someone hurts you, then you should hurt that person back. If you are hit, then you should hit back. If someone burns your house, then you should burn that person’s house. Which of the following is the biggest problem with the eye for an eye plan?</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) people have to wait until they are attacked before they can strike (aggressive response)</td>
</tr>
<tr>
<td>b) it offers no way to settle a conflict in a friendly manner (non-aggressive response)</td>
</tr>
<tr>
<td>c) it tells people to turn the other cheek (distractor option)</td>
</tr>
<tr>
<td>d) it can be used only at certain times of the year (distractor option)</td>
</tr>
</tbody>
</table>

The CRT is best used in organizations to measure aggression (Galić, 2016), achievement orientation and creativity (Schoen, Bowler, & Schilpzand, 2018), which determine work-related behavior, such as counter-productivity and job performance. In terms of the CRT test material, these tests are easily administered in pencil-and-paper or
computerized format (James & LeBreton, 2012). The CRT-Aggression, for instance, has 25 items, with four response options (as illustrated in Table 2.2), and has a 25-minute time limit. The first three test items are actual inductive reasoning problems, influencing respondents to believe that it is a test of logical reasoning. The remaining 22 conditional reasoning items are designed to reveal justification mechanisms associated with aggression. Within the response options, one justification mechanism is related to possible aggressive behavior (scored +1) and one to a non-aggressive response (based on prosocial counterparts to aggression, scored -1). Moreover, there are also two illogical distractor options (each scored 0), which add to the face validity of the CRT. Scores are added, ranging between 0 and 22, where respondents scoring high (≥ 8) are likely to act aggressively, because they have mechanisms in place to justify aggressive behavior (James & LeBreton, 2010). When participants select five or more illogical options, their score is considered invalid (James & McIntyre, 2000).

**Evaluating Implicit Measures**

An important matter to consider is whether implicit measures can be securely incorporated into organizational settings (Christiansen & Tett, 2013). One way to address this is to appraise the psychometric properties of implicit measures to see whether they adhere to the minimum measurement requirements (e.g., the Dutch Rating System for quality assessments; Evers, 2001). Thus, as a case in standing, we assessed the reliability, construct and criterion validity, perceptions of fairness, procedural justice and faking potential of the IAT, PSE and CRT.

**Reliability and Validity**

First, when determining construct validity (i.e., correlating implicit and explicit test scores from measures assessing the same construct), one would expect these scores to be highly related. However, this is not the case for implicit measures, since meta-analyses show that, on average, implicit–explicit counterparts correlate close to $r = .25$ for automaticity-based tests (Greenwald et al., 2015), $\rho = .13$ for projective-based tests (Köllner & Schultheiss, 2014), while justification-based tests rarely exceed $r = .30$ (James & McIntyre, 2000). This small to moderate implicit–explicit intercorrelation paradox commonly found is also referred to as the ‘heteromethod convergence problem’ (Bornstein, 2002, p. 48). Some researchers (e.g., McClelland et al., 1989; Nosek & Smyth, 2007) are of the opinion that implicit and explicit cognitions stem from different underlying cognitive processes and that self-report measures are not the ‘golden standard’ to determine the construct validity of implicit measures (Carter et al.,
In Table 2.3, we provide general reliability and validity estimates of the IAT, PSE and CRT, which might be compared to the standard reliability and validity estimates that are deemed adequate (i.e., according to the Dutch Rating System for quality assessment; Evers, Lucassen, Meijer, & Sijtsma, 2009; Evers et al., 2010).

It is, however, remarkable that, although some reliability and validity estimates of implicit measures do not conform to the required standards, as stipulated by the Dutch Rating System, there is adequate evidence of criterion-related validity for automaticity-, projective- and justification-based tests respectively \((r \geq .20\) as seen in Table 2.3). Showing adequate criterion-related validity, whilst still determining construct validity, is not unusual for novel assessment techniques, since this seems to be part of the natural evolution of assessment research (e.g., situational judgment test; Whetzel & Reeder, 2016). Granting that some aspects of reliability and validity of implicit measures remain disconcerting (i.e., evaluated against acceptable estimates presented in Table 2.3), current validation processes need improvement (Perugini et al., 2018).
Table 2.3  
*Psychometric Properties of the IAT, PSE, CRT Evaluated Against the Criteria of Being Adequate/Acceptable According to the Dutch Rating System*  
*(Evers et al., 2009; Evers et al., 2010)*

<table>
<thead>
<tr>
<th>Properties of reliability/validity (acceptable estimates)</th>
<th><em>IAT</em></th>
<th><em>PSE</em></th>
<th><em>CRT</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Consistency</td>
<td>(r = .70) to (.90) (Gawronski &amp; De Houwer, 2014).</td>
<td>(r = .10) and (.40) (\text{However, internal consistency is not adequate to determine reliability (Lang, 2014).})</td>
<td>(r = .76) (\text{(James et al., 2004).})</td>
</tr>
<tr>
<td>Interrater Reliability</td>
<td>Not applicable</td>
<td>(r = .70) to (.87) (\text{(Schüler et al., 2015; Schultheiss et al., 2008).})</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
| Retest Reliability                                         | \(r = .54\) \(\text{(Gawronski, Morrison, Phillips, & Galdi, 2017).}\) | Measured after \(a\) day, \(r = .70\)  
\(a\) week, \(r = .60\)  
\(a\) month, \(r = .52\)  
\(a\) one year, \(r = .37\) \(\text{(Schultheiss & Pang, 2007).}\) | \(r = .82\) \(\text{Hybrid alternative form reliability (James et al., 2005).}\) |
| Convergent Validity                                        | \(r = .17\) to \(.48\) \(\text{Depending on criterion measured (Bar-Anan & Nosek, 2014; Greenwald et al., 2009).}\) | Often low or even insignificant \(\text{(Schüler et al., 2015).}\)  
\(\text{Meta-analyses findings for motives on affiliation:} \rho = .12, \text{achievement} \rho = .14, \text{power} \rho = .04 \text{and for the overall relationship} \rho = .13 \text{ (Köllner & Schultheiss, 2014).}\) | Often unrelated and rarely exceeds \(r = .3\) \(\text{(Galić, Scherer, & LeBreton, 2014; James & LeBreton, 2012; James & McIntyre, 2000).}\) |
| Criterion-Related Validity                                 | Meta-analyses: findings for inter-group behavior range from \(r = .02\) to \(.37\) \(\text{(Kurdi et al., 2018).}\) | Meta-analyses: Achievement orientation predicts behavior \(\text{(i.e., entrepreneurial career),} \ r = .20 \text{ (Collins, Hanges, & Locke, 2004).}\) | \(r = .26\) \(\text{Meta-analysis CRT-}\)  
\(\text{Aggression predict counter-productive work behavior}\) |
### Properties of reliability/validity

<table>
<thead>
<tr>
<th></th>
<th>IAT</th>
<th>PSE</th>
<th>CRT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meta-analyses: Personality (Big Five Traits, shyness, aggression, altruism)</strong> range from $r = .13$ to $.25$ (De Cuyper et al., 2017).</td>
<td>(Berry, Sackett, &amp; Tobares, 2010).</td>
<td>**Meta-analysis: IAT scores associated with opposition to diversity policies, IAT measures were associated with opposition to diversity policies ($\bar{\rho} = .20$) [95% CI = .07, .22] (Jones et al., 2017).</td>
<td><strong>However, after controlling for publication bias, estimates might be adjusted downward, $r = .17$ (Banks, Kepes, &amp; McDaniel, 2012).</strong></td>
</tr>
<tr>
<td><strong>Meta-analyses: Black-White interracial stereotypes average around $r = .20$, predicting 4% of variance in discrimination-relevant criteria</strong></td>
<td>(Greenwald et al., 2015).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fairness Perceptions

In deciding whether to utilize tests for organizational practices, the way test-takers perceive these tests (i.e., showing fairness and procedural justice) is important, given that test-taker reactions have considerable organizational consequences (e.g., turnover, test performance, perception of organizational attractiveness; McCarthy et al., 2017). When participants were asked whether the automaticity-based IAT (developed to predict training skills) could be used as a test for hiring or promoting individuals, participants were of the opinion that the IAT shows a lack of procedural justice (Wright & Meade, 2011).

In terms of projective tests, the pictures used in exercises might elicit different motives for respondents from different cultural, gender or educational backgrounds (Drescher & Schultheiss, 2016; Runge, Lang, Chasiotis, & Hofer, 2018). The lack of face validity, potential cultural biases, and possible adverse impact may lead to a decreased acceptance of these assessment measures by test-takers (e.g., job applicants). Additionally, individuals may also respond defensively towards implicit score feedback (e.g., implying prejudice), because people generally believe that they are less biased than their implicit test results reveal (Howell, Redford, Pogge, & Ratliff, 2017; Yen et al., 2018). The perception of unfair assessment could result in legal difficulties and ethical implications for organizations (Bing et al., 2007).

In terms of justification-based CRTs, genuine inductive reasoning problems are included as items. These tests are therefore generally perceived as tests of cognitive ability. However, whether test-takers would see this as a fair assessment that demonstrates procedural justice (related to a particular job) is yet to be empirically determined (Ones, Anderson, Sinangil, & Viswesvaran, 2017).

Faking Potential

Despite test-taker reactions on fairness and procedural justice, studies have shown that it seems possible for people to fake on the automaticity-based tests, such as the IAT (Steffens, 2004). Feigning becomes probable when the purpose of the test is revealed, with increased experience or knowledge of the test, or when individuals are instructed to do so (Hu, Rosenfeld, & Bodenhausen, 2012). Specifically, for projective tests, researchers have determined that it is more difficult to fake projective tests compared to self-report and semi-structured projective measures (Ziegler, Schmidt-Atzert, Buhner, & Krumm, 2007). As in the case of automaticity-based tests, justification-based tests, such as the CRT, are also resistant to faking, but only until the construct being measured is made known (Bowler & Bowler, 2014; LeBreton, Barksdale, Robin, & James, 2007). Moreover, CRTs are susceptible to faking when items are too obvious,
because respondents are then able to identify what the test is designed to measure and ultimately predict (e.g., as in the case of the CRT-Integrity designed to predict counter-productive behavior; Fine & Gottlieb-Litvin, 2013). Finally, once respondents know how CRTs work, 75% are able to ‘fake good’ (Wiita, Meyer, Kelly, & Collins, 2017).

**Suggestions to Improve Implicit Measures in Organizations**

Our evaluation of implicit measures against industry standards for psychological measures shows these measures fall short in many areas. Establishing validity is a unitary approach (Binning & Barrett, 1989) where validity includes the full range of validity ‘types’ (content-, construct- and criterion-related validity). Therefore, considering acknowledged validation approaches (Cronbach & Meehl, 1955), we provide a few suggestions.

First, from the onset of implicit test development, stimuli should be theory-based and pilot-tested (i.e., conceptually equivalent to the explicit construct measured; De Cuyper et al., 2017). Second, and in line with measurement equivalence studies (Morelli, Potosky, Arthur, & Tippins, 2017), constructs should be assessed using different means (i.e., using different technologies, such as pencil-and-paper versus electronic tests, also using tests based on different techniques, for example an IAT, CRT and PSE to measure the construct of interest). Third, higher covariance between implicit measures can only be expected when the reliability of the tests is first accounted for. Some ideas to increase reliability (e.g., temporal fluctuation of the IAT) could be to contextualize implicit cues or stimuli in order to make implicit attitudes less malleable (Gschwendner, Hofmann, & Schmitt, 2008). In terms of the PSE, internal consistency estimates (i.e., correlating scores from different stories within a PSE) are not suited to establish reliability (Atkinson, Bongort, & Price, 1977), since different motives are triggered during the test, forcing participants to react differently to items (Bernecker & Job, 2010), consequently resulting in low estimates. To prove reliability, one might apply the Thurstonian item response theory to demonstrate that the PSE provides meaningful measures of separate constructs in a response pattern (Lang, 2014).

Fourth, to gain insight into the implicit–explicit realm, the construct–method distinction approach (multitrait–multimethod framework or MMTF; Campbell & Fiske, 1959) is recommended; thus demonstrating simultaneous evidence of convergent and discriminant validity, proving that implicit–explicit attitudes are related and distinct and not accounted for by method factors (Nosek & Smyth, 2007). For instance, Slabbinck, De Houwer, and Van Kenhove (2013) compared the criterion-related validity of an IAT and a PSE, keeping the construct (power motive) constant. In doing so, the authors determined that the IAT and PSE
methods are related, but distinct. Unfortunately, multiple motives (e.g., including achievement and affiliation) were not assessed; hence, differentiation between method and construct cannot be accounted for. In line with these authors, Arthur and Villado (2008) highlight the importance of the construct–method distinction for validating (implicit) measures. In doing so, an evidence-based approach should be followed, clearly distinguishing between predictor construct (i.e., behavioral domain being sampled) and predictor method (i.e., the process by which the behavioral domain is measured) because, when construct and method are confounded, one cannot determine whether observed effects are due to what is measured or how it is measured. On discovering construct irrelevant variance due to implicit methods, the fundamental question would then be (Morelli et al. 2017): what are the theoretical reasons for construct irrelevant variance? Further research then needs to be undertaken to answer this question.

Fifth, we recommend following a construct-oriented methodology, which is scientifically aligned with organizational research and practice (Wernimont & Campbell, 1968). Thus, from the outset, implicit measures should be aligned to assess fine-grained facets or dimensions of work performance criteria (e.g., annual performance appraisal ratings). In general, we agree that findings on actual work-related behavior appear to be thinly spread in current literature (Ones et al. 2017), since most criterion-related validities are reported within the personality or social psychology domains. Thus, more studies are needed where actual criterion-related validity estimates are reported for specific contextual work-related outcomes. Additionally, since implicit cognition refers to the spontaneous activation of behavior (De Houwer & Moors, 2010), when establishing validity, assessment techniques that are more closely related to actual behavior, such as gamified assessments, assessment centers, work samples, in-baskets, situational judgment tests and previous work history, should perhaps be considered. Finally, behavior-based observer reports (e.g., by peers or supervisors) should also be included in the validation process, since (non-significant) findings may also reveal important information about implicit behavioral relationships and whether moderating variables are involved (i.e., whether implicit aggression predicts counter-productive work behavior depends on self-control; Galić & Ružojčić, 2017).

**Thoughts to Consider Before Applying Implicit Measures**

Our evaluation of implicit measures showed that these tests could potentially be useful to predict various criteria, since they are more difficult to fake. However, in the light of the empirical evidence presented, we urge practitioners to consider using implicit measures with
caution. Since implicit tests are often used to measure underlying cognition of which people may be ignorant (e.g., racial bias), test-takers may react defensively when test results are given. Furthermore, in some countries, the use of psychometric tests for selection purposes are legally governed; therefore, some implicit tests may only be administered and scored by trained psychologists. Additionally, some evidence suggests that implicit cognition may differ across groups (Drescher & Schultheiss, 2016; Runge et al., 2018). Thus, the perception of ethnicity-based adverse impact against protected groups may lead to legal and ethical implications (McCarthy et al., 2017). Therefore, to advance the notion of implicit testing in organizations, more empirical evidence is needed in terms of method bias (i.e., across various implicit tests), item bias (stimulus material within tests), adverse impact, determining norm groups and defining cut scores (e.g., age, gender, ethnic group).

Which Implicit Test Should Organizations Use?

Despite the caveats we have pointed out, the psychologist or practitioner considering including implicit tests for psychological assessment might question which type of measure (i.e., automaticity-, projective-, or justification-based) is shown to be more useful. The answer to this question is complex and depends on what the assessment aims to achieve. For instance, where the IAT might be useful in predicting political preferences, consumer choices, prejudice behavior and certain personality traits, such as extroversion or agreeableness (De Cuyper et al., 2017), the CRT may be better suited in identifying counter-productive work behavior, especially amongst individuals with high levels of latent aggression (DeSimone & James, 2015). The PSE (and other projective construction-type tasks) may be more adequate to determine underlying needs and motives (e.g., power, achievement, affiliation and fear of failure).

In comparing the IAT, CRT and PSE, we found the theoretical basis and quality of test materials for each measure were well established. By opting to administer the respective tests electronically, higher reliability and validly estimates may result and scoring time may be faster (Schultheiss et al., 2008). However, coding the PSE may take longer (when compared to the IAT and CRT). It should also be noted that respondents should never be made aware of how a construct is measured (irrespective of the implicit test in use), since faking then becomes probable on the IAT, CRT and PSE respectively.

Whilst there are some concerns in terms of the reliability of the IAT and the PSE (i.e., temporal fluctuation and low internal consistency respectively), the CRT shows acceptable reliability estimates. However, the CRT is also not the panacea, since some questions remain
around this test, such as whether certain constructs are more amenable to be measured with the CRT, and whether justification mechanisms are applied universally across different groups (Ones et al., 2017). Furthermore, although work has been done on the application of the CRT-A to predict aggression in diverse, ‘normal’ cultural groups (Galić et al., 2014), the CRT-A seems better suited in identifying counter-productive behavior within individuals with high levels of latent aggression. Therefore, DeSimone and James (2015) recommend that, before applying this test in organizational settings, CRT-items should also be able to discriminate amongst individuals with low levels of aggression. Additionally, literature on the criterion-related validity of CRTs to predict more specific facets of performance, is lacking (Ones et al., 2017). Finally, in terms of construct validity, implicit–explicit covariance is found to be low for the IAT, CRT and PSE as illustrated in Table 2.3. However, despite low construct validity, all three tests have shown adequate estimates of criterion-related validity. Therefore, we cannot simply conclude that one implicit test is better than another, since it depends on the criteria one wishes to predict.

**Implications for Research and Practice**

A remaining challenge for researchers is firstly to understand and establish how implicit–explicit relations relate to predict criteria (James et al., 2005). Perugini et al. (2010) illustrate examples where (a) implicit, but not explicit scores predict behavior (single association), (b) implicit–explicit jointly predict behavior (channeling), (c) implicit and explicit uniquely predict different behavior (double dissociation), (d) both implicit and explicit predict behavior under different conditions (moderation), and I implicit–explicit interact to explain variance in criteria (multiplicative). More recently Kurdi et al. (2018) proposed that implicit cognition might influence explicit cognition, which then drives behavior. Therefore, more research is needed on the boundary conditions of how implicit scores predict specific behavior.

Whilst some researchers have ascribed low psychometric properties of implicit measures to contamination/deficiency, others have started questioning whether these findings could perhaps be indicative of the low stability and variability within individual personalities (Fleeson & Law, 2015; Schultheiss et al., 2008). Where self-report personality tests gauge typical behavioral tendencies, not picking up the malleability of personality (Ferguson & Lievens, 2017), implicit tests could perhaps be revealing important information about within-individual personality plasticity in response to changing environments/contexts. Thus, whether low reliability/validity estimates of implicit tests are due to situation-specific, person-specific or method-specific factors also need further investigation.
For psychologists/practitioners that wish to further extend their methodologies on implicit measures, applied in organizational contexts, we provide a few priming ideas: Automaticity-based measures, like the IAT, shows potential for use as a clinical assessment tool. For example, bus/truck drivers, pilots, or operators of heavy machinery (e.g., crane/forklift) can be screened for potential substance abuse, suicidal tendencies, driving skills and risky flight/aggressive driving behavior (Bıçaksız et al., 2018; Lindgren et al., 2018). Results could be combined with the current psychomotor tests used in practice (e.g., the Dover/Vienna Test System). Other automaticity measures (e.g., the Brief IAT) can be applied to measure achievement orientation, used to predict entrepreneurial activities. Also, picture-based projective tests have shown to predict organizational goal-setting and work performance (Hermans et al., 2017; Lang, Zettler, Ewen, & Hülsheger, 2012), the wellbeing of teachers (Wagner, Baumann, & Hank, 2016), job satisfaction (Thielgen, Krumm, Rauschenbach, & Hertel, 2015) and career planning (Ramsay, Pang, Ho, & Chan, 2017). Further, psychological capital, an important construct related to central workplace outcomes (e.g., performance, citizenship behavior, turnover, etc.) can now be assessed by using the projective technique (Harms, Krasikova, & Luthans, 2018). Also, the projective technique (i.e., sentence completion) can be used to assess personality and aspects of marketing/advertising (Joy, 2017; Ridgeway, 2017).

Furthermore, implicit measures may be of particular added value for those areas of organizational behavior where human information processing and judgment are involved, vulnerable to System I processing (such as cognitive heuristics and dual-processing theory). Derous, Buijsrogge, Roulin, and Duyck (2016), for example, explain how recruiters’ bias against stigmatized job applicants can be understood and studied from a dual-processing thinking perspective. Therefore, areas of implicit measurement application might include a broad range of human behavior in organizations (e.g., selection, assessment, creativity, entrepreneurship, leadership development).

Finally, we noted that implicit tests appear to be used most often for clinical psychological assessments in the United States and Canada (Piotrowski, 2017; Wright et al., 2017), where 49.3% of practicing psychologists report using performance-based projective tests for assessments. Further, roughly 60% of implicit measures have been developed in the United States (as illustrated in Appendix A). Countries where implicit measures are less frequently used, include Belgium and the Netherlands (Muñiz et al., 2001; Piotrowski, 2015). We trust that this article will contribute to the application of implicit measurement and dual-
processing theory, especially in countries where these approaches appear to be less explored and underutilized.

To summarize, in terms of practical implications, there are three broad categories of implicit tests, each of which might be more appropriate to measure specific constructs in organizations. First, automaticity-based measures seem best-suited to assess attitudes/preferences (e.g., political/consumer), interpersonal attitudes (related to age/race/gender/ethnicity), personality traits (especially extraversion/agreeableness), perceptions about a group/person, or the self (self-esteem, internal motives). Second, projection-based tests might be used for personal development (i.e., as part of work wellbeing programs) to establish e.g., goal setting/achievement, career planning, wellbeing, job satisfaction and motives such as the intention to quit. Third, justification-based tests can be used to detect undesirable behavior (like aggression, integrity, counter-productive work behavior), often difficult to measure with self-report tests due to social desirable responding. Also, desirable behavior, like creative performance and achievement orientation might be captured with implicit tests. Furthermore, implicit testing should be more frequently incorporated for research/developmental reasons and always in conjunction with explicit measures in organizational settings. In doing so, the process of establishing various forms of validity will be accelerated. However, more empirical (validation) evidence is needed before implicit measures can legitimately be applied for organizational assessment/selection.

Conclusion

In this review, we explored the potential usefulness of implicit measurement in organizational practice and research. To this end, our study shed light on how these measures work, which constructs they assess, and how the validity of implicit measures could potentially be improved. In this way, we hope to contribute to a better understanding of implicit measures and their potential value for organizations. As a final thought, from an industrial/organizational psychology perspective and by engaging in the implicit–explicit debate, we can learn more about the underlying processes that drive human behavior.
### Appendix A: Taxonomy of Implicit Tests Grouped According to Implicit Assessment Techniques

<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Assessment Type</th>
<th>Implicit Test</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automaticity: Defined as (computerized) tests which are used to assess respondents’ instinctive reaction (by means of selection or physical responses to latent reaction-timed tasks), towards either multiple concepts (connected as part of a cognitive schema) or individual concepts to establish how target concepts are linked in stored memory (De Houwer et al., 2009; Uhlmann et al., 2012).</td>
<td>Association</td>
<td>Implicit Association Test</td>
<td>Greenwald et al. (1998)</td>
</tr>
<tr>
<td>Association</td>
<td>Recoding Free IAT</td>
<td>Rothermund, Teige-Mocigemba, Gast, and Wentura (2009)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Go/No-Go Association Task</td>
<td>Nosek and Banaji (2001)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Implicit Relational Assessment Procedure</td>
<td>Barnes-Holmes et al. (2006)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Breadth-based Adjective Rating Task</td>
<td>Karpinski, Steinberg, Versek, and Alloy (2007)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Brief Implicit Association Test</td>
<td>Sriram and Greenwald (2009)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Evaluative Movement Assessment</td>
<td>Brendl, Markman, and Messner (2005)</td>
<td></td>
</tr>
<tr>
<td>Assessment Technique</td>
<td>Assessment Type</td>
<td>Implicit Test</td>
<td>Source</td>
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<td>------------------------------------------------------------------------</td>
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<tr>
<td>Association</td>
<td>Affective Priming Task</td>
<td>Hermans, Houwer, and Eelen (1994)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Shooter Task</td>
<td>Correll, Park, Judd, and Wittenbrink (2002)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Name-Letter Effect</td>
<td>Nuttin (1985)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Sequential Evaluative Priming</td>
<td>Fazio et al. (1986)</td>
<td></td>
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<tr>
<td>Association</td>
<td>Subliminal Contact Priming</td>
<td>Dovidio, Kawakami, Johnson, Johnson, and Howard (1997)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Approach-Avoid Task</td>
<td>Rinck and Becker (2007)</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>Sorting Paired Features</td>
<td>Bar-Anan, Nosek, and Vianello (2009)</td>
<td></td>
</tr>
<tr>
<td>Accessibility</td>
<td>Modified Stroop Task</td>
<td>Mathews and MacLeod (1985)</td>
<td></td>
</tr>
<tr>
<td>Accessibility</td>
<td>Lexical Decision Task</td>
<td>Wittenbrink, Judd, and Park (1997)</td>
<td></td>
</tr>
</tbody>
</table>
Projection: Defined as tests that require respondents to generate responses by using association, construction, completing, arrangement and expression, which reveal aspects of their personality by disambiguating unstructured test stimuli (Lilienfeld et al., 2000).
<table>
<thead>
<tr>
<th>Assessment Technique</th>
<th>Assessment Type</th>
<th>Implicit Test</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association</td>
<td></td>
<td>Rorschach Group and Multiple-Choice Test</td>
<td>Harrower-Erickson and Steiner (1945)</td>
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<td></td>
<td></td>
<td>Szondi Test</td>
<td>Szondi (1947)</td>
</tr>
<tr>
<td>Arrangement/Selection</td>
<td></td>
<td>Lüscher Color Test</td>
<td>Lüscher and Scott (1969)</td>
</tr>
<tr>
<td>Arrangement/Selection</td>
<td></td>
<td>Tomkin–Horn Picture Arrangement</td>
<td>Tomkins and Miner (1957)</td>
</tr>
<tr>
<td>Expression</td>
<td></td>
<td>Projective Puppet Play</td>
<td>Woltmann (1960)</td>
</tr>
<tr>
<td>Expression</td>
<td></td>
<td>Handwriting Analysis</td>
<td>Beyerstein and Beyerstein (1992)</td>
</tr>
</tbody>
</table>

**Justification:** Defined as tests that use scenarios/situations to assess what a test respondent would think is a justifiable/reasonable way to act. Implicit tests, using justification as means of assessment, work on the assumption that individuals will project their own worldview on scenarios/situations offered by making judgments that support it (Greenwald et al., 2009; James et al., 2004, p. 274).

**Reasoning**

**Judgment**

**Note.** We build on the taxonomy proposed by Uhlmann et al. (2012) by combining disconnected literature on the types and categorization of implicit measures (Carter et al., 2013; Friese, Hofmann, & Schmitt, 2008; Gawronski & De Houwer, 2014; Hofmann, Gschwendner, Nosek, & Schmitt, 2005; Lindzey, 1959; Nosek, Hawkins, & Frazier, 2011). Based on how implicit content is captured, we categories 49 different implicit measures, according to eight different type of assessment techniques and we cluster them into three broader categories. Information about the popularity (i.e., number of citations) and origin (in which country each test was developed) is available from the first author on request.
CHAPTER 3

NARROW FACETS OF HONESTY-HUMILITY PREDICT COLLEGIATE CHEATING

As collegiate cheating is a growing concern across the world, researchers have started to explore personality traits for a better understanding of why students engage in such behavior. While prior studies investigated the relationship between personality and general academic dishonesty criteria (viz., counter-academic behavior), this study aimed to provide a deeper understanding of how narrow facets of honesty-humility (i.e., HEXACO Personality Inventory) predict both general and specific academic dishonest behavior. Results from our study of 308 university students replicated prior findings in that the narrow facet, fairness, was the best predictor of broad counter-academic behavior. However, our data revealed that greed avoidance predicted a more specific form of academic dishonest behavior, namely collegiate cheating. Furthermore, narrow facets of honesty-humility show incremental predictive validity above and beyond the global trait when explaining variance in both general and specific self-reported measures.

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**Introduction**

Internationally, collegiate cheating has become a central concern for educational stakeholders (Bretag, 2016; Gallant, Binkin, & Donohue, 2015). A review of 64 studies of general cheating prevalence (amongst United States and Canadian college students) revealed an average of 43.1% students confessing to having cheated on examinations in some way (Whitley, 1998). More recent research – a longitudinal study including data from 134,709 students over the period 2002 to 2013 – reports an average of 37.3% students cheated by receiving unauthorized help whilst conducting written tasks (McCabe, 2016). As collegiate cheating appears to be a prevailing problem, a more comprehensive understanding of its psychological underpinnings is needed.

Prior studies (Marcus et al., 2007; McAbee, Oswald, & Connelly, 2014) show that students’ personality traits might play an important role in academic dishonest behavior. For example, honesty-humility (one of the six broad traits derived from HEXACO-Personality Inventory; Lee & Ashton, 2004) has consistently shown negative relationships with counter-academic behavior (De Vries et al., 2011). Counter-academic behavior is defined as a broad criterion, encapsulating multiple ethical transgressions within an academic context (i.e., cheating, plagiarism, substance abuse, misrepresentation, low personal standards, petty personal gain; Hakstian, Farrell, & Tweed, 2002). Remarkably, we do not yet understand how honesty-humility might relate to more context-specific measures of counter-academic behavior, such as cheating on a test. Counter academic behavior encompasses various types of wrongdoing, whereas the latter accounts for a specific type of dishonest behavior. Given that collegiate cheating represents a serious violation in the academic context (Bretag, 2016; Gallant et al., 2015), it is important to determine whether honesty-humility predicts this specific form of counter-academic behavior.

The present study investigated how narrow facets of honesty-humility relate to different types of academic dishonesty criteria (i.e., differentiated by generality insofar that counter-academic behavior includes several, varied outcomes whereas collegiate cheating is more specific). Although it has been investigated how personality factors relate to counter-academic behavior as general criterion, how personality predicts cheating as a more specific form of dishonest academic behavior has not yet been explored. Therefore, we sought to replicate the findings of earlier studies (De Vries et al., 2011) and establish how narrow facets of honesty-humility relate to collegiate cheating.

Another issue to consider was how well collegiate cheating could be predicted from narrow facets (versus the global trait) of honesty-humility, in the light of predictor specificity.
In the personality literature (Soto & John, 2017), it is suggested that narrow facets may predict context-specific behavior (e.g., collegiate cheating) with higher accuracy compared to global traits. Therefore, a secondary aim was to establish whether narrow facets of honesty-humility are better predictors of collegiate cheating compared to the global trait measure.

**Honesty-Humility and Counter-Academic Behavior**

Honesty-humility is the “quintessential basic trait to account for individual differences in ethical behavior” (Hilbig & Zettler, 2015, p. 85). This personality trait is defined as “the tendency to be fair and genuine in dealing with others” (Ashton & Lee, 2007, p. 156). Honesty-humility as a global trait comprises two theoretical aspects: honesty and humility (Leone et al., 2012). Honesty is defined as “the refusal to pretend that facts of reality are other than what they are” (Becker, 1998, p. 158). Put differently, honesty refers to being fair and trustworthy, unwilling to cheat, exploit, steal or lie to others for personal gain (Ashton et al., 2000). Humility, on the other hand, is about being modest and avoiding greed. Individuals high on humility are uninterested in acquiring luxury goods or having high social status (Ashton & Lee, 2001, 2002).

Further, the global trait of honesty-humility is operationalized as comprising four narrow facets (Lee & Ashton, 2004). Together, the two narrow facets of sincerity (being genuine in interpersonal relations) and fairness (avoiding fraud and corruption) theoretically represent the element of honesty. It is specifically suggested that people high on honesty have the internal control to avoid fraud, stealing or cheating, irrespective of their motivation in wanting to do so (Zettler & Hilbig, 2010). As individuals high on honesty are associated with fostering relationships based on trust and reciprocity, one would expect less counter-productive behavior from such individuals. In contrast, the two narrow facets of greed avoidance (being uninterested in possessing lavish wealth, acquiring luxury goods and having high social status) and modesty (viewing oneself as an ordinary person, unentitled to special treatment), represent the aspect of humility. A person high on humility would have less motivation to compete for acquiring social status or material advantages (Leone et al., 2012) as humility represents an accurate view of one’s actual traits, abilities or resources. To summarize, greed avoidance and modesty could be the underlying motive for engaging in unethical behavior; and fairness and sincerity may – despite the motive – act as a control element, buffering whether one would actually engage in counter-productive behavior.

Counter-productive behavior, specifically conducted within an academic or collegiate setting, is referred to as counter-academic behavior (Hakstian et al., 2002). Counter-academic
behavior has been operationalized as self-proclaimed ethical violations and is computed as the mean score of various counter-productive behaviors added together (e.g., misrepresentation, cheating during examinations, plagiarizing, etc.). Counter-academic behavior has been found to relate negatively to the global trait of honesty-humility ($r = -.40, p < .01$; showing medium to large effect) (De Vries et al., 2011). However, the narrow facets underlying honesty-humility may predict academic dishonesty differently; the reason being ascribed to the conceptual difference of facets and the way counter-academic behavior is conceptualized.

The narrow facets of honesty-humility may relate to counter-academic behavior in different ways. For instance, De Vries et al. (2011) found that the four narrow facets of honesty-humility correlated negatively with broad counter-academic behavior. In their research, they explored how all six global traits of the HEXACO-PI relate to counter-academic behavior. More relevant to our research, De Vries et al. (2011) found that, although all narrow facets of honesty-humility significantly correlated with counter-academic behavior, only one narrow facet, namely fairness, predicted counter-academic behavior ($\beta = -.47, p < .01$). Further, the findings of De Vries et al. (2011) revealed that fairness (which is expressed as relative weight in percentages) explained 67.7% of the total variance in predicting counter-academic behavior.

Following De Vries et al. (2011), we expected to replicate the findings that:

**Hypothesis 1.** The narrow facets of fairness (H1a), sincerity (H1b), greed avoidance (H1c) and modesty (H1d) will relate negatively to counter-academic behavior, with fairness relating more negatively to counter-academic behavior than sincerity, greed avoidance and modesty (H1e).

**Honesty-Humility and Collegiate Cheating**

Many studies have so far failed to consider how the narrow facets of honesty-humility would relate to a context-specific measure of counter-academic behavior, like cheating. As a consequence, we do not yet understand how honesty-humility, at facet-level, might relate to collegiate cheating (Hilbig & Hessler, 2013).

In prior studies (De Vries et al., 2011; Marcus et al., 2007; McAbee et al., 2014) counter-academic behavior was defined as a broad form of academic dishonesty, encapsulating multiple ethical transgressions like plagiarizing, or cheating. In contrast, it is also possible to conceptualize academic dishonesty in a narrower way, fitting a particular situational context.
For example, cheating during a test could be considered a context-specific criterion measure of academic dishonest behavior.

Recently, researchers have found a significant relationship between the global trait, honesty-humility, and the probability of actual cheating under monetary incentivized conditions (Hilbig & Zettler, 2015). For example, one study (Zettler et al., 2015) reports that low scores on honesty-humility significantly relate to over-reporting on alleged wins during a monetary incentivized coin-toss task. Closer to the notion of using narrow facets as predictors of criteria, Hilbig, Glöckner, and Zettler (2014) predicted that honesty-humility would explain unique variance in predicting prosocial behavior (being the opposite of self-interest behavior such as cheating) due to the inclusion of the fairness and greed avoidance aspect. Although both these narrow facets were significantly associated with prosocial behavior, only fairness explained unique variance in this outcome. However, how honesty-humility, at facet level, might relate to collegiate cheating has not been tested yet.

As far as current literature reports, a person high on fairness would want to avoid fraud, corruption, stealing and cheating (Lee & Ashton, 2004; Zettler & Hilbig, 2010). Further, fairness has been found to be the best predictor of counter-academic behavior when compared to the other three narrow facets of honesty-humility (De Vries et al., 2011). Furthermore, counter-academic behavior was found to include aspects of self-reported cheating during examination (captured by items in the counter-academic behavior measure; Hakstian et al., 2002). Therefore, we expected that students that are low on fairness would also be more likely to engage in dishonest behavior like cheating. Hence our premise:

**Hypothesis 2.** The narrow facets of fairness (H2a), sincerity (H2b), greed avoidance (H2c) and modesty (H2d) will relate negatively to collegiate cheating, with fairness relating more negatively to collegiate cheating than sincerity, greed avoidance and modesty (H2e).

Researchers have demonstrated that strong relations and increased validity may result when narrow-level facets of personality constructs are related to specific criteria, as opposed to using the global trait alone (Barrick & Mount, 2003). To increase predictive precision, a facet-level research approach could be followed when studies pose context-specific research questions and wish to predict specific outcomes (Judge & Kammeyer-Mueller, 2012; Soto & John, 2017). This notion suggests that the narrow facets of honesty-humility could show incremental predictive validity over and above that of the global trait, honesty-humility, when
predicting specific dishonest behavior (viz., collegiate cheating). Such facet-level insights are important, because they may provide a better theoretical understanding of how personality and criteria are linked (Hastings & O’Neill, 2009).

In fact, prior studies using a broad academic counter-behavior criterion (De Vries et al., 2011) showed that a model containing the two global traits, honesty-humility and conscientiousness ($R^2 = .29, p < .01$) versus a model containing their narrow facets ($R^2 = .41, p < .01$) respectively, incrementally predicted counter-academic behavior ($\Delta R^2 = .12, p < .01$). Thus, by using narrow facets, rather than the global trait predictors, an additional 12% of variance in counter-academic behavior was explained. Therefore, to establish whether narrow facets of honesty-humility are better predictors of collegiate cheating compared to the global trait measure, we proposed:

**Hypothesis 3.** The set of honesty-humility narrow facets (fairness, sincerity, greed avoidance, modesty) will explain more variance in collegiate cheating than a model containing only the global trait (honesty-humility).

**Method**

**Participants and Procedure**

An email was sent to 700 students studying at a large South African university, requesting them to participate in our study. Of these, 392 students started the survey, but either did not complete the questionnaire or did not give consent after the purpose of the research had been made known. Therefore, the final sample comprised 308 participants who completed the online questionnaire. The mean age of the sample was 22.9 years ($SD = 5.23$; ranging from 18 to 47 years), comprising diverse ethnic backgrounds (Black = 37.3%, White = 37.7%, Indian = 12%; mixed Black/White, = 6.5%, Asian = 2.3%, other = 4.2%). The sample represented 64.7% bachelor students (equally spread across the three years) and 35.3% postgraduate students (honors, master’s, PhD). Men and women were almost equally represented (157 women; 151 men).

After obtaining their informed consent, participants commenced with the questionnaire measuring variables in the following sequence: demographics, collegiate cheating (disguised as a cognitive task), honesty-humility, and counter-academic behavior. Next, we debriefed participants by disclosing that the “cognitive task” elicited cheating behavior. Finally, participants were given the opportunity to self-report whether they had cheated or not (see
4.2.3). Participants then had the option to voluntarily withdraw their consent. Before conducting this study, approval was received from ethics board of the relevant university.

**Measures**

**HEXACO-PI.** Honesty-humility was measured with sixteen items of the honesty-humility scale of the HEXACO-PI, which is a widely used and valid personality questionnaire (Ashton, Lee, & De Vries, 2014; Lee & Ashton, 2004). According to the literature, honesty-humility (global trait) consists of four narrow facets, captured by four items respectively. All items are measured on a 5-point Likert-type scale (1 = strongly disagree to 5 = strongly agree). Each of the narrow facets, namely fairness (α = .71), greed avoidance (α = .76), modesty (α = .60) and sincerity (α = .60) showed acceptable internal consistency.

**Counter-academic behavior.** Self-reported counter-academic behavior was captured by using the Inventory of Counter-productive Behavior (ICB; Hakstian et al., 2002). Like others (De Vries et al., 2011; Marcus et al., 2007), 25 items measuring academic counter-productive behaviors were measured on a 6-point Likert-type scale (1 = never even considered it, to 6 = did it three or more times). Example items include submitted a class paper or project that was not your own work (misrepresentation); and turned in work that was of poor quality and lower than your true potential or ability (low personal standards). The measure showed good (α = .86) internal consistency.

**Collegiate cheating measure.** Building on previous studies (Halevy, Shalvi, & Verschuere, 2014; Peer, Acquisti, & Shalvi, 2014), we measured students’ self-reported cheating on a task which was presented as a cognitive ability test. In a standardized situation, respondents had the opportunity to win money if they performed well, thus making cheating an attractive and non-risky option. During the task, explicit instructions were given not to use any unauthorized help (i.e., using the internet, a calculator or asking help from a friend) or to change answers whilst looking at the answer sheet, as this would constitute cheating. Participants scored their own answers against an electronic answer sheet. Following Halevy et al. (2014), self-reported cheating was captured as a binary outcome (yes I cheated = 1, or no, I did not cheat = 0), irrespective of the method or frequency of cheating (Peer et al., 2014).

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2 See Appendix B: Information about the cheating task. To view items used in the cheating task, see Chapter 5, Appendix E: Cheating Measure Instructions to Respondents.

3 We acknowledge an anonymous reviewer for wording of the text.
Collegiate cheating was therefore contextualized to capture self-reported cheating about a specific situation that had been experienced immediately beforehand, making this criterion more precise as compared to general counter-academic behavior.

**Results**

Before the main analyses were conducted, we checked missing values (with no missing data), various assumptions, descriptive statistics and correlations (Table 3.1). Next, in following best-practice recommendations on whether to include/exclude control variables, we applied the decision-making tree by Bernerth and Aguinis (2016), answering a series of questions that summarize sequential steps in the process of selecting control variables. According Bernerth and Aguinis (2016) researchers too often include unwarranted control variables. We first considered empirical findings about the relation between collegiate cheating, gender and age. To date there are non-consistent results about age and gender differences with regards to cheating in academic settings (Crown & Spiller, 1998; Gallant et al., 2015). Since there is no strong theoretical rationale about the relationship between the focal variable (cheating) and control variables (age and gender), we elected to not include any control variables.

Table 3.1

**Descriptive Statistics and Intercorrelations of Study Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gender</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2. Age</td>
<td>22.94</td>
<td>5.23</td>
<td>.03</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>3. Honesty-humility</td>
<td>3.50</td>
<td>0.60</td>
<td>-.21**</td>
<td>.18**</td>
<td>α = .83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Fairness</td>
<td>3.84</td>
<td>0.89</td>
<td>-.25**</td>
<td>.16**</td>
<td>.78**</td>
<td>α = .71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Sincerity</td>
<td>3.44</td>
<td>0.75</td>
<td>-.05</td>
<td>.08</td>
<td>.67**</td>
<td>.39**</td>
<td>α = .60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Greed avoidance</td>
<td>2.99</td>
<td>0.87</td>
<td>-.10</td>
<td>.16**</td>
<td>.73**</td>
<td>.39**</td>
<td>.28**</td>
<td>α = .75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Modesty</td>
<td>3.71</td>
<td>0.75</td>
<td>-.20</td>
<td>.12*</td>
<td>.75**</td>
<td>.47**</td>
<td>.35**</td>
<td>.43**</td>
<td>α = .60</td>
<td></td>
</tr>
<tr>
<td>8. CAB</td>
<td>2.43</td>
<td>0.71</td>
<td>.18**</td>
<td>-.25**</td>
<td>-.42**</td>
<td>-.48**</td>
<td>-.27**</td>
<td>-.26**</td>
<td>-.19**</td>
<td>α = .86</td>
</tr>
<tr>
<td>9. Collegiate cheating</td>
<td>0.32</td>
<td>0.47</td>
<td>-.04</td>
<td>-.20**</td>
<td>-.11*</td>
<td>-.04</td>
<td>-.09</td>
<td>-.15**</td>
<td>-.06</td>
<td>.12*</td>
</tr>
</tbody>
</table>

*Note. N = 308 of which n = 99 cheated on the task. Internal consistencies (α) are available on the diagonal.

*Gender was coded 0 = female and 1 = male. †CAB = counter-academic behavior. ‡Collegiate cheating was coded as 1 = did cheat and 0 = did not cheat; cheating (as a binary variable) and other continuous variables were correlated using Point Biserial correlation.

*p < .05. ** p < .01 (two-tailed).
Our results were in support of Hypothesis 1, as fairness did show the strongest negative relationship with counter-academic behavior (H1a; \( r = -.48, p < .01 \); medium to strong effect size), compared to the relationships of the other narrow facets: sincerity (H1b; \( r = -.27, p < .01 \)); greed avoidance (H1c; \( r = -.26, p < .01 \)) and modesty (H1d; \( r = -.19, p < .01 \)). The Steiger Z-test (Steiger, 1980) revealed that the relationship between fairness and counter-academic behavior was indeed significantly stronger (H1e) than the relationship between sincerity and counter-academic behavior (\( Z = -3.72, p < .001 \)), greed avoidance and counter-academic behavior (\( Z = -3.89, p < .001 \)), and modesty and counter-academic behavior (\( Z = -5.42, p < .001 \)).

Hypothesis 2 was not supported by our data, because the relationship between collegiate cheating and fairness (H2a; \( r = -.04, p > .05 \)), sincerity (H2b; \( r = -.09, p > .05 \)) and modesty (H2d; \( r = -.06, p > .05 \)) were all non-significant. Surprisingly, only greed avoidance significantly related to collegiate cheating (H2c; \( r = -.15, p < .01 \); small effect size). For this reason, we only tested whether greed avoidance related more negatively to cheating than fairness (H2e). No significant difference was found in comparing the relationship between greed avoidance and cheating versus fairness and cheating (\( Z = -1.75, p > .05 \)).

Finally, Hypothesis 3 explored whether the set of narrow facets of honesty-humility would explain more variance in collegiate cheating than a model containing only the global trait. To test the predictive power of the narrow facts, binary logistic regression and relative weight analyses were conducted (Tonidandel & LeBreton, 2015). First, cheating was regressed onto the global trait honesty-humility (see Table 3.2, Model 1; \( R^2 = .018, p < .05 \)), and then onto the narrow facets: fairness, sincerity, modesty and greed avoidance (Model 2; \( R^2 = .035, p < .05 \)). Only greed avoidance was significant in predicting the odds of cheating, namely \( Exp(\beta) = .69, \chi^2(8) = 6, p < .05 \) (Model 2), implying that as greed avoidance increases, the odds of cheating decreases. The odds ratio corresponds with a small to medium-sized effect (Rosenthal, 1996). Hypothesis 3 was confirmed in that the set of narrow facets for honesty-humility incremented the prediction over a model containing the global trait (\( \Delta R^2 = .017, p < .05 \)). The result had a small effect, \( f^2 = .02 \) (Cohen, 1988).
We further explored whether the set of narrow facets of honesty-humility would also—as in the case of collegiate cheating—explain more variance in counter-academic behavior than the global trait. By regressing counter-academic behavior on honesty-humility as a global trait (Step 1) and narrow facets (Step 2), the same pattern emerged as narrow facets showed incremental predictive validity in predicting counter-academic behavior. Additionally, we also obtained the relative weights (RW) for hierarchical regression.
Results were in line with De Vries et al. (2011): RW analysis (Figure 3.1) revealed that fairness explained most (69.3%) of the variance in counter-academic behavior. However, for narrow facets as predictors of collegiate cheating, the RW analysis in logistic regression revealed that greed avoidance explained most (72.3%) of the variance in cheating.

Discussion

Our findings were in line with previous research (De Vries et al., 2011; Marcus et al., 2007) in that fairness (as compared with the other three narrow facets) showed the strongest relationship with counter-academic behavior. One way to explain this is to say that fairness is a product of moral judgment (Peterson & Seligman, 2004), and it is associated with two forms of reasoning, namely care and justice reasoning (Kohlberg, 1984). Care reasoning refers to having empathy, compassion and relational understanding in moral deliberation. By contrast, justice reasoning denotes how people refer to others in terms of equity and of what is right or wrong. One explanation of why fairness would relate to self-reported counter-academic behavior might be that students who score highly on fairness, would adhere to social rules and norms (Leone et al., 2012), and they would be unwilling to take advantage of others (De Vries et al., 2011). Students high on fairness would be more prosocial in their acts, unwilling to break rules (Hilbig et al., 2014) and hence they would avoid counter-academic behavior.
Our data showed that greed avoidance was the only significant predictor of collegiate cheating, implying that the probability of cheating might be 1.38 times higher for a student who is low on greed avoidance, as compared to a student who is not. This finding corresponds with studies which have related cheating to the attitude towards money and conditions under which monetary stakes were high (e.g., Chen, Tang, & Tang, 2014). As it is recommended to elicit strong behavior during field experiments (Highhouse, 2009), we offered prize money to create a motive to elicit cheating behavior. When the opportunity exists, greedy individuals are motivated to keep money for themselves (Seuntjens, Zeelenberg, Van de Ven, & Breugelmans, 2015). As greed avoidance represents a motivational element, individuals motivated by material gain might have felt entitled to cheat on the task in order to stand a chance to receive the prize money. Perhaps if other incentives (unrelated to material gain) were offered, the findings might have been different. Understanding the psychological underpinnings of how greed avoidance relates to specific student behavior may be worthy of further pursuit. Our observation (i.e., that greed avoidance is the best predictor of collegiate cheating, as compared to the other narrow facets) remains tentative until this finding can be replicated in other samples and with other measures of cheating.⁴

Our results point out that facet-level insights seem to provide more defensible explanations of how personality and criteria are linked (Hastings & O’Neill, 2009; Soto & John, 2017), giving us a deeper understanding of what drives dishonest academic behavior. Our data show that when predicting counter-academic behavior, fairness is important, and when predicting a more specific form of counter-academic behavior, namely collegiate cheating, greed avoidance is important. Therefore, by including narrow facets of personality that are specifically relevant in predicting the outcome of interest, one may increase criterion validity, predicting specific behavior with higher accuracy.

Conclusion

The present findings support the notion that honesty-humility has substantive underlying facets that drive different types of dishonest academic behavior. The take-home message is that fairness may play an important role in predicting counter-academic behavior, whilst greed avoidance might be important in predicting cheating, especially when a monetary reward is involved.

⁴ We thank an anonymous reviewer for this comment.
Our study showed potential practical value. By demonstrating how the narrow facets of honesty-humility predict academic dishonest behavior differently, one would be able to anticipate more accurately which students would be more vulnerable to engage in specific ethical transgressions. Special attention might be given to mentoring such students on ethical honor codes, as awareness training might significantly influence students’ moral reasoning and behavior.

A study limitation is the possibility of individuals who could have cheated in ways that our cheating task did not capture. As the task was administered without supervision (i.e., online), some individuals might have cheated (e.g., by asking assistance) and did not confess to doing so. Being unable to detect the true outcome of cheating is a typical problem associated with research about cheating (e.g., Halevy et al., 2014; Zettler et al., 2015). Notwithstanding this limitation, we managed to capture actual cheating. Future research could control for this by conducting the cheating task in a classroom setting. Another shortcoming, but also an opportunity for researchers to expand the present research, was to not include both honesty-humility and conscientiousness, given that Cohen et al. (2014) found these factors relate most strongly to moral character. Further, the narrow facet fairness shows considerable secondary loadings on conscientiousness (Ashton, Paunonen, & Lee, 2014; Lee & Ashton, 2016). By conducting bifactor latent variable modelling (McAbee et al., 2014) one could investigate the structural relations between these factors and their underlying narrow facets, to predict various dishonest behavioral outcomes. Findings might explain why fairness predicts counter-academic behavior better than do the other facets in the honesty-humility domain.

In conclusion, as few studies have taken a facet-level approach to predict general and more specific dishonest academic behavior, we add to the literature in that a more complete picture of the underlying relationship between personality and collegiate cheating have emerged.
Appendix B: Information about the Cheating Task

Pilot study

Prior to conducting the cheating task, we piloted an independent sample of 22 participants to determine whether the cheating measure gave participants the opportunity to cheat (see supplementary material on the cheating task, p. 5 line 2). The outcome resulted in 50% agreeing that students would cheat if the stakes were high. Because of the outcome of our pilot study – and as it is recommended to elicit strong behavior during field experiments (Highhouse, 2009) – we offered prize money to create a motive for participants to cheat. In total, R5 000 (i.e., €330) was paid to the ten best-performing individuals.

Cheating score

As this “cognitive task” was completed online (at home), respondents could have had other means of cheating (i.e., using unauthorized resources such as asking a friend for help, using the internet, etc.). It is for this reason that cheating was captured as a self-report measure directly after the task was completed. Irrespective of whether participants confessed to have cheated once or multiple times, cheating was captured as a dichotomous variable (1 = cheat; 0 = did not cheat). According to Halevy et al. (2014), when asked, most individuals are honest about their dishonest actions. By giving respondents the opportunity to confess (directly after cheating), individuals generally have the need to “come clean” and will therefore confess (even if only in part) their wrongdoings/transgressions (Peer et al., 2014). Therefore, we think that cheaters were likely positively and correctly identified. Given Becker’s (1998, p. 158) definition of honesty (the refusal to pretend that facts of reality are other than what they are), we were able to capture whether respondents were honest about their dishonesty.

Cheating on non-proctored tests (i.e., when candidates take online assessments from home and are thus unsupervised) remain a concern in assessments and empirical evidence to better understand the conditions under which this behavior occurs, is called for (Drasgow, Nye, Guo, & Tay, 2009). The challenge with capturing cheating is that researchers often follow a design where determining the true outcome of individual respondents cheating behavior, is not always possible. For example, and in the case of Zettler et al. (2015), when using a coin-tossing task to determine cheating behavior, the aggregate patterns given the statistical baseline probability of winning (i.e., 25%) are interpreted as a cheating score. This implies that the group cheating probability, rather than individual cheating, could be determined. Therefore, we think that our research design adds value to the operationalization of the criteria (i.e., capturing cheating online).
The result

Our data show that out of 308 participants, 67.9% reported that they did not cheat, whilst 32.1% admitted having cheated on the task. This finding is in line with McCabe’s (2016) longitudinal research, in that students who admit to using unauthorized resources during tasks varies between 33% and 41%.
CHAPTER 4

DEVELOPMENT AND CONSTRUCT VALIDATION OF AN IMPLICIT ASSOCIATION TEST FOR HONESTY-HUMILITY

Honesty-humility (HH; the sixth trait of the HEXACO-model) is a personality trait correlated to integrity-related outcomes. Since individuals might easily fake their responses during self-report tests, we developed an Implicit Association Test (IAT) to capture honesty-humility (IAT-HH). In this study, we aimed to establish into which construct our IAT-HH taps. We did so by first demonstrating that measures on implicit and explicit honesty-humility are two related, but distinct constructs. Second, we examined the nomological network of honesty-humility by establishing that the explicit (but not implicit) measure relates to social desirability (showing convergent validity) and that both implicit and explicit measures are unrelated to cognitive ability (i.e., discriminant validity). To gain deeper insight about why explicit—not implicit—honesty-humility related stronger to social desirability, we measured whether participants were able to identify the criteria being measured (i.e., ATIC) in a novel way. Finally, we highlight research limitations and make recommendations for future research on this topic. In concluding, we discuss the overall construct validity of the IAT-HH.

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**Introduction**

Honesty-humility, the sixth dimension of the HEXACO Personality Inventory (Lee & Ashton, 2004) enjoys increasing importance, because it represents a personality trait that accounts for individual differences in integrity-related behavior (Marcus, Te Nijenhuis, Cremers, & Heijden-Lek, 2016). Until now, honesty-humility has only been assessed with self-report measures, which may be more transparent. One concern associated with self-report assessment of (dis)honesty and integrity-related behavior, is that these tests remain vulnerable to faking, since test-takers may aim to maximize positive personal characteristics, especially during high-stake settings (Gawronski & De Houwer, 2011; Schnabel et al., 2008). Contrary to self-report tests, implicit measures may overcome this limitation, because they are assumed to reflect automatic responses, which are said to be unbiased assessments of the processes underlying social judgment (Gawronski & Hahn, 2017). For this reason, we developed an Implicit Association Test (IAT; Greenwald et al., 1998) to assess honesty-humility (referred to as the IAT-HH). Using the IAT-HH during assessments may help industrial and organizational psychologists to make better decisions (e.g., selection or placements). Hence, a reduced number of false negatives (associated with general integrity testing) may result, because it might be more difficult for test-takers to fake on IATs.

Results of a meta-analysis, including research findings stretched across 85 years (Schmidt & Hunter, 1998), confirmed that integrity, in combination with general mental ability, is the greatest predictor of job performance ($r = .65$). In accordance with this study, the business leader, Warren Buffet, also identified the most important qualities of working individuals as integrity, intelligence and energy. Billionaire Buffet states that, if an individual does not have the first quality, “the other two will kill you” (Bauman, 2013, p. 417). It then comes as no surprise that honesty is rated amongst the top three most desired personal attributes across occupations in the United States (Sackett & Walmsley, 2014). It is for this reason that researchers aim to develop implicit measures to assess integrity-related personality traits. For example, Fine and Gottlieb-Litvin (2013) developed a Conditional Reasoning Test (CRT) to detect counter-productive behavior by means of justification mechanisms. In this specific study, although counter-productive behavior was indirectly assessed, the test-items were still too obvious. Hence, respondents were able to fake their responses, making test results invalid. Whilst there are numerous types of implicit tests (see Appendix A, Chapter 2), the IAT is the most practical implicit test to assess personality (De Cuyper et al., 2017), showing significant relationship with corresponding explicit counterparts of personality traits and also with related behavior (Vecchione et al., 2017). Further, the IAT outperforms other latent-reaction response
time measures in terms of popularity (i.e., the number of citations) and internal reliability (Gawronski & De Houwer, 2014). However, the construct validity of personality IATs is still not well-understood (Siers & Christiansen, 2013). Therefore, our main goal was first to develop an IAT-HH and then to establish its construct validity, by using explicit honesty-humility as a basis for comparison. By establishing the construct validity of the IAT-HH, one would be able to apply this measure confidently to assess honesty-humility in an indirect way. However, should the IAT-HH lack construct validity, results obtained from administering this test would be difficult to interpret.

In this study we first report on the development of the IAT-HH. Second, we aim to establish what this test measures by reporting elements of construct validity (i.e., the extent to which variance in the measure reflects variance in the underlying construct). In doing so, we focus on the measurement method (implicit versus explicit) to establish method-related convergence. Next, we determine the nomological network (Cronbach & Meehl, 1955) of the personality trait honesty-humility by illustrating convergence (the degree of confidence that both implicit and explicit honesty-humility are associated in a similar way with theoretically and conceptually related constructs) and discriminant validity (that implicit and explicit honesty-humility vary independently with unrelated constructs in a similar way). Additionally, we also explore whether participants were able to identify the criteria measured (whilst completing the IAT-HH and explicit honesty-humility).

**Developing the IAT-HH**

In line with how others (e.g., Rowatt et al., 2006; Siers & Christiansen, 2013) have gone about in developing personality IATs, we developed an IAT for honesty-humility, which derived from the HEXACO model (Lee & Ashton, 2004).

**Selecting IAT Stimuli**

Novel to the development of personality IATs, in our IAT-HH we decided to include adjectives that best describe the four narrow facets of the global trait, honesty-humility. Thus, the IAT-HH represents two target categories: *high honesty-humility* (with item labels sincere, fair, modest, generous) and *low honesty-humility* (with item labels insincere, immodest, unfair, greedy). However, prior to deciding on the final stimuli included in the IAT-HH, we first present the stimuli to three subject matter experts (SMEs), who were university professors with experience in either personality or the IAT method. We asked the SMEs to give feedback on whether they agreed that the IAT-HH target categories and labels were comprehensible and adequate to capture the honesty-humility trait on an implicit level. Suggestions were made, changes were incorporated, and the final IAT-HH stimuli were approved.
Whilst Table 4.1 illustrates the sequence of the trial blocks and items used, more specific details on how the IAT-HH was administered, and scoring is explained in the measurement section.

Table 4.1
Illustration of the Sequence of Trial Blocks for the Implicit Association Test Designed to Assess Honesty-Humility (IAT-HH)

<table>
<thead>
<tr>
<th>Block</th>
<th>No. of trials</th>
<th>Task function</th>
<th>Stimulus items assigned to left-hand key response</th>
<th>Stimulus items assigned to right-hand key response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>Practice</td>
<td>High honesty-humility</td>
<td>Low honesty-humility</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>Practice</td>
<td>I am</td>
<td>I am not</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>Practice</td>
<td>I am + high honesty-humility</td>
<td>I am not + low honesty-humility</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>Test</td>
<td>I am + high honesty-humility</td>
<td>I am not + low honesty-humility</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>Practice</td>
<td>High honesty-humility</td>
<td>Low honesty-humility</td>
</tr>
<tr>
<td>6</td>
<td>40</td>
<td>Practice</td>
<td>I am + low honesty-humility</td>
<td>I am not + high honesty-humility</td>
</tr>
<tr>
<td>7</td>
<td>40</td>
<td>Test</td>
<td>I am + low honesty-humility</td>
<td>I am not + high honesty-humility</td>
</tr>
</tbody>
</table>

*Note.* The target labels used in IAT-HH for the category *I am* (educated, human, alive, clothed) and *I am not* (illiterate, an astronaut, dead, naked). Target categories were used for high honesty-humility (fair, sincere, generous, modest) and low honesty-humility (unfair, insincere, greedy, immodest).

Pre-pilot Study to Test IAT Stimuli

Next, we conducted an item sensitivity review (Cheung, Van de Vijver, & Leong, 2011) to test whether important terms used in the IAT-HH (and in the cheating task presented in Chapter 3), were meaningful to participants from different cultural backgrounds (see Footnote 1). We conducted this review amongst 16 master students in psychology. One student remarked that it is possible that not all participants would understand the terms used in the IAT-HH (i.e., generous and immodest were specifically mentioned). This concern was also noted by one of our SMEs, who recommended that we include definitions of the IAT stimuli prior to commencing with the IAT-HH. Indeed, a prerequisite of including IAT stimulus is that respondents should be familiar with the concepts used during the test (Brunel, Tietje, & Greenwald, 2004). Therefore, before participants started the IAT-HH, a definition for each of the item labels was presented, as illustrated in Table 4.2.
Table 4.2

Definitions of Item Labels for Both High and Low Honesty-Humility Target Categories in the IAT-HH

<table>
<thead>
<tr>
<th>Low honesty-humility</th>
<th>High honesty-humility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insincere – saying or doing something that I do not really mean or believe.</td>
<td>Sincere – only saying/showing what I really think or feel.</td>
</tr>
<tr>
<td>Unfair – not right or fair according to a set of rules or principles, not treating people equally.</td>
<td>Fair – treating people equally or in a way that is reasonable.</td>
</tr>
<tr>
<td>Greedy – having or showing an intense and selfish desire for more wealth or power.</td>
<td>Generous – willing to give somebody my money, gifts, time or kindness freely.</td>
</tr>
<tr>
<td>Immodest – having or showing a very high opinion of myself and my abilities.</td>
<td>Modest – not talking much about my own abilities or possessions.</td>
</tr>
</tbody>
</table>

Next, we sent out an electronic link via email to colleagues within our department, requesting voluntary participation in our online IAT-HH and cheating task. Four PhD students, two post-doc students and one professor participated, and gave verbal feedback on how they experienced the online tasks. The main aim of this small pilot study was to use suggestions to improve the IAT-HH and cheating task, and to test whether data were correctly captured online. Feedback included that some IAT-items (e.g., *I am educated*) might have a positive connotation, whereas some targets (e.g., *I am not dead*) might have a negative connotation. Further, targets for high honesty-humility (e.g., *modest*) might have a positive connotation, whereas the targets for low honesty-humility (e.g., *immodest*) might be associated negatively. Thus, the concern was that selecting target categories, which indicate a strong association between *I am* and *honest* to begin with, might lead to a baseline IAT-effect, meaning that the real *I am honest/dishonest* association cannot be determined accurately and that the IAT-effect could reflect an artefact from the labels (i.e., capturing nothing but positive–negative valence). Therefore, we also needed to determine whether the IAT-HH target labels and categories correlated to positive–negative valence (Siers & Christiansen, 2013).

Pilot Study to Determine Valence of IAT-HH Target Labels

To test whether the IAT-HH related to positive–negative valence, we created a second IAT (IAT-Valence illustrated in Table 4.3). We equally balanced the positive–negative valence of the trait categories in the IAT-Valence, in the same way as in the IAT-HH, and we tested whether these two IAT scores correlated (Schnabel et al., 2008). In addition, to maintain standardized procedures, we provided participants with the definitions for each of the item labels used in the IAT-Valence, prior to commencing with the test (exactly as in the IAT-HH). Table 4.4 presents the definitions of item labels used in the IAT-Valence.
Table 4.3

Illustration of the Sequence of Trial Blocks for the Implicit Association Test Designed to Assess Valence (IAT-Valence)

<table>
<thead>
<tr>
<th>Block</th>
<th>No. of trials</th>
<th>Task function</th>
<th>Items assigned to left-key response</th>
<th>Items assigned to right-key response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>Practice</td>
<td>Positive words</td>
<td>Negative words</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>Practice</td>
<td>I am</td>
<td>I am not</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>Practice</td>
<td>I am + positive words</td>
<td>I am not + negative words</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>Test</td>
<td>I am + positive words</td>
<td>I am not + negative words</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>Practice</td>
<td>Positive words</td>
<td>Negative words</td>
</tr>
<tr>
<td>6</td>
<td>40</td>
<td>Practice</td>
<td>I am + negative words</td>
<td>I am not + positive words</td>
</tr>
<tr>
<td>7</td>
<td>40</td>
<td>Test</td>
<td>I am + negative words</td>
<td>I am not + positive words</td>
</tr>
</tbody>
</table>

Note. The target labels used in IAT-Valence for the category I am (educated, human, alive, clothed) and I am not (illiterate, an astronaut, dead, naked). Target categories were used for positive valence (enthusiastic, friendly, optimistic, joyful) and negative valence (unenthusiastic, unfriendly, pessimistic, joyless).

Table 4.4

Definitions of Item Labels for Both Positive and Negative Valence Target Categories in the IAT-Valence

<table>
<thead>
<tr>
<th>Positive valence</th>
<th>Negative valence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enthusiastic – feeling or showing a lot of excitement and interest about somebody/something.</td>
<td>Unenthusiastic – not having or showing enthusiasm.</td>
</tr>
<tr>
<td>Friendly – making someone feel relaxed and as though they are among friends.</td>
<td>Unfriendly – not kind, but unpleasant toward somebody.</td>
</tr>
<tr>
<td>Optimistic – expecting good things to happen or something to be successful.</td>
<td>Pessimistic – expecting bad things to happen or something not to be successful.</td>
</tr>
<tr>
<td>Joyful – to be very happy and causing others to be happy.</td>
<td>Joyless – without joy and bringing no happiness to others.</td>
</tr>
</tbody>
</table>

To test the relationship between the two IAT scores, we conducted a pilot study amongst a South African university student sample ($N = 35$; 19 women and 16 men); aged between 19 and 45 years ($M = 24.2$; $SD = 6.5$); consisting of undergraduate students ($n = 19$) and postgraduate students ($n = 16$). Both the IAT-HH and IAT-Valence were scored according to the improved algorithm of Greenwald et al. (2003), which is fully described in the method section (of this chapter). Both IATs showed to be reliable, since the spit-half reliability was acceptable for both the IAT-HH ($r = .77$) and the IAT-Valence ($r = .75$).

Our results revealed that the IAT-HH score did not significantly relate to that of the IAT-Valence ($r = -.009$, $p = .96$). From this result, we inferred that the IAT-HH did not capture
positive–negative valence. This finding also suggests that the IAT-HH is based on the assessment of semantic content (i.e., based on the narrow facets that honesty-humility comprises). In addition, the IAT-HH might be suitable for the assessment of honesty-humility, should further evidence of content validity be established (Schnabel et al., 2008).

In sum, during the development of the IAT-HH, we established that the stimuli used in the IAT-HH were representative of the narrow facets of honesty-humility, that item labels were comprehensible for participants (coming from different cultural backgrounds), and that the IAT-HH captured some meaningful construct (i.e., it was not contaminated by positive–negative valence). However, to determine what the IAT-HH measured, we proceeded with our main study to establish construct validity. In deciding how to assess the validity of our IAT-HH, we first needed to define validity and establish the process of validation.

**Determining the Construct Validity of the Implicit Association Test for Honesty-Humility**

Validity can be defined as “an integrated evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of inferences and actions based on test scores or other modes of assessment” (Messick, 1989, p. 13). Furthermore, validation is about providing meaning to a test (Borsboom, Mellenbergh, & Van Heerden, 2004). Thus, showing that an implicit test adheres to various forms of validity (e.g., convergent and discriminant in terms of the trait being measured and the method being used), acts as an important indicator for the utility of a test (Costantini et al., 2015).

Therefore, we aimed to establish the construct validity of IAT-HH in two ways. First, we tested the convergence of the implicit versus explicit measurement method for honesty-humility, in order to determine whether both measures capture exactly the same construct, are only related, or if implicit and explicit honesty-humility are distinct concepts (Nosek & Smyth, 2007). By using confirmatory factor analysis (CFA), we established whether the implicit and explicit measures were related (i.e., measuring the same underlying construct) but also distinct (showing variation in the method used). Second, like other researchers (e.g., Rowatt et al., 2006; Van der Kaap-Deeder, De Houwer, Hughes, Spruyt, & Vansteenkiste, 2018) we determined the nomological network of implicit and explicit honesty-humility measures to test how they correlate with other conceptually relevant variables (i.e., social desirability, cognitive ability and the ability to identify criteria), which are theoretically associated (positively, negatively, or not at all).
Establishing Convergence of Implicit and Explicit Honesty-Humility Methods

When validating IATs, it is important first to establish how the two different measurement procedures relate to each other (i.e., the relation between the IAT-HH and self-report measure assessing honesty-humility). Convergent validity is demonstrated when indicators of a given trait correlate highly across the measurement method. Whereas strong correlations can be interpreted as more evidence of convergent validity, weak correlations can be interpreted as little support to claim convergent validity (Nosek & Smyth, 2007). Meta-analyses have found that the relation between implicit and explicit scores, measuring the same construct, show small to moderate convergent validity estimates. Depending on the criterion measured, correlations range from $r = .17$ to $.48$ (Bar-Anan & Nosek, 2014; Greenwald et al., 2009), averaging around $r = .25$ (Greenwald et al., 2015). More recent research shows that the higher the implicit–explicit intercorrelation, the higher the expected concurrent validity of the implicit measure to predict relevant criteria (Kurdi et al., 2018). However, if implicit–explicit intercorrelations are too high (e.g., $r > .70$), it would imply that both measures are tapping into the same process, making it futile to assess honesty-humility using both methods (Bornstein, 2002). On the other hand, no or low intercorrelations between implicit and explicit measures could imply that the two methods tap into different constructs. Thus, either one of the two methods may not be suitable to measure the specified construct (i.e., honesty-humility).

Additionally, the correlation between implicit and explicit measures reveal the degree of relatedness, and is therefore considered an indicator of convergent validity (Richetin, Richardson, & Mason, 2010). Prior studies have shown that implicit and explicit constructs are related, but distinct, for instance, Cunningham, Nezlek, and Banaji (2004) who found that implicit and explicit measures of ethnocentrism revealed related, but distinct factors. Likewise, Nosek and Smyth (2007) also established that across seven general attitude domains, a model describing implicit versus explicit attitudes as distinct latent factors, provides a better fit than a single-factor conceptualization. Similarly, we were also interested to establish whether honesty-humility, when measured with an implicit versus an explicit test, shows to be a one-factor (i.e., depicted as one global latent construct) or a two-factor model (where implicit and explicit honesty-humility are two separate, unrelated constructs), or whether implicit and explicit honesty-humility are both related, but also distinct factors. Therefore, alike Nosek and Smyth (2007), we sought to demonstrate the convergence across the two measurement types (i.e., that the IAT and self-report tests for honesty-humility used different measurement methods to capture the same construct). Although we pioneered the IAT-HH (i.e., specifically based on narrow facets), we expected that:
**Hypothesis 1.** The relationship between implicit honesty-humility (i.e., the IAT-HH) and explicit (self-report) honesty-humility will show low to medium, positive correlation (H1a), but that implicit and explicit honesty-humility will also be distinct (H1b).

**Examining the Nomological Network of Implicit and Explicit Honesty-Humility: Social Desirability, Cognitive Ability and the Ability to Identify Criteria (ATIC)**

Next, we wanted to establish whether the implicit (IAT-HH) and the explicit (self-report) measure of honesty-humility showed the same pattern of correlations with other variables, theoretically associated in predictable ways. Like other researchers (e.g., Rowatt et al., 2006; Van der Kaap-Deeder et al., 2018), we explored how both implicit and explicit measures converge with related and dissociate from unrelated constructs. By determining whether the correlations of the IAT-HH and self-report measures of honesty-humility were associated with other constructs, we aimed to gain deeper insight about the construct into which the IAT-HH taps. Based on the fundamental principle of the nomological network, we tested how the honesty-humility global trait related to other independent constructs when measured with an implicit and self-report (explicit) measure. As suggested by Cronbach and Meehl (1955), such a nomological network is described in terms of positive or negative correlations and is not focused on the magnitude of such relationships.

**Establishing convergent validity of implicit honesty-humility with social desirability.** Results in the field of personality show that honesty-humility significantly relates positively to social desirability (De Vries, Zettler, & Hilbig, 2014; Zettler et al., 2015). Previous researchers describe social desirability as “distorting one’s self-presentation to make a favorable impression upon others” (Blake, Valdiserri, Neuendorf, & Nemeth, 2006, p. 1625). However, evidence suggests that social desirability scales also represent substantive individual differences in personality (Lönnqvist, Paunonen, Tuulio-Henriksson, Lönnqvist, & Verkasalo, 2007). Connelly and Chang (2016) found that social desirability reflects elements of both substance (i.e., trait variance of honesty-humility) and style (i.e., positive self-descriptions). Further studies on the association between social desirable responding and honesty-humility found that social desirability does indeed reflect an element of real honesty (Müller & Moshagen, 2018), since individuals high on social desirability were associated with less cheating during a coin-tossing task. Also, amongst the broad dimensions of the HEXACO personality model, honesty-humility has been found to be the strongest predictor of real cheating (Heck, Thielmann, Moshagen, & Hilbig, 2018). Therefore, honest individuals score high on both social desirability
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and honesty-humility. In fact, social desirability has shown direct, high positive correlation with honesty-humility, averaging around $r = .50$ (Dunlop et al., 2017). Hence, individuals high on social desirability do not just present themselves in a socially favorable way, they also seem to behave more honestly and in ways generally approved or desired by society. In line with these findings, we expected that:

**Hypothesis 2.** Social desirability will relate positively to both implicit honesty-humility (H2a) and to explicit honesty-humility (H2b), and both implicit and explicit honesty-humility will be related to social desirability in a similar way (H2c).

Establishing discriminant validity of implicit honesty-humility with cognitive ability. Researchers have found that the broad personality trait, honesty-humility, does not relate to general mental ability ($r = -.03$) (Marcus et al., 2016), nor does it significantly relate to cognitive ability ($r = -.03$) (Oh et al., 2014). Additionally, numerous researchers have criticized the construct validity of the IAT (e.g., Blanton & Jaccard, 2006; Blanton et al., 2009; McFarland & Crouch, 2002; Mitchell & Tetlock, 2017; Oswald, Mitchell, Blanton, Jaccard, & Tetlock, 2013), suggesting that the response patterns from the IAT may be a confound measure of cognitive ability and that IAT scores do not reflect any meaningful construct (such as personality traits). However, in justifying the validity of the IAT, the new scoring algorithm by Greenwald et al. (2003) controls for method-specific variance. By using the D-score algorithm, the confound effect of individual differences in cognitive ability (and also age) are successfully controlled for (Mierke & Klauer, 2003). By re-analyzing the same IAT data from studies criticizing the IAT as a confound measure of cognitive ability (e.g., McFarland & Crouch, 2002), results confirmed that the IAT is indeed a valid assessment of (relative strengths of associations between) concepts and attributes (Cai, Sriram, Greenwald, & McFarland, 2004), declaring the IAT a scientifically valid measure (Rudman, 2008). Furthermore, results from various meta-analyses show that the IAT is a valid method to assess personality (De Cuyper et al., 2017), not tapping into cognitive ability. Considering these findings, we expected that:

**Hypothesis 3.** Cognitive ability will be unrelated to both implicit honesty-humility (H3a) and explicit honesty-humility (H3b).

**Implicit and explicit honesty-humility and the ability to identify criteria (ATIC).** The difference between implicit and explicit measures is found in the complexity of the
processes used to assess an attribute. Whereas *implicit measurement* denotes assessing attitudes indirectly (inferred from spontaneous reaction on performance-based procedures), *explicit measurement* signifies direct measurement, or fully considered, self-report assessments (De Houwer & Moors, 2010). This is another reason why implicit measures are considered more difficult to fake in comparison to self-report measures of the same construct. Although IATs are not immune to faking (Fiedler & Bluemke, 2005; Steffens, 2004), faking becomes probable with increasing experience on the IAT, when participants are instructed to fake their responses (Fiedler, Messner, & Bluemke, 2006; Hu et al., 2012) or having knowledge on when to speed up or slowdown on IAT trials (Greenwald et al., 2009; Kim, 2003; Sartori et al., 2008). Therefore, the IAT is considered less transparent and more difficult to fake (as compared to explicit tests). However, test-takers have been found to have insight into, or show a level of awareness of their own implicit attitudes, given that individuals are able to accurately predict their own IAT scores (Hahn et al., 2014). Therefore, implicit attitudes are not necessarily inaccessible to introspection, and test-takers are not entirely oblivious to what is being measured when taking an IAT.

As in the case of IATs, previous studies have found that when test criteria are made transparent (e.g., in assessment centers), testing becomes easier, and increased performance can be expected (Kleinmann, 1993). This ability to perceive performance criteria correctly, especially during evaluative situations, has been labeled ATIC (i.e., ability to identify criteria; Kleinmann, 1993). ATIC emerges across various evaluation procedures (e.g., assessment centers, interviews and personality questionnaires) when people show the ability to identify criteria and perform well on target dimensions (Melchers et al., 2009). Thus, individuals high on ATIC perform well on testing criteria, because they recognize the dimensions measured and know how to respond in order to create a positive impression.

Further, ATIC is an ability measure and not just a self-report measure, which relates to cognitive ability scores. However, even after controlling for cognitive ability, the ATIC effect still holds (König, Melchers, Kleinmann, Richter, & Klehe, 2007). Therefore, ATIC explains why some candidates might perform better than others during assessment situations. For example, individuals high on ATIC also score high on self-report integrity measures (König, Melchers, Kleinmann, Richter, & Klehe, 2006). Additionally, researchers have found that candidates who perform well during situational and structured interviews, also perform well on the actual job (Ingold, Kleinmann, König, Melchers, & Van Iddekinge, 2015). This implies that during assessments, people perform better on dimensions they recognize, rather than on dimensions they cannot identify. This ability also helps individuals to perform well, not only during assessment situations, but also in real life.
In our study, we wanted to test whether participants had the ability to identify what is being assessed with the implicit (i.e., an indirect, performance-based procedure) and explicit honesty-humility measures respectively (i.e., self-report items; thus, possibly dimensions that are easy to identify). Since no prior studies have tested the relationship between ATIC (captured in a novel way) and implicit honesty-humility (compared to the relationship between ATIC and explicit honesty-humility), we did not predict a directional (positive or negative) relationship. Moreover, since our data were collected in a low-stake condition (i.e., not for assessment purposes), we did not necessarily expect individuals, high or low on ATIC, to perform better or worse on either the implicit or explicit honesty-humility measure. However, in line with the arguments for establishing construct validity for the implicit honesty-humility (i.e., that implicit and explicit measures of honesty-humility should be associated with theoretical constructs in a similar way), we posited:

**Hypothesis 4.** Implicit and explicit honesty-humility will relate in a similar way to the ability to identify criteria (ATIC).

**Method**

**Participants and Procedure**

Our sample consisted of Flemish university students (N = 178; 137 women and 41 men) aged between 21 and 53 years (M = 24.34; SD = 4.7), comprising of psychology (n = 94) and medical (n = 84) students. All participants gave informed consent prior to the data collection and each participant was awarded three euro for participation. The study was approved by the university ethics committee.

Initially, 178 respondents started with the data collection process. However, since data were collected at separate timepoints over the period of almost four months, eight students dropped out of the course (of which seven were part-time medical students). Out of the participants who started (N = 178), only 170 participated in the full data collection. Furthermore, of the total sample, the IAT data of seven participants were not recorded (due to technical errors or non-participation) and two participants’ data were removed, since they had 10% trials < 300 ms. The total sample in our analyses ranged between N = 163 and 178 (depending on the variable showing missing data).

Since our research involved testing within-person variability of personality and inter-individual differences, it was important to keep conditions as similar as possible for all participants during our data collection. Since implicit measures—which can be used to predict
behavior—are relevant “in some conditions, for some people, for some behaviors, with some tasks” (Perugini et al., 2010, p. 38), we did not counterbalance test items or IAT blocks. Additionally, when determining the validity of an IAT, counterbalancing IAT block-orders might make it more difficult to detect existing relationships between variables, as compared to not counterbalancing (Lane, Banaji, Nosek, & Greenwald, 2007).

It should be noted that the data presented in Chapters 4 and 5 were collected in a sequential fashion. While Chapter 4 reports what the IAT-HH measures, we continue in Chapter 5 to address what the IAT-HH predicts (i.e., addressing two different forms of validity in each respective chapter). Figure 4.1 presents a graphic illustration of the order in which tests were administered.

<table>
<thead>
<tr>
<th>Chapter 4: Development and construct validation of the IAT-HH</th>
<th>Chapter 5: Determining the criterion-related validity of the IAT-HH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing the IAT-HH</td>
<td>Validating the IAT-HH (Empirical study, N = 178)</td>
</tr>
<tr>
<td>(Item sensitivity review)</td>
<td>Time 1</td>
</tr>
<tr>
<td>N = 16</td>
<td>IAT-HH</td>
</tr>
<tr>
<td>Items used in: IAT-HH</td>
<td>Time 2</td>
</tr>
<tr>
<td>Cheating task</td>
<td>IAT-HH (five weeks later)</td>
</tr>
<tr>
<td>(Pilot study) N = 35</td>
<td>Cheating task (objective)</td>
</tr>
<tr>
<td>IAT-HH</td>
<td>(two weeks later)</td>
</tr>
<tr>
<td>(Pilot study) N = 7</td>
<td>Counter-academic behavior</td>
</tr>
<tr>
<td>Cheating task (objective and self-confessed)</td>
<td>Cheating (self-confessed)</td>
</tr>
<tr>
<td>IAT-Valence</td>
<td>Ability to identify criteria (ATIC)</td>
</tr>
<tr>
<td>IAT-HH</td>
<td>Questions 1 – 6</td>
</tr>
<tr>
<td>Cheating task (objective)</td>
<td>Question 7</td>
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<td>Social desirability</td>
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<tr>
<td>Ability to identify criteria (ATIC)</td>
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<td></td>
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</tbody>
</table>

*Figure 4.1. Illustration of the order of test administration for data presented in Chapters 4 and 5*

**Measures**

Implicit association test for honesty-humility (IAT-HH). To test implicit honesty-humility, we developed an Implicit Association Test (IAT; Greenwald et al., 1998) and called it the IAT-HH. The IAT-HH was programmed and administered online with Inquisit Millisecond (Draine, 2016). Stimuli for target categories consisted of *I am (educated, human, alive, clothed)* versus *I am not (illiterate, an astronaut, dead, naked)* as well as categories for high honesty-humility (*fair, sincere, modest, generous*) versus low honesty-humility (*unfair, insincere, immodest, greedy*), which were based on the narrow facets of honesty-humility (Lee & Ashton, 2004).

One prerequisite of IAT stimulus selection is that respondents should be familiar with concepts (Brunel et al., 2004). Additionally, during the IAT-HH development phase, SMEs
DEVELOPMENT AND CONSTRUCT VALIDATION OF AN IAT-HH

recommended that concepts used in the IAT-HH be explained to participants. Therefore, before starting the IAT-HH, participants were given the definition of each item label used to assess the target categories for high honesty-humility (i.e., sincere, fair, generous, modest) and low honesty-humility (i.e., insincere, unfair, greedy, immodest). All IAT-HH target categories and labels are listed in Table 4.1 and specific definitions are provided in Table 4.2.

The IAT-HH was scored according to the improved algorithm by Greenwald et al. (2003). Although various IAT scoring algorithms exist, the traditional D-score is a good measure and is still the most well-documented in the IAT literature (Richetin, Costantini, Perugini, & Schönbrodt, 2015). Based on this improved algorithm (Greenwald et al., 2003), the Shiny App was developed (De Schryver, 2018), which allows researchers to upload IAT data to calculate IAT-effects. This program (found online at http://datapp.ugent.be/shiny/implicit/) also allows for the calculation of the split-half reliability (based on an odd–even split and corrected by the Spearman–Brown formula). Based on the abovementioned improved scoring algorithm, the IAT-HH score (also referred to as the D-score or the IAT-effect) was calculated\(^2\) in the following way:

- eliminating all trials with latencies greater than 10 000 ms;
- including error trials in the analysis by using the latency between stimulus presentation and correct response;
- subtracting the mean latency for the critical trials of the I am and honest block from the mean latency for the critical trials of the I am and dishonest block; and
- computing the IAT-effect by dividing the above difference by the individual respondent reaction time standard deviation.

Whilst a high IAT-effect suggests a stronger association between self and high honesty-humility, a low score suggests a stronger association between self and low honesty-humility. None of our participants had fewer than the required 160 trials, but two participants had 10\% reaction time faster than 300 ms, and were therefore removed from the IAT database. The split-half reliability of the IAT-HH showed to be acceptable (based on an odd–even split and corrected by the Spearman–Brown formula, \(r = .77\)).

Explicit honesty-humility. The 16 items measuring honesty-humility were extracted from the revised HEXACO Personality Inventory (Lee & Ashton, 2004, 2016). Participants were asked to self-report on the items (e.g., I’d be tempted to use counterfeit money, if I were

\(^2\) We thank Dr. De Schryver for assisting in the calculation of the IAT-HH D-score and split-half reliability.
sure I could get away with it) and to select a response on a five-point Likert-type scale, ranging from 1 (strongly disagree) to 5 = strongly agree). The internal consistency for the global trait, honesty-humility, was acceptable (α = .78). Likewise, the internal consistency for each of the narrow facets, namely fairness (α = .71), greed avoidance (α = .70), modesty (α = .65) and sincerity (α = .75) were also acceptable.

Social Desirability Scale (SDS-17). The Social Desirability Scale (SDS-17; Stöber, 1999) originally comprised 17 items, but Stöber (2001) recommends that one unsuitable item (I have tried illegal drugs for example, marijuana, cocaine, etc.) be excluded. Thus, the SDS consists of 16 items, of which six are reverse-scored, which presents responses on a Likert-type scale as (1 = strongly disagree to 5 = strongly agree). Example items include I always accept others’ opinions, even when they don’t agree with my own and I take out my bad moods on others now and then (reverse-scored). The SDS-17 is a reliable and valid measure of social desirability, suitable for adults of 18 to 80 years of age and shows good reliability in cross-cultural contexts (Blake et al., 2006; Stöber, 2001). In our data, we deleted one reverse-scored item (i.e., sometimes I only help because I expect something in return), which improved the Cronbach’s α from .53 to .65.

Cognitive ability. To assess cognitive ability, we used the International Cognitive Ability Resource (ICAR; Condon & Revelle, 2014), which is a reliable, valid open-source test. The test consists of 16 items, representing three different general type of questions, namely pattern completion, cube rotation, and direct questions (e.g., If the day after tomorrow is two days before Thursday, then what day is it today). All questions have six response options from which to choose, of which only one is correct. The ICAR test was administered during class-time as a pen-and-paper test, under standardized testing conditions (i.e., strict supervision, no communication and cellular phones off). The reason for doing it this way was to prevent students from cheating on the cognitive measure. The test was untimed and all students completed the test within less than one hour. The ICAR showed to have acceptable internal consistency (α = .68).

Ability to Identify Criteria (ATIC). To measure ATIC, we developed a test to assess how well participants were able to detect what criteria were assessed during our data collection (see Appendix C: Supplementary Material for Scoring ATIC). ATIC can be tailored to fit a situation; therefore, we operationalized ATIC in a similar way as structured interviews and personality inventories (König et al., 2006; Melchers et al., 2009). By customizing typical instructions (Jansen, Lievens, & Kleinmann, 2011), we asked respondents what they thought or
assumed were being assessed, specifically during the implicit and explicit honesty-humility measures and also at the end of our research, when all the data had been collected. Since ATIC is an actual ability on which participants can give correct or incorrect answers, we transformed respondents’ qualitative answers into quantitative data. Finally, respondents’ (ATIC) answers were captured as a continuous variable.

In deciding how to operationalize and score ATIC, three SMEs were consulted (i.e., two experts with specific knowledge on operationalizing ATIC and one with knowledge on the relevant criteria, namely honesty-humility and the narrow facets that it comprises). Two SMEs gave advise on how to assess ATIC in our specific situation (i.e., during data collection for research purposes; not during assessments or high-stake conditions where ATIC is most often researched). Seven different questions were used to assess ATIC. Questions 1 to 6 were measured after participants had completed the implicit and explicit honesty-humility measures, whilst Question 7 was posed after all data had been collected. The third SME advised us on how to score ATIC, specifically linking respondents’ qualitative answers to quantitative scores, which were based on the magnitude of correlation for co-variates, associated with honesty-humility. In calculating the final ATIC scores, the main researcher quantified respondents’ open responses (qualitative answers) by coding it with either 0 (<.10, incorrect answer/have no idea), or 1 (> .10 or small relation to honesty-humility), 2 (> .30 or medium relation to honesty-humility), 3 (> .50 or large relation to honesty-humility); or 4 (> .90, fully correct answer). Next, respondents’ scores were summed to a final score out of 28. The final scoring-system was double checked by a master’s student in psychology and a second volunteer. Finally, one SME was provided with the results, and was invited to provide further input and/or approval. The internal consistency of the seven separate items showed to be acceptable (α = .61).

Results

Table 4.5 reports means, standard deviations and correlations of the study variables in our main research study.

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3 We thank Prof. F. Lievens, Prof M. Kleinmann and Prof R.E. de Vries for sharing their ideas on how to operationalize and score ATIC.
Table 4.5  
Means, Standard Deviations and Intercorrelations of Study Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
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<td>1. Gender</td>
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<td>.422</td>
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<td>2. Age</td>
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<td>3. Explicit HH</td>
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<td>0.17*</td>
<td>.78</td>
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<tr>
<td>4. Explicit Sincere</td>
<td>3.19</td>
<td>0.75</td>
<td>0.01</td>
<td>0.18*</td>
<td>.68**</td>
<td>.78</td>
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<td>5. Explicit Fair</td>
<td>3.79</td>
<td>0.77</td>
<td>0.21**</td>
<td>0.08</td>
<td>.67**</td>
<td>.23**</td>
<td>.71</td>
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<td>6. Explicit Greed Av</td>
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<td>0.70**</td>
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<td>.70</td>
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<td>7. Explicit Modest</td>
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<td>.21**</td>
<td>.29**</td>
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<td>8. IAT-HH</td>
<td>0.87</td>
<td>0.26</td>
<td>0.05</td>
<td>0.13</td>
<td>0.18*</td>
<td>0.10</td>
<td>0.12</td>
<td>0.17*</td>
<td>0.07</td>
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<tr>
<td>9. IAT Sincere</td>
<td>0.99</td>
<td>0.41</td>
<td>0.07</td>
<td>0.14</td>
<td>0.06</td>
<td>-0.03</td>
<td>0.09</td>
<td>0.09</td>
<td>-0.00</td>
<td>.62**</td>
<td></td>
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</tr>
<tr>
<td>10. IAT Fair</td>
<td>1.01</td>
<td>0.41</td>
<td>0.05</td>
<td>0.06</td>
<td>0.13</td>
<td>0.05</td>
<td>0.13</td>
<td>0.15</td>
<td>0.01</td>
<td>.61**</td>
<td>.31**</td>
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<tr>
<td>11. IAT Greed Av</td>
<td>0.91</td>
<td>0.44</td>
<td>0.01</td>
<td>0.14</td>
<td>0.18*</td>
<td>0.10</td>
<td>0.17*</td>
<td>0.14</td>
<td>0.06</td>
<td>.65**</td>
<td>.41**</td>
<td>.35**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. IAT Modest</td>
<td>0.91</td>
<td>0.44</td>
<td>0.02</td>
<td>0.11</td>
<td>0.22**</td>
<td>0.23**</td>
<td>0.07</td>
<td>0.19*</td>
<td>0.10</td>
<td>.64**</td>
<td>.29**</td>
<td>.39**</td>
<td>.24**</td>
<td></td>
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</tr>
<tr>
<td>13. SD</td>
<td>3.27</td>
<td>0.37</td>
<td>-0.20**</td>
<td>0.17*</td>
<td>.40**</td>
<td>.38**</td>
<td>.27**</td>
<td>.19*</td>
<td>.22**</td>
<td>.12</td>
<td>-0.03</td>
<td>0.11</td>
<td>0.11</td>
<td>0.08</td>
<td>.65</td>
<td></td>
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<td>14. ICAR</td>
<td>11.85</td>
<td>2.23</td>
<td>-0.20*</td>
<td>0.02</td>
<td>0.08</td>
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<td>-0.09</td>
<td>0.07</td>
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<td>0.09</td>
<td>0.05</td>
<td>.68</td>
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</tr>
<tr>
<td>15. ATIC</td>
<td>15.60</td>
<td>5.63</td>
<td>-0.07</td>
<td>-0.15</td>
<td>0.02</td>
<td>0.04</td>
<td>-0.04</td>
<td>0.08</td>
<td>-0.02</td>
<td>0.18*</td>
<td>0.07</td>
<td>0.10</td>
<td>0.10</td>
<td>0.13</td>
<td>0.24**</td>
<td>.61</td>
<td></td>
</tr>
</tbody>
</table>

Notes. N size ranged from 163 to 178 due to missing data.  
Internal consistencies for self-report measures (α) are available in bold on the diagonal.  
The IAT-HH latency ranged from 0 to 1.5 and split-half reliability = .77.  
*a* Gender was coded 1 = male and 2 = female; b HH = Honesty-humility; b IAT-HH = Implicit Association Test Honesty-humility  
d SD = Social Desirability; e ICAR = International Cognitive Ability Resource; f ATIC = Ability to Identify Criteria.  
*p < .05. ** p < .01 (two-tailed).
In testing whether implicit and explicit honesty-humility show low to medium positive correlation (H1a), we found that the implicit (IAT-HH) score related to that of explicit (self-report) scores of honesty-humility ($r = .18, p = .03$).

Next, to test whether the implicit and explicit honesty-humility also showed to be distinct (H1b), we ran CFA in LAVAAN (Rosseel, 2012), a package in R version 3.5.1, to test three separate models (i.e., to test if implicit and explicit honesty-humility showed to be one global factor, two separate factors or two factors that are distinct, but also related). For explicit honesty-humility we included the four items for each narrow facet as a parcel (i.e., fairness, sincerity, greed avoidance, modesty). For the implicit measure, we followed a homogenous parceling strategy in which the items in the parcel were related to one another, forming a homogenous group (Marsh, Lüdtke, Nagengast, Morin, & Von Davier, 2013), based on the narrow facets of implicit honesty-humility, namely fairness, sincerity, greed avoidance, modesty.

As a rule of thumb we used the following criteria for good model fit (Hu & Bentler, 1999): comparative fit index or goodness-of-fit indices (CFI/GFI) values > .90; standardized root mean square residual (SRMR) < .05 indicating good fit (.08 deemed acceptable); root mean square error of approximation (RMSEA) < .05 (good) and <.08 (close), smaller chi-square (indicating poor fit). Finally, we based our primary criterion for judging whether one model significantly improved on the fit of another, on the RMSEA of the change in fit (e.g., Nosek & Smyth, 2007).

In assessing the fit indices of each model (as seen in Table 4.6), we find that Model 1 shows the poorest fit [$\chi^2$(df) = 52.575(16); $p = .00$; CFI = 0.730; RMSEA = 0.113; SRMR = 0.078]. Whilst the fit indices improve in Model 2 [$\chi^2$(df) = 52.575(16); $p = .00$; CFI = 0.936; RMSEA = 0.113; SRMR = 0.078]; Model 3 shows the best fit [$\chi^2$(df) = 21.014(19); $p = 0.334$; CFI = 0.985; RMSEA = 0.024; SRMR = 0.044].
Table 4.6

Goodness-of-Fit Indices for the Three Measurement Models Tested

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$ (df)</th>
<th>p-value</th>
<th>CFI</th>
<th>GFI</th>
<th>RMSEA</th>
<th>SRMR</th>
<th>AIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1 (One factor)</td>
<td>52.575 (16)</td>
<td>0.00</td>
<td>0.730</td>
<td>0.996</td>
<td>0.113</td>
<td>0.078</td>
<td>2229.098</td>
</tr>
<tr>
<td>Model 2 (Two factors)</td>
<td>28.68 (20)</td>
<td>0.101</td>
<td>0.936</td>
<td>0.998</td>
<td>0.049</td>
<td>0.073</td>
<td>2197.81</td>
</tr>
<tr>
<td>Model 3 (Two distinct but related factors)</td>
<td>21.014 (19)</td>
<td>0.334</td>
<td>0.985</td>
<td>0.998</td>
<td>0.024</td>
<td>0.044</td>
<td>2192.506</td>
</tr>
</tbody>
</table>

The figures below illustrate confirmatory factor analyses (CFAs) of implicit and explicit self-concept of honesty-humility, first as one global factor (Model 1 in Figure 4.2), then as two separate, unrelated factors (Model 2 depicted in Figure 4.3) and finally as two related, but distinct factors (Model 3 presented in Figure 4.4).

Note: HH = honesty-humility; E = explicit, I = implicit, S = sincerity, F = fairness, GA = greed avoidance, M = modesty.

*Figure 4.2. Model 1 depicting honesty-humility as one global factor*
DEVELOPMENT AND CONSTRUCT VALIDATION OF AN IAT-HH

Figure 4.3. Model 2 depicting implicit and explicit honesty-humility as two separate factors

Note: EHH = explicit honesty-humility; IHH = implicit honesty-humility; E = explicit, I = implicit, S = sincerity, F = fairness; GA = greed avoidance, M = modesty.

Figure 4.4. Model 3 depicting implicit and explicit honesty-humility as two distinct, related factors

Note: EHH = explicit honesty-humility; IHH = implicit honesty-humility; E = explicit, I = implicit, S = sincerity, F = fairness; GA = greed avoidance, M = modesty.
Convergent validity between the explicit and implicit approaches is demonstrated by Model 3, which fitted the data better (compared to Model 1), indicating that the explicitly and implicitly measured indicators of honesty-humility are two separate constructs, not one global trait. At the same time, discriminant validity was also demonstrated as Model 3 fitted the data better than Model 2, where the weaker fit in Model 2 indicates that the explicitly and implicitly measured indicators of honesty-humility are unrelated. Finally, Model 3 shows the best fit, illustrating that the implicit and explicit honesty-humility are distinct, but also related constructs. Therefore, both implicit and explicit measures tapped the construct honesty-humility, but are also different, given that they used different measurement methods. Thus, H1b is supported.

To test Hypotheses 2, 3 and 4, we conducted a series of biserial correlations using SPSS v. 25 and Steiger-Z to compare correlations (Steiger, 1980). We conducted both pairwise and listwise deletion to explore results, but in both cases, results remained unchanged.

In testing Hypothesis 2a (i.e., social desirability relates positively to implicit honesty-humility) we found that H2a did not hold \((r = .12, p = .15)\). However, H2b was supported, since social desirability related positively to explicit honesty-humility \((r = .40, p = .00)\). When the two correlations were compared, we found that the implicit versus explicit relationship was not similarly related to social desirability (H2c). As calculated by Steiger \(Z = 3.13, p < .00\) (1-tail) and \(p < .11\) (two-tail), the two relations showed to be significantly different from each other; thus, disconfirming H2c. Therefore, socially desirability related to explicit (self-report) honesty-humility but showed no meaningful relationship to implicit honesty-humility scores.

Next, cognitive ability was unrelated to both implicit honesty-humility (H3a; \(r = .06, p = .50\)) and explicit honesty-humility (H3b; \(r = -.01, p = .87\)), thus confirming Hypotheses 3a and b. Our results found that being high or low on cognitive ability made no difference to respondents’ implicit or explicit honesty-humility scores, since these constructs are theoretically unrelated.

Finally, in testing Hypothesis 4, we explored whether implicit and explicit honesty-humility related similarly to ATIC. We found that the implicit honesty-humility significantly related positively to ATIC \((r = .19, p = .02)\), but explicit honesty-humility and ATIC did not \((r = .04, p = .58)\). This finding suggests that respondents who scored high on ATIC also scored high on implicit honesty-humility (whilst individuals low on ATIC also received lower scores on the implicit honesty-humility test). In retrospect, we took into account the fact that performance on the implicit test might have been influenced by giving participants the definitions of the honesty-humility concepts, prior to commencing on the IAT-HH (as recommended by the SMEs during the development of the test). Additionally, our results also show that respondents, irrespective of being high or low on ATIC, showed no significant
relationship to explicit (self-report) honesty-humility test scores. Therefore, Hypothesis 4 was not confirmed.

**Discussion**

The aim of this current study was twofold. The first aim was to develop a novel measure to assess implicit honesty-humility, and the second aim involved establishing the construct validity of this newly-developed IAT-HH by investigating what the IAT-HH measures.

During the development of the IAT-HH, we needed to establish whether the item labels and target categories that we included were representative of the global trait (and narrow facets), honesty-humility. For this reason, we consulted three SMEs (on honesty-humility, the IAT method and general personality assessment), who gave their approval on the final stimuli included in the IAT-HH.

We determined whether respondents found the selected IAT-HH stimuli comprehensible by asking master’s students in psychology to give feedback on the specific items we used in the IAT-HH. Suggestions (also noted by one SME) included explaining the concepts used prior to commencing the IAT-HH. Therefore, we included definitions of item labels used in the IAT-HH.

Additionally, and to make further improvements to the IAT-HH, we asked colleagues within our department to participate voluntarily in our research and to make suggestions and comments. Feedback included that the IAT-HH stimuli might not be fully neutral, which could lead to the IAT-HH capturing positive–negative valence, rather than a meaningful construct (i.e., honesty-humility). Therefore, we tested item labels and target categories against those of the IAT-Valence (equally balancing the valence in both IATs). Our results showed no relationship between the two IATs; thus, confirming that the IAT-HH was not confounded with positive–negative valence and that it captured some meaningful construct. However, to determine what the IAT-HH was capturing, we continued with our research to establish the construct validity of the IAT-HH.

In achieving our second aim (determining the construct validity of the IAT-HH), we first went about establishing the convergent validity, thus determining whether implicit and explicit honesty-humility were capturing the same construct. We found that the IAT-HH showed small to moderate relation to its explicit counterpart (H1a; $r = .18$). Next, the results of CFAs showed that the implicit and explicit honesty-humility measures were measuring the same underlying construct; however, these two constructs were also distinct, since they were captured with different methods (H1b). According to the multitrait-multimethod matrix
(Campbell & Fiske, 1959), having medium implicit–explicit intercorrelations would be ideal, since no or low relations could be seen as evidence against convergent validity (Bornstein, 2002), implying that either the implicit or the explicit measure lacks validity (Greenwald & Banaji, 2017). On the other hand, having too high intercorrelation (e.g., $r > .70$) would also not suffice, since this would suggest that the implicit and/or explicit measure(s) are confounded and assessing overlapping processes are futile (Bornstein, 2002). In fact, implicit–explicit correlations should not necessarily be high, as expected with the multitrait-multimethod matrix, because implicit and explicit tests use different methods to assess dissimilar underlying motives or cognitions (McClelland et al., 1989). Various meta-analyses have confirmed that implicit–explicit intercorrelations are low to moderate, averaging around $r = .25$ (Greenwald et al., 2015; Greenwald et al., 2009). However, subsequent findings on these meta-analyses have now suggested that stronger implicit–explicit correlations might lead to greater predictive validity of implicit tests (Kurdi et al., 2018).

Second, in order to make inferences about the convergent and discriminant validity of the IAT-HH, we appraised validity estimates based on the nomological network of implicit honesty-humility to determine the degree to which certain explanatory concepts (such as social desirability, cognitive ability and ATIC) account for performance on implicit measures (Messick, 1989). Then the relationship between implicit honesty-humility and respective concepts were compared to that of explicit honesty-humility. To establish convergent validity, we tested whether social desirability would relate to implicit honesty-humility in the same manner as it relates to explicit honesty-humility. In doing so, we found that social desirability did not relate positively to implicit honesty-humility (H2a), but that social desirability and explicit honesty-humility showed a significant positive relationship (H2b) with medium to large effect (Rosenthal, 1996). Previous research has shown that social desirability is a double-edged sword, reflecting both aspects of response bias, but also elements of personality traits (e.g., Connelly & Chang, 2016; Müller & Moshagen, 2018). Therefore, it should be expected that, if social desirability reflects only positive self-description or bias, then it could be expected that explicit (self-report) honesty-humility and social desirability would show a stronger relationship. However, should social desirability reflect only elements of the personality trait variance of honesty-humility, then it would be expected to find a positive relationship between implicit honesty-humility scores and social desirability. In our study, we found that, when comparing the relation between implicit honesty-humility and social desirability, to that of explicit honesty-humility and social desirability (H2c), the latter relation was significantly stronger, as compared to the former. Therefore, our results showed that the implicit honesty-humility measure did not capture variance in social desirability, but the explicit honesty-humility measure did.
To explain this finding, we first considered the *social desirability hypothesis* (Gawronski, LeBel, & Peters, 2007). Also known as the *implicit as lie detector view* (Nosek & Banaji, 2002), the social desirability hypothesis states that implicit measures might measure traits (like honesty-humility) differently to that of explicit measures, because it is more difficult to fake on IATs. To fake on an IAT, respondents require either experience or knowledge of the rationale of the IAT (Fiedler et al., 2006; Hu et al., 2012; Kim, 2003; Sartori et al., 2008). For this reason, implicit measures are generally considered less transparent than explicit measures.

Additionally, previous research also made it evident that social desirability is not only a representation of biased responding, but also represents individual differences in personality (Lönqvist et al., 2007), strongly associated with honesty-humility \((r = .50)\) (Dunlop et al., 2017) reflecting elements of real honesty (Müller & Moshagen, 2018) in the same way that honesty-humility does (Heck et al., 2018). Furthermore, individuals high on honesty-humility are also expected to show highly social desirable behavior (De Vries et al., 2014; Zettler et al., 2015).

Therefore, we can conclude that, in the current research, the implicit measure either did not capture variance in the honesty-humility personality trait (which strongly relates to personality elements of social desirability) or the implicit measure captured honesty-humility successfully (but without the positive self-descriptive elements, generally associated with high social desirability). However, what remains unclear is whether the explicit honesty-humility test is related to social desirability, because social desirability reflects elements of personality (strongly associated with honesty-humility), or whether explicit honesty-humility is positively associated with social desirability due to response bias. If the former idea is correct, then implicit honesty-humility did not show convergent validity. Therefore, the convergent validity of the IAT-HH could not be fully established.

We then continued to investigate the divergent validity of implicit honesty-humility. Since we found that cognitive ability was related to neither the implicit (H3a) nor the explicit measures of honesty-humility (H3b), the divergent validity of the implicit honesty-humility test was confirmed, implying that implicit honesty-humility was not confounded with cognitive ability. This result is in line with the findings of Mierke and Klauer (2003), in that the IAT-effect is not a confound measure of cognitive ability.

To gain deeper insight into the construct validity of the implicit honesty-humility measure, we also explored how ATIC related to implicit honesty-humility (compared to explicit honesty-humility). We found a positive relationship, with small effect (Rosenthal, 1996) between implicit honesty-humility and ATIC. Participants high on ATIC therefore also scored...
high on implicit honesty-humility, and those low on ATIC scored low on the implicit test. This result is somewhat in line with the findings of Hahn et al. (2014), who found that IAT test-takers are aware of (and have insight into) their own implicit attitudes (irrespective of being informed about what the IAT measures). However, with further investigation, we realized that we defined the IAT-HH stimulus to respondents prior to commencing with the test (as recommended by a SME). Since constructs were defined in the IAT-HH, participants high on ATIC might have been sharper on their performance during IAT-HH (leading to a significant positive relationship between implicit honesty-humility and ATIC).

However, this significant, positive relationship was not found between ATIC and explicit honesty-humility. A previous study on ATIC has found a positive relationship between the performance on integrity tests and scoring high on ATIC (König et al., 2006). However, it should be noted that in the study (König et al., 2006, p. 372), the researchers excluded three personality-based subscales from the integrity test used (modesty, conflict avoidance and sensation seeking), “because they seemed problematic in the context of the present study”. Thus, 60 overt and 34 covert integrity items were finally included in this integrity test. These researchers found that ATIC indeed related to overt integrity items ($r = .25$), but not to covert (personality-based) items. In line with our findings, being high or low on ATIC made no difference on respondents’ explicit (self-report) honesty-humility scores. Therefore, it appears that evaluating which criteria are assessed by covert integrity appears to be more difficult for test-takers, because personality-based items are not that transparent.

Finally, in comparing the relationships between ATIC and implicit honesty-humility to the relationship between explicit honesty-humility and ATIC (H4), we found no significant difference between these two relationships. Therefore, implicit and explicit honesty-humility were found to relate to ATIC in a similar way, however the relationship between implicit honesty-humility (as compared to explicit) and ATIC was slightly stronger (i.e., possibly caused by the fact that respondents were made aware of the constructs being assessed by including definitions in the IAT-HH).

**Limitations and Suggestions for Future Research**

Although our study offers novel and valuable findings, some limitations should be addressed. Originally, we incorporated ATIC in our research to explore whether relationships between implicit versus explicit honesty-humility would relate in a similar way. However, explaining honesty-humility constructs (i.e., IAT-HH item labels) might have influenced respondents’ performance on ATIC. However, we do make a novel contribution to measuring ATIC, since ATIC scores significantly correlated ($r = .24$) to that of cognitive ability (ICAR; Condon & Revelle, 2014). This finding is in line with previous research results showing
correlations between ATIC and cognitive ability range between $r = .19$ and $r = .30$ (Melchers et al., 2009), making us more confident that ATIC was operationalized in an acceptable way in the current study. We encourage further studies to operationalize ATIC in the same way and to incorporate this measure to explore the effects of including or excluding definitions of personality constructs used within IATs to investigate how this may influence test performance.

Furthermore, researchers solely interested in assessing ATIC should refrain from defining criteria during the research they undertake (either in implicit or explicit measures), since this might influence participants’ performance or make it easier for respondents to identify criteria.

Additionally, more research is needed to determine how social desirability predicts (dis)honesty in low or high-stake settings and whether it is a personality trait, self-report bias, or perhaps both (and the magnitude of both elements). Further research is also needed to determine whether individuals low on social desirability are indeed dishonest or whether they are individuals who are just honest about their dishonesty, thus being true to themselves, not caring to make socially desirable impressions on others.

Finally, some researchers are of the opinion that self-report measures are not the ‘golden standard’ to determine the construct validity of implicit measures, because implicit and explicit cognitions originate from different underlying cognitive processes (Carter et al., 2013; McClelland et al., 1989; e.g., Nosek & Smyth, 2007). In fact, previous research has found that even when personality IATs show low convergent validity, they might still be adequate in predicting relevant criteria. For example, depending on the construct assessed, findings on construct validity for IATs show to average around $r = .25$ (Greenwald et al., 2015). However, the criterion-related validity for (intergroup behavior) IATs may range between $r = .02$ and $r = .37$ (Kurdi et al., 2018). Additionally, meta-analyses findings on implicit measures for personality (e.g., Big Five traits, shyness, aggression, altruism) show that the criterion-related validity range from $r = .13$ to $r = .25$, although it has been noted that estimates are larger for extraversion and agreeableness and smaller for other personality traits (De Cuyper et al., 2017). Therefore, academics are urged to continue research on personality-IATs to establish more concrete evidence of construct validity (Perugini et al., 2018). Although we established some elements of construct validity in the current study, further research is needed to establish whether the IAT-HH could predict integrity-related outcomes.

**Summary and Conclusion**

To summarize our findings, by investigating the nomological network of implicit honesty-humility, we established that the implicit honesty-humility test (i.e., IAT-HH) assessed
the same underlying construct as its explicit counterpart (i.e., honesty-humility self-report measure) and that these measures are distinct (capturing honesty-humility in two very different ways). Explicit, but not implicit honesty-humility related to social desirability (i.e., a construct consisting of both personality substance and self-descriptive style). This finding is due either to the fact that the implicit measure did not capture variance in the honesty-humility personality trait (which strongly relates to personality elements of social desirability, which implies that the IAT-HH may not be a valid test of honesty-humility), or the implicit measure successfully captured honesty-humility (but without the positive self-descriptive elements generally associated with high social desirability). Further investigation showed that ATIC related to the implicit test, but not to the explicit honesty-humility test. In retrospect, including definitions (i.e., about the constructs used in the IAT-HH) might have influenced respondents’ implicit test performance (in the same way as when criteria are made known during explicit or self-report tests, where test-takers also perform better). Finally, in terms of discriminant validity, we established that implicit and explicit honesty-humility were both unrelated to cognitive ability.

In conclusion, to establish whether the IAT-HH is a valid measure of honesty-humility, Cronbach and Meehl (1955, p. 290) state that the challenge “is not to conclude that the test is valid for measuring the construct”, but to determine “the degree of validity”. Furthermore, validity is a unitary concept, not a matter of all or none (Messick, 1998). Therefore, establishing validity requires a unitary approach (Binning & Barrett, 1989) where the full range of validity ‘types’ (e.g., construct and criterion-related validity) should be established and all act as important indicators for the utility of a test (Costantini et al., 2015). However, in this chapter, we only reported on elements of convergent and discriminant validity. In terms of our findings, we can only conclude that further research is needed, prior to making an “integrated evaluative judgment” on whether the IAT-HH is a valid measure of honesty-humility (Messick, 1989, p. 13). Therefore, in the next chapter we continue to provide meaning to our test by reporting on the criterion-related validity of the IAT-HH.
Appendix C: Supplementary Material for Scoring ATIC

The ability to identify relevant criteria (ATIC; Kleinmann, 1993) is defined as a person’s ability to perceive performance criteria correctly, when participating in evaluative situations (König et al., 2007). ATIC correlates with positive performance on evaluative tasks during assessment centers, interviews and even on-the-job performance. Hence, this construct is not a self-report measure, but an ability, and should be measured as such (Ingold et al., 2015). ATIC significantly relates to cognitive ability scores (between $r = .19$ and .30) (Melchers et al., 2009) and the effect of ATIC still holds after controlling for cognitive ability (König et al., 2007). Therefore, appears that the operationalization of ATIC was done in a valid manner, given that our ATIC scores significantly correlated with students’ course results ($r = .38$, $p < .01$) and with a separate cognitive ability test ($r = .24$, $p < .01$) (Condon & Revelle, 2014). Table 4.7 provides an example, taken from literature, to illustrate how ATIC was assessed during a group discussion.

Table 4.7
Illustration of Assessing ATIC During a Group Discussion (Kleinmann et al., 2011, p. 141)

<table>
<thead>
<tr>
<th>Four dimensions assessed by a group discussion</th>
<th>Candidate’s assumptions</th>
<th>Candidate’s behavioral examples</th>
<th>Strength of fit rated on 4-point scale ($0 = \text{no fit at all to } 3 = \text{perfect fit}$)</th>
</tr>
</thead>
</table>
| Organizing                                    | Willingness to compromise| Not stubbornly persist with one’s point of view | 3 for consideration of others  
0 for organizing  
0 for analytical skills  
0 for persuasiveness. |
| Consideration of others                       | Leadership               | To take initiative, to structure the discussion, to integrate opinions, to help the group to find a consensus | 2 for organizing,  
2 for consideration of others,  
0 for persuasiveness  
0 for analytical skills. |
| Analytical skills                             | Assertiveness            | To argue conclusively, to persuade the others of the importance of one’s points | 3 for persuasiveness  
0 for organizing  
0 consideration of others  
0 for analytical skills |
| Persuasiveness                                | Appearance               | To be authentic and professional | Does not correspond to any dimension  
0 on all dimensions |
**Operationalizing ATIC**

During our research, ATIC was measured with seven different questions, at two points in time. Questions 1 to 6 was measured at time point 1, directly after completing the implicit honesty-humility and the explicit honesty-humility measures respectively. Question 7 was asked at the end of the research, after all data had been collected (i.e., two months after time point 1). Below, we illustrate how each question was asked to assess ATIC.

**Question 1 (Implicit Honesty-Humility)**

During this session, you completed different tests. You are now to guess what was measured with each test separately. The test that you completed with flashing words presented on screen (I am/ I am not) together with words (educated, human, alive, clothed / illiterate, an astronaut, dead, naked) measured something specific. You are to guess what was measured by typing in your idea/hypothesis of what was measured during this test. Use the space provided. You are also allowed to say if you have no idea what was measured.

**Question 2 (Explicit Sincerity)**

You are to guess what was measured with the following four items by typing in your idea/hypothesis of what was measured:

1) If I want something from a person I dislike, I will act very nicely toward that person in order to get it.

2) I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed.

3) If I want something from someone, I will laugh at that person's worst jokes.

4) I wouldn't pretend to like someone just to get that person to do favours for me.

Use the space provided to type in your idea. You are also allowed to say if you have no idea what was measured.

**Question 3 (Explicit Fairness)**

You are to guess what was measured with the following four items by typing in your idea/hypothesis of what was measured:

1) If I knew that I could never get caught, I would be willing to steal a million Euro/Rand.

2) I would be tempted to buy stolen property if I were financially tight.

3) I would never accept a bribe, even if it were very large.

4) I’d be tempted to use counterfeit money, if I were sure I could get away with it.

Use the space provided to type in your idea. You are also allowed to say if you have no idea what was measured.
**Question 4 (Explicit Greed Avoidance)**

You are to guess what was measured with the following four items by typing in your idea/hypothesis of what was measured:

1) Having a lot of money is not especially important to me.
2) I would like to live in a very expensive, high-class neighborhood.
3) I would like to be seen driving around in a very expensive car.
4) I would get a lot of pleasure from owning expensive luxury goods.

Use the space provided to type in your idea. You are also allowed to say if you have no idea what was measured.

**Question 5 (Explicit Modesty)**

You are to guess what was measured with the following four items by typing in your idea/hypothesis of what was measured:

1) I am an ordinary person who is no better than others.
2) I wouldn’t want people to treat me as though I were superior to them.
3) I think that I am entitled to more respect than the average person is.
4) I want people to know that I am an important person of high status.

Use the space provided to type in your idea. You are also allowed to say if you have no idea what was measured.

**Question 6 (Explicit Honesty-Humility)**

All 16 items holistically measured something specific. You are to guess what was measured by typing in your idea/hypothesis in the space provided. You are also allowed to say if you have no idea what was measured.

**Question 7 ( Entire Research)**

(This question was asked at the end of the research after all data had been collected.)

During this research data was collected during three waves (at three different points in time). When you think back of all three waves, what do you think this research was about? You can share your idea/hypothesis by typing in your answer in the white space below… You may also indicate if you have no idea.
Transforming Respondents’ Qualitative Answers into Quantitative ATIC Scores

Participants’ answers were first categorized according to themes or clusters of correctness. Next, each answer was given a score from $0 = no fit$ to $4 = perfect fit$. To link the degree of correctness of an answer to a point system, we consulted literature on honesty-humility to see the strength of correlations between honesty-humility (as a broad trait and the narrow facets it comprises) with various constructs. Qualitative answers were transformed into quantitative data in the following way:

- answers with no relationship or a low relationship to the trait or facets of honesty-humility ($< .10$) = 0;
- answers that showed small relationship ($>.10$) = 1;
- answers with a medium relationship ($>.30$) = 2;
- answers with a medium to strong relationship ($>.50$) = 3; and
- correct answers ($>.90$) = 4.

To establish what the correct or incorrect answer was, we first consulted the definition for honesty-humility and each of the narrow facets. Table 4.8 provides a list of these definitions.

Table 4.8
Definitions For the Global Trait and Narrow Facets of Honesty-Humility (Lee & Ashton, 2004, p. 334)

<table>
<thead>
<tr>
<th>Question</th>
<th>Trait/Facet</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Implicit Honesty-Humility</td>
<td>High scores - avoid manipulating others for personal gain, feel little temptation to break rules, are uninterested in lavish wealth and luxuries, and feel no special entitlement to elevated social status. Low scores - will flatter others to get what they want, are inclined to break rules for personal profit, are motivated by material gain, and feel a strong sense of self-importance.</td>
</tr>
<tr>
<td>2</td>
<td>Sincerity</td>
<td>To be genuine in interpersonal relations. Low scorers will flatter others or pretend to like them in order to obtain favors. High scorers are unwilling to manipulate others.</td>
</tr>
<tr>
<td>3</td>
<td>Fairness</td>
<td>To avoid fraud and corruption. Low scorers are willing to gain by cheating or stealing. High scorers are unwilling to take advantage of other individuals or of society at large.</td>
</tr>
<tr>
<td>4</td>
<td>Greed Avoidance</td>
<td>To be uninterested in possessing lavish wealth, luxury goods, and signs of high social status. Low scorers want to enjoy and to display wealth and privilege. High scorers are not especially motivated by monetary or social-status considerations.</td>
</tr>
<tr>
<td>5</td>
<td>Modesty</td>
<td>To be modest and unassuming.</td>
</tr>
</tbody>
</table>
DEVELOPMENT AND CONSTRUCT VALIDATION OF AN IAT-HH

<table>
<thead>
<tr>
<th>Question</th>
<th>Trait/Facet</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low scorers consider themselves as superior and entitled to privileges that others do not have.</td>
<td>High scorers view themselves as ordinary people without any claim to special treatment.</td>
</tr>
<tr>
<td>6 Explicit Honesty-Humility</td>
<td>High scores - avoid manipulating others for personal gain, feel little temptation to break rules, are uninterested in lavish wealth and luxuries, and feel no special entitlement to elevated social status.</td>
<td>Low scores - will flatter others to get what they want, are inclined to break rules for personal profit, are motivated by material gain, and feel a strong sense of self-importance.</td>
</tr>
</tbody>
</table>

As seen in Table 4.9, we consulted literature to determine the magnitude or strength of co-variates of honesty-humility (as a global trait) and for each narrow facet.

### Table 4.9

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social desirability scales, impression management</td>
<td>De Vries et al. (2014)</td>
</tr>
<tr>
<td>Self-monitoring, sincerity, emotional manipulation</td>
<td>Griev (2011)</td>
</tr>
<tr>
<td>Narcissism, Machiavellianism, psychopathy</td>
<td>Paulhus and Williams (2002); (Lee et al., 2013); Ashton et al. (2000)</td>
</tr>
<tr>
<td>Dark triad</td>
<td>Lee and Ashton (2014)</td>
</tr>
<tr>
<td>Altruism</td>
<td>Zettler and Hilbig (2015)</td>
</tr>
<tr>
<td>Big Five (neuroticism, emotional stability, conscientiousness, trust)</td>
<td>Ashton and Lee (2005)</td>
</tr>
<tr>
<td>Counter-productive work, integrity (synonym for honesty-humility)</td>
<td>De Vries et al. (2011)</td>
</tr>
<tr>
<td>Honesty/integrity used synonymously</td>
<td>Becker (1998)</td>
</tr>
<tr>
<td>Counter-productive work behavior</td>
<td>Marcus et al. (2007)</td>
</tr>
<tr>
<td>Egoism</td>
<td>De Vries, De Vries, De Hoogh, and Feij (2009)</td>
</tr>
<tr>
<td>Empathy</td>
<td>Johnson, Rowatt, and Petrini (2011)</td>
</tr>
<tr>
<td>Humility/self-esteem</td>
<td>Weidman, Cheng, and Tracy (2018)</td>
</tr>
<tr>
<td>Anti-social behavior; hypocrite</td>
<td>Lee et al. (2005)</td>
</tr>
<tr>
<td>Opportunism</td>
<td>Oh, Lee, Ashton, and De Vries (2011)</td>
</tr>
</tbody>
</table>
Examples of Answers and Scoring

To score the answers of this question, we used the scoring system as presented in Table 4.10 below:

Table 4.10
**Examples and Mark Allocation of Answers for Question 1 (Implicit Honesty-Humility)**

<table>
<thead>
<tr>
<th>Score</th>
<th>Honesty-Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Honesty-humility, any synonym of honesty, humility, integrity, morality.</td>
</tr>
<tr>
<td>3</td>
<td>Any of the four subscales or the opposite thereof e.g., fairness/unfairness, sincerity/insincerity, modest/immodesty, greed/greed avoidance, materialism, arrogance, psychopathy, Machiavellianism.</td>
</tr>
<tr>
<td>2</td>
<td>Agreeableness, narcissism, delinquency, counter-productive work/academic behavior, manipulativeness, self-monitoring, social adaptability, impression management, social desirability, altruism, egocentrism, authentic.</td>
</tr>
<tr>
<td>1</td>
<td>Emotional stability, conscientiousness.</td>
</tr>
<tr>
<td>0</td>
<td>Don’t know, intelligence, dominance, concentration, adaptability.</td>
</tr>
</tbody>
</table>

Table 4.11
**Examples and Mark Allocation of Answers for Question 2 (Explicit Sincerity)**

<table>
<thead>
<tr>
<th>Score</th>
<th>Sincere</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Sincere (or synonyms), false, sly, authentic, being real, lying, honesty-humility, synonyms of honesty, humility, integrity, morality.</td>
</tr>
<tr>
<td>3</td>
<td>Any of the other three subscales, psychopathy, Machiavellianism, power, hypocrite, manipulativeness, self-monitoring, social adaptability, impression management, social desirability, surface acting.</td>
</tr>
<tr>
<td>2</td>
<td>Agreeableness, narcissism, crime, delinquency, counterproductive work/academic behavior, opportunism, altruism, egoism, empathy.</td>
</tr>
<tr>
<td>1</td>
<td>Conscientiousness, personality, characteristic, emotional stability.</td>
</tr>
<tr>
<td>0</td>
<td>Don’t know, intelligence, dominance, irresponsibleness.</td>
</tr>
</tbody>
</table>

Table 4.12
**Examples and Mark Allocation of Answers for Question 3 (Explicit Fairness)**

<table>
<thead>
<tr>
<th>Score</th>
<th>Fairness</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Fair (or synonyms), fairness, unfairness, breaking rules, sense of justice, law obedience, honesty-humility (or synonyms), norms, values.</td>
</tr>
<tr>
<td>3</td>
<td>Any of the other 3 subscales, psychopathy, Machiavellianism, illegal activity, crime, delinquency, fraud, slyness, stealing.</td>
</tr>
<tr>
<td>2</td>
<td>Agreeableness, narcissism, manipulativeness, self-monitoring, social adaptability, impression management, altruism, selfishness.</td>
</tr>
<tr>
<td>1</td>
<td>Conscientiousness, personality, characteristics, conventional behavior, trust, emotional stability.</td>
</tr>
<tr>
<td>0</td>
<td>Don’t know, intelligence, dominance, dignity, courage, guilt.</td>
</tr>
</tbody>
</table>
Table 4.13

Examples and Mark Allocation of Answers for Question 4 (Explicit Greed Avoidance)

<table>
<thead>
<tr>
<th>Score</th>
<th>Greed Avoidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Greed (or synonyms), greed avoidance, generous, materialism, status, attitude towards money, status, possession of money, honesty-humility (synonyms).</td>
</tr>
<tr>
<td>3</td>
<td>Any of the other 3 subscales, Psychopathy, Machiavellianism.</td>
</tr>
<tr>
<td>2</td>
<td>Agreeableness, narcissism, manipulativeness, self-monitoring, impression management, Egocentrism, selfishness, self-image.</td>
</tr>
<tr>
<td>1</td>
<td>Conscientiousness, emotional stability, attitude, extraversion, how others see you, external validation.</td>
</tr>
<tr>
<td>0</td>
<td>Don’t know, intelligence, dominance, perception, uncertainty, standards of living.</td>
</tr>
</tbody>
</table>

Table 4.14

Examples and Mark Allocation of Answers for Question 5 (Explicit Modesty)

<table>
<thead>
<tr>
<th>Score</th>
<th>Modesty</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Modest(y), any synonym of modesty / immodest, arrogant, down to earth, egotism, self-centered, honesty-humility (synonyms).</td>
</tr>
<tr>
<td>3</td>
<td>Any of the other 3 subscales, psychopathy, Machiavellianism, shyness, narcissism, egocentrism, selfishness, self-image, self-esteem.</td>
</tr>
<tr>
<td>2</td>
<td>Agreeableness, self-monitoring, social adaptability, impression management, social desirability, altruism, empathy, comparing to others, seeing self as more as others.</td>
</tr>
<tr>
<td>1</td>
<td>Conscientiousness, introversion, need for acceptance by others, respect, equality, competitiveness.</td>
</tr>
<tr>
<td>0</td>
<td>Don’t know, intelligence, dominance, respectful.</td>
</tr>
</tbody>
</table>

Table 4.15

Examples and Mark Allocation of Answers for Question 6 (Explicit Honesty-Humility)

<table>
<thead>
<tr>
<th>Score</th>
<th>Honesty-Humility</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Honesty-humility, any synonym of honesty, humility, integrity, morality.</td>
</tr>
<tr>
<td>3</td>
<td>Any of the four subscales or the opposite thereof e.g., fairness/unfairness, sincerity/insincerity, modest/immodesty, greed/greed avoidance, materialism, arrogance, psychopathy, Machiavellianism.</td>
</tr>
<tr>
<td>2</td>
<td>Agreeableness, narcissism, delinquency, counter-productive work/academic behavior, manipulativeness, self-monitoring, social adaptability, impression management, social desirability, altruism, egocentrism, authentic.</td>
</tr>
<tr>
<td>1</td>
<td>Emotional stability, conscientiousness.</td>
</tr>
<tr>
<td>0</td>
<td>Don’t know, intelligence, dominance, concentration, adaptability.</td>
</tr>
</tbody>
</table>
Table 4.16

*Examples and Mark Allocation of Answers for Question 7 (Entire Research)*

<table>
<thead>
<tr>
<th>Score</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Perfect fit answers, such as cheating, honesty, ethical behavior, morality (or any synonyms / antonyms of honesty-humility).</td>
</tr>
<tr>
<td>3</td>
<td>Any of the sub-scales of honesty-humility and counter-productive, deviant behavior (which is broader than cheating), constructs strongly related to honesty-humility and cheating.</td>
</tr>
<tr>
<td>2</td>
<td>Constructs relating (.30) to honesty-humility and cheating.</td>
</tr>
<tr>
<td>1</td>
<td>Constructs relating to honesty-humility and cheating (&gt; .10), personality, attitude personal characteristics, self-esteem, self-knowledge, perception of the self.</td>
</tr>
<tr>
<td>0</td>
<td>If person had no idea, incorrect (&lt; .10), e.g., impulsivity, the relationship between personality and intelligence.</td>
</tr>
</tbody>
</table>
As a first attempt to measure implicit honesty-humility, we initially explored another implicit measure, called the Relational Responding Task (RRT; De Houwer, Heider, Spruyt, Roets, & Hughes, 2015), which is also a latent reaction-time task. Stimulus items were also included in the item sensitivity review. According to De Houwer et al. (2015) the RRT is used to capture implicit self-belief in a highly specific, complex, relational manner. Instructions require that participants respond by thinking of themselves as first being high on honesty-humility and then low on honesty-humility. For propositions used in the RRT to measure high and low honesty-humility, we included short statements from the Brief HEXACO Inventory (De Vries, 2013). We tested the RRT on the sample described in Chapter 3 (N = 304). The congeneric reliability of our RRT was acceptable (r = .72). However, the RRT showed no indication of construct or criterion-related validity, given that non-significant relationships were found between RRT and explicit honesty-humility (r = .11, p > .05), counter-academic behavior (r = .001, p > .05), and collegiate cheating (r = -.04, p > .05) respectively. Various reasons could be ascribed to the non-significant findings: method variance, tapping cognitive aspects rather than the belief about the self as relating to honest/dishonest propositions, the I/Me-element in the propositional statements might have gone unnoticed by participants during the task, or the proposition-items could have been too long and complex. Prepositions used in the RRT are much longer, as compared to the stimuli used in a standard IAT. To maintain the idea of capturing the self-concept of honesty-humility, like in the RRT, we turned to the IAT to operationalize implicit honesty-humility, since target categories/labels are less complex and much shorter. Table 4.17 presents the RRT target category labels and prepositions, which were derived from Brief HEXACO Inventory (De Vries, 2013).

Table 4.17

Stimuli Used in the Relational Responding Task to Capture Honesty-Humility

<table>
<thead>
<tr>
<th>High honesty-humility statements</th>
<th>Low honesty-humility statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>I find it difficult to lie (sincere).</td>
<td>I sometimes tell lies to get my way (insincere).</td>
</tr>
<tr>
<td>I’d rather die than steal anything (fair).</td>
<td>I am curious about how you can earn a lot of money in a dishonest way (unfair).</td>
</tr>
<tr>
<td>I wear beat up rather than expensive clothes (greed avoidance).</td>
<td>I want to be famous (greed avoidance).</td>
</tr>
<tr>
<td>I am an ordinary person; anything but special (modest).</td>
<td>I am entitled to special treatment (immodest).</td>
</tr>
</tbody>
</table>

Note. For true target category labels = correct, accurate, right, factual; and false target category labels = incorrect, inaccurate, wrong, untrue.
In this study, we investigated the criterion-related validity of the Implicit Association Test for Honesty-Humility (IAT-HH) to test whether it can predict desirable (i.e., grade point average) and undesirable academic criteria (i.e., counter-academic behavior and cheating) in the same way that explicit honesty-humility does. Additionally, we tested whether implicit honesty-humility shows incremental validity over explicit honesty-humility to predict criteria. Finally, in this study, we discuss our results in terms of the criterion-related validity of the IAT-HH. By conducting the current research (i.e., collecting data at multiple timepoints with measures that conceptually differ, including implicit, explicit, real and self-report behavior), we concluded that predicting criteria with the personality trait honesty-humility is more complex than expected. In this study, we highlight the implications for theory and practice and make recommendations for further research on this topic.
Introduction

Robust research by McCabe and others, covering multiple campus and multi-year reports has led to significant insight into the prevalence of dishonest student behavior (McCabe, 2016; McCabe & Bowers, 1994; McCabe et al., 2001). Not only does academic dishonesty (e.g., plagiarism, cheating and misrepresentation) lead to pedagogical challenges, but it also involves moral and ethical dilemmas in the educational system (Stiles, Wong, & LaBeff, 2018). Addressing dishonesty already at university level is relevant, because students who engage in dishonest acts at university are more likely to engage in dishonest behavior as employees in the workplace (Nonis & Swift, 2001). Moreover, within organizational psychology, understanding and predicting individual performance (both desirable and undesirable) is crucial, given that performance drives the economy (Campbell & Wiernik, 2015). Therefore, assessing and addressing performance already at a tertiary level is important.

Researchers have realized that by assessing personality, performance within work and academic settings can be predicted (Berry, Ones, & Sackett, 2007; Chiaburu, Oh, Berry, Li, & Gardner, 2011; Kluemper, McLarty, & Bing, 2015; Poropat, 2009). One particular personality dimension that has shown practical value in predicting integrity-related behavior, is the honesty-humility trait (deriving from the HEXACO Personality Inventory; Lee & Ashton, 2004, 2016). More specifically, honesty-humility has been found to relate to productive and counter-productive behavior, both in university and work settings (Catano et al., 2018; De Vries et al., 2011). However, self-report personality tests may be vulnerable to socially desirable responding, self-report bias and prone to faking (Fan et al., 2012; Gawronski & De Houwer, 2011; Ingold, Kleinmann, König, & Melchers, 2014), and for this reason, implicit tests have become popular. Prior research found that when personality traits, related to work performance, are assessed with IATs, responses are more difficult to fake, as when compared to the self-report counterparts (Vecchione et al., 2014).

The Implicit Association Test (IAT; Greenwald et al., 1998) has become a popular measurement tool in personality psychology, since IAT scores are assumed to reflect unbiased assessments of personality and beliefs of social judgment which may influence behavior (Becker & Menges, 2013; Gawronski & Hahn, 2017; Johnson & Tan, 2009; Perugini & Banse, 2007). The rationale for studying the IAT is that it might improve our prediction and understanding of meaningful psychological criteria (Blanton, Jaccard, Gonzales, & Christie, 2006).

IAT scores have been found to relate to positive outcomes, such as desirable academic performance amongst students (Nosek & Smyth, 2011; Nosek et al., 2009; Vianello, Robusto,
Moreover, IAT scores have also been found to relate significantly to undesirable behavior, such as immoral insurance claims (Reynolds, Leavitt, & DeCelles, 2010), cheating during a dice-rolling game (Perugini & Leone, 2009), and risk-taking behavior of pilots (Molesworth & Chang, 2009). Additionally, meta-analyses on implicit measures assessing personality (e.g., assessing the Big Five traits, shyness, aggression, altruism) found criterion-related validity estimates ranged between $r = .13$ and $r = .25$, but were larger for extraversion and agreeableness, compared to other personality traits (De Cuyper et al., 2017). Given that IATs have been applied to assess personality traits and predict actual behavior (De Cuyper et al., 2017; Kurdi et al., 2018), we developed an IAT to assess honesty-humility (called the IAT-HH) and wanted to determine whether the IAT-HH could be applied to predict real-world outcomes (i.e., criterion-related validity).

Establishing criterion-related validity is the *sine qua non* for all psychometric tests, as the main idea of psychological assessments is to predict important, real-world behavior (Doliński, 2018; Schmidt & Hunter, 1998). In fact, criterion-related validity is the hallmark of any good measure (Perugini et al., 2010), and becomes even more important when tests are used for making legally defensible selection decisions (Van Iddekinge & Ployhart, 2008). Therefore, in this study, we wanted to establish whether the IAT-HH is meaningful in predicting criteria within a student setting. In doing so, we aimed to achieve two goals. First, we tested whether the IAT-HH related to undesirable criteria (i.e., counter-academic behavior committed in the past), cheating (both objective and self-confessed), and also desirable criteria (i.e., grade point average). Additionally, we used explicit honesty-humility as a comparative benchmark to assess whether the newly developed IAT-HH was similarly related to criteria, in the same way as explicit honesty-humility (i.e., adding to evidence of overall construct validity). Second, we tested whether implicit honesty-humility, would show incremental predictive validity above that of explicit honesty-humility, in predicting academic criteria (i.e., counter-academic behavior, objective and self-confessed cheating, and grade point averages).

Based on our findings, we discuss the general criterion-related validity of the IAT-HH. Founded on our research results, we conclude by outlining theoretical contributions and implications for practice (i.e., specifically about the construct honesty-humility and the IAT method). Finally, we make suggestions for future researchers who wish to predict behavior with an implicit honesty-humility measure.
Honesty-Humility and Academic Criteria

Background of Honesty-Humility

Honesty-humility, the sixth dimension of the HEXACO model (Lee & Ashton, 2004, 2016) captures personality content related to both honesty (i.e., sincerity and fairness) and to humility (i.e., modesty and the lack of greed). Honesty-humility has been defined as “the tendency to be fair and genuine in dealing with others, in the sense of cooperation with others even when one might exploit others without suffering retaliation” (Ashton & Lee, 2007, p. 156). Specifically, honesty-humility relates to performance in occupations that require personal integrity, low self-focus, and appreciation of others (Johnson et al., 2011). Thus, people high on honesty-humility are sincere and generally show strong internal control, inhibiting impulses of acting in a deviant or uncooperative manner (Liu, Zettler, & Hilbig, 2016). Further, people high on honesty-humility show little interest in luxury goods or higher social status; therefore, they will not engage in crime or deviant behavior to reach financial gains (Liu et al., 2016).

Criterion-Related Validity of Explicit and Implicit Honesty-Humility

Several authors found that explicitly measured honesty-humility may predict desired behavior in a student setting (Allgaier, Zettler, Wagner, Puttmann, & Trautwein, 2015). For example, De Vries et al. (2011), found a significant positive relationship between honesty-humility and grade point averages (GPA; $r = .23$, $p < .01$). Specifically, in this study, the researchers found that the narrow facet, greed avoidance, displayed the strongest relationship with academic performance. To make sense of this finding, these researchers explain that students who are not greedy may find it unimportant to live in luxury. Thus, students high on greed avoidance might not feel the need to take on a job (apart from going to school) to be able to afford luxury goods. Thus, these students might use their additional time for studying (not working), resulting in high academic performance. However, in another study (Kajonius, 2016), negative correlations were found between academic performance and honesty-humility ($r = -.19$, $p < .05$). In this study, the narrow facet, modesty, was the greatest negative predictor of GPAs. Results were interpreted as students scoring high on GPA scores might perhaps be very confident and feel somewhat entitled to some advantages in life. Since prior research (Kajonius, 2016) have found both positive and negative significant relationships, ways in which honesty-humility relates to academic results are somewhat mixed.

Aside from predicting prosocial academic behavior, various studies have shown explicitly measured (or self-reported) honesty-humility to relate to antisocial or counter-academic behavior (De Vries et al., 2011; Holtrop et al., 2014; Janse van Rensburg, De Kock,
The term, *counter-academic behavior*, refers to students committing devious acts, such as plagiarizing, having low personal standards in performing tasks or misrepresenting someone else’s work as their own (Marcus et al., 2007). Also, students who are high on explicit honesty-humility, are less likely to cheat during games, such as dice-rolling (Kleinlogel, Dietz, & Antonakis, 2018; Pfattheicher, Schindler, & Nockur, 2019), coin-tossing (Hilbig & Zettler, 2015), or even during cognitive tasks performed in an educational setting where monetary incentives are involved (see Janse van Rensburg et al., 2018). Therefore, since literature shows that explicit honesty-humility relates to academic criteria, which can be undesirable (e.g., counter-academic behavior or cheating) or desirable (e.g., grade point average performance), we expected that:

**Hypothesis 1.** Explicit honesty-humility will relate negatively with counter-academic behavior (H1a), cheating (H1b), self-confessed cheating (H1c), and will relate positively to GPA (H1d).

As far as we know, no prior research has considered the predictive validity of an IAT for honesty-humility in the context of (counter-) academic behavior. However, studies that considered other implicit personality traits (e.g., IAT to measure conscientiousness), have found that when implicit tests were designed to assess the same construct as its explicit (self-report) counterpart, IAT scores significantly related to self-reported or actual behavior. For example, an implicit measure of conscientiousness correlated significantly with the behavioral scale for responsibility, $r = .20, p < .01$ (Costantini et al., 2015) and job performance, $r = .27, p < .05$ (Vecchione et al., 2016). Personality IAT scores (measuring conscientiousness) have also correlated with indicators of academic behavior (Steffens & Schulze König, 2006), such as the number of examinations that students passed ($r = .27, p < .05$; Vianello et al., 2010). Furthermore, implicit gender stereotypes showed greater predictive validity (than the explicit counterpart for stereotypes) in predicting interest, participation and achievement in science, technology, engineering and mathematics. Therefore, researchers have noted that the IAT might be a valuable tool for educational research (Nosek & Smyth, 2011; Nosek et al., 2009). Specifically, in the study by Nosek and Smyth (2011), women with a stronger implicit *male stereotype* predicted greater negativity toward math, less participation, weaker self-ascribed ability, and worse math achievement, compared to men (where these relationships were weaker, but in the opposite direction).
Interestingly, Rowatt et al. (2006) assessed humility with an IAT. In their study, implicitly measured humility related to academic course grades (when conscientiousness, narcissism and self-esteem were controlled for). These authors explain that students who approach new classroom experiences and education with humility, might maximize their learning experience, compared to students who are arrogant and pretentious ($r = .26, p = .10$). Thus, *know-it-all thinking* at the implicit level (i.e., low implicit humility) negatively relates to course results.

In line with literature showing that scores on personality IATs can be meaningful in relating to real or self-reported indicators of behavior, as well as the findings of Rowatt et al. (2006), we expected that:

**Hypothesis 2.** Implicit honesty-humility will relate negatively with counter-academic behavior (H2a), cheating (H2b), self-confessed cheating (H2c), and will relate positively to GPA (H2d).

**Incremental Predictive Validity of the IAT-HH**

Researchers have suggested using both implicit and explicit measures to fully understand the manifestations of personality, because dual attitudes reflect different evaluations of the same attitude (Wilson et al., 2000). Thus, by using both implicit and explicit measures, one might be able to enhance the prediction of personality criterion-related behavior. Prior studies have found that personality IATs incrementally predicted relevant criteria, above that of explicit measures, to predict shy (Asendorpf, Banse, & Mücke, 2002) and anxious behavior ($\Delta R^2 = .064, p < .01$) (Egloff & Schmukle, 2002; Schnabel, Banse, & Asendorpf, 2006). Likewise, the IAT showed incremental validity in predicting actual behavior related to neuroticism and extraversion, above and beyond explicit measures of personality (Back, Schmukle, & Egloff, 2009), implying that acting in a nervous or cheerful manner is strongly influenced by impulsive processes. This is in line with the dual process theory (i.e., the reflective–impulsive model; Strack & Deutsch, 2004), which explains general social behavior as a joint function of two distinct, but related processes (i.e., implicit and explicit). Considering this, we were also curious to determine whether implicit honesty-humility would incrementally predict behavioral criteria, above that of explicit honesty-humility. Going beyond existing literature, but in line with previous research, we expected that:
Hypothesis 3. Implicit honesty-humility will add to explicit honesty-humility by incrementally predicting counter-academic behavior (H3a), objective cheating (H3b), self-confessed cheating (H3d), and grade point averages (H3d).

Method

Participants

The sample consisted of Flemish university students \( N = 178 \); 137 women and 41 men) aged between 21 and 53 years \( M = 24.34; SD = 4.7 \) and comprised psychology \( n = 94 \) and medical \( n = 84 \) students. Since data was collected at separate timepoints over the period of four months, eight students dropped out during the course (of which seven were part-time medical students).

To address power issues, we investigated whether our sample size was sufficient to find small to medium-sized effects of honesty-humility on (counter-)academic behavior in two different ways. First, to detect a medium-sized effect \( (r = .30) \) with high statistical power \( (1 - \beta = .95) \), a sample size of \( N = 138 \) was required, as calculated with the G-power program (Faul, Erdfelder, Buchner, & Lang, 2009). Second, we also consulted previous research which investigated effects of (explicitly measured) honesty-humility on cheating. In their study, Hilbig and Zettler (2015) suggested that, for a medium-sized effect \( (f^2 = .08) \) with high statistical power \( (1 - \beta = .95) \), a sample size of \( N = 165 \) is required. Our sample size ranged between 162 and 178 (depending on the variable being tested), which was considered adequate for our research purposes.

Procedure

All participants gave informed consent prior to the data collection and after the purpose of the research had been made known to them. Each participant was awarded course credits and three euro for participation. For maximum performance during the cheating task, prize money of 60 euro was made available. The study was approved by the university ethics committee. Figure 5.1 presents a timeline and the order in which tests were administered in this study. Initially, students were personally briefed on how and when data would be collected. Students completed the implicit and explicit honesty-humility measures, online and at home \((Time 1)\). Following that, they completed the cognitive task which captured cheating \((Time 2)\), and subsequently counter-academic behavior \((Time 3)\). Moreover, at \( Time 3 \), students were given the opportunity to confess whether they had cheated during the cognitive task \((i.e., \text{both})\).
confessed cheating and informed consent were electronically captured. Finally, students were *debriefed* by the main researcher, who revealed the full purpose of the study and shared the general results to enhance the students’ educational experience. Eight weeks later (*Time 4*), GPA results were collected.

<table>
<thead>
<tr>
<th><strong>Briefing</strong> (in class)</th>
<th><strong>Time 1</strong> (online questionnaire sent on same day as briefing)</th>
<th><strong>Time 2</strong> (data collected five weeks later)</th>
<th><strong>Time 3</strong> (data collected two weeks later)</th>
<th><strong>Debrief</strong> (in class)</th>
<th><strong>Time 4</strong> (data collected eight weeks later)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students briefed about proceedings of how data will be collected (purpose of research was unknown)</td>
<td>Implicit honesty-humility</td>
<td>Online “cognitive task” (to assess objective cheating)</td>
<td>Counter-academic behavior</td>
<td>Students debriefed by main researcher to reveal the full purpose of the research</td>
<td>Grade point average (GPA)</td>
</tr>
</tbody>
</table>

*Figure 5.1.* Data collection timeline illustrating the sequence of tests administration

**Measures**

**Implicit association test for honesty-humility.** To measure implicit honesty-humility, we developed the Implicit Association Test for honesty-humility (IAT-HH), which was programmed and administered online using Inquisit Millisecond (Draine, 2016). The development procedure and IAT stimuli used in the IAT-HH are described in Chapter 4 (see Table 4.1 for IAT-HH target categories and item labels). In the IAT-HH, we used adjectives to describe the narrow facets of honesty-humility (Ashton et al., 2004) to assess *high* honesty-humility (i.e., *sincere, fair, generous, modest*) and *low* honesty-humility (i.e., *insincere, unfair, greedy, immodest*). The IAT-HH was scored according to the improved algorithm of Greenwald et al. (2003) by using a user-friendly online application, called the Shiny App (De Schryver, 2018), which allows researchers to upload IAT data in order to calculate IAT-effects. This online application also allows for the calculation of the split-half reliability (based on an odd–even split and corrected by the Spearman–Brown formula). Participants were instructed to complete the IAT-HH on a personal computer in noise-free, test-like conditions to optimize concentration. The IAT-HH showed to acceptable split-half reliability estimates (*r* = .77).

**Explicit honesty-humility.** Proving to be highly reliable and valid, the HEXACO Personality Inventory Revised was used to measure explicit honesty-humility (Lee & Ashton,
We extracted 16 items from the 100-item HEXACO-PI R. All items were measured on a 5-point Likert-type scale (1 = strongly agree to 5 = strongly disagree). The test showed acceptable internal consistency for the global honesty-humility trait ($\alpha = .78$), and for each of the narrow facets, namely fairness ($\alpha = .71$), greed avoidance ($\alpha = .70$), modesty ($\alpha = .65$) and sincerity ($\alpha = .75$).

**Objective and self-confessed cheating.** To measure cheating (both objective and self-confessed), we used an online cognitive test adapted from Janse van Rensburg et al. (2018). Participants were instructed to complete the online task as an evening assignment at home. This online task was in fact not developed to assess cognitive ability, but was designed to capture real cheating. The online tasks consisted of a series of general knowledge items. One example item was *Grand Central Terminal, Park Avenue, New York is the world's…* Four response options are presented, with one correct answer (i.e., largest railway station). See Appendix B (for information about the cheating task) and Appendix E (for all items).

Prior to commencing with the cheating task, participants were given explicit instructions not to use any unauthorized help (i.e., using the internet, a calculator or asking help from a friend) or to exchange answers whilst completing the task, as this would have constituted cheating. With Qualtrics (2018), we were able to track, record and save participants’ actual cheating behavior. Hence, we could capture cheating in an objective manner.

As it was also possible for participants to cheat in other ways, not captured (e.g., asking help from a friend or using the internet for assistance), we explicitly asked participants whether they had cheated during the task or not (for a similar approach to assess self-confessed cheating see Abeler, Becker, & Falk, 2014; Pfattheicher et al., 2019). This question was asked only after all data had been collected. In sum, two separate measures for cheating were captured: objective cheating (i.e., during the online cognitive task in which we could see whether a person had cheated) and self-confessed cheating (i.e., when every participant was given the opportunity to ‘come clean’ or to confess whether they had cheated or not).

To score cheating behavior, we followed the theoretical thinking of Doliński (2018, p. 10), who noted, “between 0 and 1 there is a tremendous qualitative difference: nothing versus something” and that deceiving six or seven out of ten times “is de facto quite small”, compared to not deceiving at all. Therefore, also in line with previous research (Halevy et al., 2014; Peer et al., 2014) both objective and self-reported cheating were captured respectively as a binary
outcome variable (0 = did not cheat and 1 = did cheat), irrespective of the method or frequency of cheating.

**Counter-productive academic behavior.** Like others (De Vries et al., 2011; Holtrop et al., 2014; Marcus et al., 2007), in the current research, self-reported counter-academic behavior was assessed by extracting 25 items from the Inventory of Counter-productive Behavior (ICB; Hakstian et al., 2002). Respondents were asked to think how frequently they had shown specific behavior in the past five years of school or university when completing the items (e.g., *I stayed home and did not write an exam because I felt unprepared*). Response options were presented on a Likert-type scale, ranging from 1 (never even considered it) to 6 (did it three or more times). The internal reliability in our data was acceptable (α = .78).

**Grade point average scores (GPA).** The grade point average, for each individual student, was computed as the average of all the exams taken during one academic year (i.e., the year that the study was conducted in). GPAs were obtained from official academic records and ranged from 1 to 20, with higher scores indicating higher GPAs.

**Results**

Before the main analyses were conducted, we checked missing values, descriptive statistics and correlations. Table 5.1 reports means, standard deviations and correlations of the study variables. We also checked for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices and multicollinearity, with no violations noted (Field, 2013). For our main analyses, we performed a series of bivariate correlations and regression analyses. Below, we first discuss some relevant correlations, followed by the tests of our hypotheses.
Table 5.1  
Means, Standard Deviations and Intercorrelations of Study Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
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<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
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<tbody>
<tr>
<td>1. Gender</td>
<td>1.77</td>
<td>0.42</td>
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<tr>
<td>2. Age</td>
<td>24.34</td>
<td>4.70</td>
<td>.06</td>
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<tr>
<td>3. Explicit H-H</td>
<td>3.53</td>
<td>0.47</td>
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<td>.78</td>
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<tr>
<td>4. Explicit Sincere</td>
<td>3.19</td>
<td>0.75</td>
<td>-.01</td>
<td>.18*</td>
<td>.68**</td>
<td>.78</td>
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<tr>
<td>5. Explicit Fair</td>
<td>3.79</td>
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<td>.23**</td>
<td>.71</td>
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<tr>
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<td>-.01</td>
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<td>.70**</td>
<td>.29**</td>
<td>.27**</td>
<td>.70</td>
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<tr>
<td>7. Explicit Modest</td>
<td>3.94</td>
<td>0.60</td>
<td>-.08</td>
<td>.05</td>
<td>.61**</td>
<td>.26**</td>
<td>.21**</td>
<td>.29**</td>
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<td>8. IAT-HH</td>
<td>0.87</td>
<td>0.26</td>
<td>-.05</td>
<td>.13</td>
<td>.18*</td>
<td>.10</td>
<td>.12</td>
<td>.17*</td>
<td>.07</td>
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<tr>
<td>9. IAT Sincere</td>
<td>0.99</td>
<td>0.41</td>
<td>.07</td>
<td>.14</td>
<td>.06</td>
<td>-.03</td>
<td>.09</td>
<td>.09</td>
<td>-.00</td>
<td>.62**</td>
<td>—</td>
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<td></td>
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<tr>
<td>10. IAT Fair</td>
<td>1.01</td>
<td>0.41</td>
<td>-.05</td>
<td>.06</td>
<td>.13</td>
<td>.05</td>
<td>.13</td>
<td>.15</td>
<td>.01</td>
<td>.61**</td>
<td>.31**</td>
<td>—</td>
<td></td>
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<tr>
<td>11. IAT Greed Av</td>
<td>0.91</td>
<td>0.46</td>
<td>.01</td>
<td>.14</td>
<td>.18*</td>
<td>.10</td>
<td>.17*</td>
<td>.14</td>
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<td>.35**</td>
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<tr>
<td>12. IAT Modest</td>
<td>0.91</td>
<td>0.44</td>
<td>-.02</td>
<td>.11</td>
<td>.22**</td>
<td>.23**</td>
<td>.07</td>
<td>.19*</td>
<td>.10</td>
<td>.64**</td>
<td>.29**</td>
<td>.39**</td>
<td>.24**</td>
<td>—</td>
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<tr>
<td>13. GPA</td>
<td>13.33</td>
<td>2.43</td>
<td>-.02</td>
<td>-.26**</td>
<td>-.08</td>
<td>-.12</td>
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<td>-.02</td>
<td>-.01</td>
<td>.00</td>
<td>—</td>
<td></td>
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<tr>
<td>14. CAB</td>
<td>2.73</td>
<td>0.62</td>
<td>.18*</td>
<td>-.05</td>
<td>-.16*</td>
<td>-.00</td>
<td>-.29**</td>
<td>-.03</td>
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<td>-.00</td>
<td>-.12</td>
<td>.78</td>
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<tr>
<td>15. Cheat Objective</td>
<td>0.35</td>
<td>0.48</td>
<td>.01</td>
<td>-.00</td>
<td>.06</td>
<td>.08</td>
<td>-.07</td>
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<td>.06</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Cheat Confessed</td>
<td>0.24</td>
<td>0.43</td>
<td>.09</td>
<td>-.10</td>
<td>-.03</td>
<td>-.04</td>
<td>-.07</td>
<td>.07</td>
<td>-.04</td>
<td>-.07</td>
<td>.01</td>
<td>.03</td>
<td>-.10</td>
<td>-.13</td>
<td>-.01</td>
<td>.16*</td>
<td>.65**</td>
</tr>
</tbody>
</table>

Notes. N size ranged from 163 to 178 due to missing data. Internal consistencies for self-report measures (α) are available on the diagonal. The IAT-HH latency ranged from 0 to 1.5 and split-half reliability = .77.

a Gender was coded 0 = female and 1 = male; b HH = Honesty-humility; c IAT-HH = Implicit Association Test Honesty-humility; d GPA = Grade Point Average; e CAB = Counter-academic behavior. Objective and self-confessed cheating was coded 0 = did not cheat and 1 = did cheat (of N = 170 students, n = 64 cheated). *p < .05. **p < .01 (two-tailed).
Descriptive Statistics and Correlations

As shown in Table 5.1, we first explored our correlational analyses and noted that the relationship between implicit and explicit honesty-humility showed a low positive correlation ($r = .18, p = .03$). This is in line with previous meta-analyses, which found the intercorrelation between implicit and explicit scores ranges between $r = .17$ and $r = .48$ (Bar-Anan & Nosek, 2014; Greenwald et al., 2009), depending on the criterion measured, but averages around $r = .25$ (Greenwald et al., 2015).

We also found that counter-academic behavior (where items include but are not limited to confessing to have cheated during examinations e.g., *During an exam I brought in crib-notes or other aids that were not officially permitted*) related to self-confessed cheating ($r = .16, p = .04$). This moderate, positive relationship replicates our previous findings (Janse van Rensburg et al., 2018). Furthermore, the result of the total number of respondents cheating during our cheating task was 35.3% (for both confessed and objective cheating), which is in line with previous findings on cheating prevalence (Janse van Rensburg et al., 2018; McCabe, 2016). Additionally, counter-academic behavior and the narrow facet, *fairness*, showed the strongest relationship ($r = -.29, p = .00$), compared to the other narrow facets of honesty-humility, which also replicates prior research (De Vries et al., 2011; Janse van Rensburg et al., 2018).

Control variables. Additionally, we investigated whether we needed to control for participant demographics. In deciding whether to include control variables in our main analyses, we first considered empirical findings about collegiate cheating. In studying the relationships between honesty-humility, counter academic behavior and cheating, researchers have either controlled for gender (De Vries et al., 2011; Marcus et al., 2007), for both age and gender (Holtrop et al., 2014), or did not control for either (Hilbig & Zettler, 2015). We based our final decision (i.e., whether to control for age/gender) on following the sequential steps presented in the Decision-Making Tree (Bernerth & Aguinis, 2016).  

Although gender and age have been associated with cheating in the past (Whitley, 1998), these variables show non-consistent findings with regards to cheating in academic settings (Gallant et al., 2015; Spiller & Crown, 1998). There was no theoretical rationale for

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1 According to Bernerth and Aguinis (2016) researchers too often include unwarranted control variables. The Decision Tree summarizes sequential steps in the process of selecting control variables. Empirical findings about collegiate cheating and counter academic behavior were considered before deciding whether to control for gender and age. As there is no strong theoretical rationale about the relationship between the focal variable (i.e., cheating and counter-academic behavior) and control variables (age and gender), we elected to not include any control variables.
including control variables in our main analyses, and by controlling for age and gender no additional variance could be explained, hence we included none. Results with the control variables included can be obtained on request.\(^2\) Correlations relevant for the testing of our hypotheses are discussed next.

### Hypotheses

Considering our first set of hypotheses, we found that explicit honesty-humility significantly related negative to counter-academic behavior (H1a; \(r = -.16, p = .03\)), but showed a slight positive, though non-significant relationship with objective cheating (H1b; \(r = .06, p = .47\)), and a slight negative, non-significant relation with both self-confessed cheating (H1c; \(r = -.03, p = .70\)) and GPA (H1d; \(r = -.08, p = .29\)). Of all these hypotheses, only H1a could be supported, since this was the only significant relationship we found.

For the second set of hypotheses, we found no significant relationships. Implicit honesty-humility showed a slight negative relation to counter-academic behavior (H2a; \(r = -.08, p = .32\)), objective cheating (H2b; \(r = -.01, p = .86\)), self-confessed cheating (H2c; \(r = -.07, p = .41\)), and related slightly positive to GPA (H2d; \(r = .04, p = .59\)). Although all the relations were in the expected direction, none were statistically significant. Therefore H2a-d were disconfirmed.

Finally, to test incremental predictive validity, we regressed each criterion—that is counter-academic behavior (H3a), objective cheating (H3b), self-confessed cheating (H3c), and GPA (H3d)—first on explicit honesty-humility (Step 1) and added implicit honesty-humility (Step 2). We found that neither explicit honesty-humility (Step 1, \(R^2 = .01, p = .06\)) nor implicit honesty-humility (Step 2, \(R^2 = .027, p = .50\)) predicted counter-academic behavior. Also, explicit honesty-humility (Step 1, \(R^2 = .007, p = .30\)) and implicit honesty-humility (Step 2, \(R^2 = .01, p = .46\)) did not explain any variance in predicting GPA results. The results of these two separate regression analyses (i.e., H3a and H3d) can be seen in Table 5.2. Although these results were non-significant, the relative weights expressed as a percentage (Tonidandel & LeBreton, 2015), was greater for explicit honesty-humility, explaining more variance in both counter-academic behavior and GPA (i.e., 81.73% and 73.80% respectively), as compared to

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\(^2\) Additionally, with partial correlation analyses, we also explored how controlling for age and gender might respectively influence the relationship between implicit honesty-humility and counter-academic behavior (\(r = -.80, p = .35\)), objective cheating (\(r = -.02, p = .81\)), self-confessed cheating (\(r = -.07, p = .41\)), and GPA (\(r = .06, p = .49\)).
implicit honesty-humility (i.e., explaining 18.26% of variance in counter-academic behavior and 26.20% in GPA).

Table 5.2

*Hierarchical Regression and Relative Weights of GPA and CAB on Explicit and Implicit Honesty-Humility as a Global Trait*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Counter-academic Behavior</th>
<th>Grade Point Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Final $B$’s</td>
<td>RWA</td>
</tr>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicit HH</td>
<td>-.138</td>
<td>81.73%</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implicit HH</td>
<td>-.053</td>
<td>18.26%</td>
</tr>
</tbody>
</table>

*Note. N = 163 for counter-academic behavior and N = 164 for GPA.*

Additionally, we conducted a series of logistic regression analyses, were we first regressed objective cheating (H3b) and then self-confessed cheating (H3c) on explicit honesty-humility (Step 1), then implicit honesty-humility (Step 2). Results for both regression analyses are presented in Table 5.3. Neither explicit nor implicit honesty-humility predicted cheating.
Table 5.3

Logistic Regression and Relative Weights Analysis of Objective Cheating and Confessed Cheating on Explicit and Implicit Honesty-Humility as a Global Trait

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Objective Cheating</th>
<th>Confessed Cheating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>Exp(β) [95% CI]</td>
</tr>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicit honesty-humility</td>
<td>.37</td>
<td>1.45 [0.706; 2.98]</td>
</tr>
<tr>
<td>-2 log likelihood</td>
<td></td>
<td>207.96</td>
</tr>
<tr>
<td>R² (N)</td>
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<td>.006</td>
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<tr>
<td>R²(CS)</td>
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<td>.008</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implicit honesty-humility</td>
<td>-.23</td>
<td>0.79 [0.230; 2.73]</td>
</tr>
<tr>
<td>-2 log likelihood</td>
<td></td>
<td>207.82</td>
</tr>
<tr>
<td>R² (N)</td>
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<td>.007</td>
</tr>
<tr>
<td>R²(CS)</td>
<td></td>
<td>.009</td>
</tr>
</tbody>
</table>

Notes. N = 162 All predictors showed zero effect. 
R² (N) = Nagelkerke; R² (CS) = Cox & Snell; cheating was coded as 0 = did not cheat, and 1 = did cheat, so positive β values indicate positive associations with cheating. For objective cheating Hosmer and Lemeshow Test for Model 1 (Explicit honesty-humility): χ²(8) = 14.74, p = .064. Model 2 implicit honesty-humility: χ²(8) = 12.79, p = .12. For confessed cheating Hosmer and Lemeshow Test for Model 1 (Explicit honesty-humility): χ²(8) = 9.78, p = .28. Model 2 implicit honesty-humility: χ²(8) = 3.71, p = .88. *95% confidence interval (95%). Bootstrapped results are based on 1 000 bootstrap samples. *p < .05. ** p < .01.

Discussion

In this study, we aimed to test whether the IAT-HH could be used to predict negative (counter-) academic criteria, in the same way that explicit (self-report) honesty-humility does. First, of all the relationships that were tested, the only significant relationship found was between explicit honesty-humility and counter-academic behavior. In fact, counter-academic behavior and the narrow facet, fairness, showed the strongest relation (r = -.29, p < .01), as compared to the other narrow facets of honesty-humility. This result has now been well-established in literature (De Vries et al., 2011; Holtrop et al., 2014; Janse van Rensburg et al., 2018; Marcus et al., 2007; McAbee et al., 2014).

Second, we found a negative, but non-significant relation between objective cheating and implicit honesty-humility (H1b). This finding is somewhat in line with prior studies who found a negative relationship between honesty-humility and the probability of cheating during dice-rolling or coin-tossing tasks (Hilbig & Zettler, 2015; Kleinlogel et al., 2018). However, we found a slight positive, non-significant relation between objective cheating and explicit honesty-humility (H2b), which we cannot fully clarify in terms of existing literature, since prior studies (investigating the relation between honesty-humility and cheating) captured cheating...
either as ‘the probability of cheating’ (Hilbig & Zettler, 2015; Kleinlogel et al., 2018) or ‘self-confessed cheating’ during tasks (Janse van Rensburg et al., 2018; Pfattheicher et al., 2019). In line with these studies, we did find a slight negative, but non-significant relation between self-confessed cheating (H1c) and both implicit and explicit honesty-humility respectively (Janse van Rensburg et al., 2018; Pfattheicher et al., 2019). Thus, to summarize how implicit and explicit honesty-humility related to (negative) academic criteria, the only significant result we found was between explicit honesty-humility and self-reported counter-academic behavior.

To make sense of these results, in retrospect, we realize that all prior studies investigating the relation between honesty-humility and (counter-) academic criteria, were conducted cross-sectionally (where data were collected on the same day). This is very different as to how we collected data in the current study (which were at various timepoints), given that we wanted to avoid common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), and also test the predictive validity of the IAT-HH (Nunnally Jr & Bernstein, 1994), we collected data at various timepoints across several weeks, to investigate whether the IAT-HH could predict relevant criteria. To clarify, in the current study implicit and explicit honesty-humility were administered first, followed by objective cheating (five weeks later), then counter-academic behavior and self-confessed cheating (seven weeks after implicit/explicit honesty-humility were administered). On this matter, researchers note that finding significant relations between self-report (explicit) personality measures and behavior is quite complex, since they are both conceptually and empirically different (Back et al., 2009). Additionally, little is known about the influence of explicit honesty-humility on actual behavior to start with. Therefore, researches are encouraged to do more longitudinal empirical research to establish how honesty-humility relates to real-world integrity-related behavior (De Vries, Pathak, Van Gelder, & Singh, 2017).

Adding to this line of thought, both within and between individual differences in personality play a role in how people react to different situations. Thus, the same person may act very differently in varying circumstances (Baumeister, Vohs, & Funder, 2007; Funder, 2006; Mischel & Shoda, 1995). Especially when it comes to dishonest behavior, like cheating, various situational and environmental factors affect how people will react (Iyer & Eastman, 2008). For instance, having moral cues in the physical environment (like a picture of ‘watching eyes’) or situational characteristics (such as the universities’ departmental climate) may influence whether students will cheat or not (Jackson, Levine, Furnham, & Burr, 2002; Kleinlogel et al., 2018; Oda, Kato, & Hiraishi, 2015). Additionally, studies also confirmed that both individual and contextual variables (e.g., having academic honor codes and prevalence of
academic dishonesty on university on campus) may also affect whether students cheat or not (McCabe et al., 2012; McCabe et al., 2008). Some researchers have even gone so far as to say that dishonesty is not a characteristic of the person, but rather of the situation (Hartshorne & May, 1928). Therefore, whether individuals will cheat or not, is not only based on personality, but also as a function of the situation/environment/context that they are in (Heck et al., 2018; Mazar, Amir, & Ariely, 2008).

What we confirmed in this current study, was that explicit honesty-humility significantly relates to counter-academic behavior, even when these two tests are administered almost two months apart. One possible reason for this, is that counter-academic behavior is based on self-reported devious academic acts that have been committed in the past (e.g., plagiarizing, cheating, having low personal standards). In fact, researchers who have determined the significant, negative relation between explicit honesty-humility and counter-academic behavior might consider to refer to the postdictive validity (instead of predictive validity) of honesty-humility, since this term seems to be more appropriate (Nunnally Jr & Bernstein, 1994). The fact that explicit honesty-humility shows postdictive validity in predicting counter-academic behavior, seems to be well established in the current literature (De Vries et al., 2011; Holtrop et al., 2014; Janse van Rensburg et al., 2018; Marcus et al., 2007; McAbee et al., 2014). Additionally, we also reconfirmed that it is in fact the narrow facet, fairness, that explains almost all the variance in counter-academic behavior (De Vries et al., 2011; Janse van Rensburg et al., 2018; Marcus et al., 2007). Thus, students who score highly on fairness are likely to adhere to social rules and norms (Leone et al., 2012), are prosocial in their acts and are unwilling to take advantage of other students by breaking rules (Hilbig et al., 2014).

We also tested whether implicit and explicit honesty-humility scores related to desirable academic criteria (GPA scores). Our results found the relationship between implicit honesty-humility and GPA was non-significant, but nevertheless slightly positive, which is in line with the findings of De Vries et al. (2011) who found a positive relation between GPA scores and explicit honesty-humility. Additionally Rowatt et al. (2006) found that implicit humility (as measured with an IAT) also related positively to academic course results. Upon further investigation, we confirmed that the relationship between GPA and (with either implicit or explicit) honesty-humility is more complex. Whereas some researchers found that honesty-humility positively related to GPA results, with the narrow facet greed avoidance being the strongest predictor ($B = .25, p < .01$), the argument was that students low on greed avoidance (i.e., greedy) might take on a second job to make more money, which results in less time to
study, and hence low GPA scores (De Vries et al., 2011). Whereas other researchers found a negative relation between explicit honesty-humility and GPA scores, with the narrow facet, modesty, being the strongest predictor. These researchers argued that students high on modesty are perhaps more confident, having feelings of entitlement, and perhaps think that they do not have to work hard or perform well to enjoy a privileged life (Kajonius, 2016). In retrospect, we are questioning whether there are other mediating/moderating factors that might explain the relationship between honesty-humility and GPA results (e.g., social economic status, family upbringing, education, etc.). More research is needed to determine what regulates the relationship between GPA and explicit honesty-humility, before using GPA to establish the criterion-related validity of an implicit and/or explicit honesty-humility measure.

Lastly, we tested whether implicit honesty-humility could predict criteria above and beyond that of explicit honesty-humility. Our results revealed that implicit honesty-humility did not add any incremental predictive validity in determining either counter-academic behavior (H3a), objective cheating (H3b), self-confessed cheating (H3c) or GPAs (H3d). Apart from comprehending the complexity of how explicit honesty-humility predicts self-report and actual cheating, implicit honesty-humility seems to add to this complexity, because research on implicit measures show that IAT scores may vary according to situational factors (Machery, 2017). The IAT is also sensitive to contextual cues, for example seeing a picture of a snake may create anxiety, which may lead to the low temporal stability of IAT scores (Gschwendner et al., 2008). Additionally, IAT scores might also be malleable according to the contextual cues and situational variables they are presented in. For instance, automatic racial bias can be moderated by presenting Black versus White individuals as a prisoner, churchgoer or factory worker, or being in the presence of a competent black experimenter may activate a positive implicit attitudes toward Blacks within White participants (Barden, Maddux, Petty, & Brewer, 2004; Gawronski et al., 2018). Therefore, not catering for the situational, environmental and contextual cues in our research design, might have affected our results, influencing our findings on the criterion-related validity of the IAT-HH (Azar, 2008).

Finally, we investigated whether statistical artifacts (e.g., measurement error and/or unreliability) might have been the reason as to why we did not find any significant relations between implicit honesty-humility and (un)desirable criteria. It should be noted that in our research, we did not assess the test-retest reliability of the IAT-HH, given that literature confirms that the reliability estimates of response latency measures are generally low (Lane et al., 2007). Also, meta-analysis findings indicated that implicit measures have a low average temporal stability ($r = .54$; Gawronski et al., 2017), with no meaningful decrement when
measured a week \((r = .58)\), a month \((r = .62)\) or one year apart \((r = .47);\) Back, Schmukle, & Egloff, 2005; Back et al., 2009). In defense, De Schryver, Hughes, Rosseel, and De Houwer (2016) state that low reliability estimates of the IAT is not always a problem of random measurement error, but could also reflect the lack of experimental control. Since our IAT-HH data were collected online, we are not able to account for experimental control. However, prior research does report that there is no significant difference in the reliability of laboratory versus web-based research when using latent response measures to collect data (Hilbig, 2015).

**Limitations**

In our research we could not establish the criterion-related validity of the IAT-HH, which might be due to various factors, as discussed next. First, as compared to our previous research (Janse van Rensburg et al., 2018), data were collected cross-sectionally, whereas in the present study we collected data online, at different timepoints. Also, our participants were briefed/debriefed in person. Collecting data in this fashion (i.e., online, at different timepoints, and briefing/debriefing individuals in person) might have influenced our results and findings. Since the research of the current study, versus that of the previous study, were differential designs, we cannot fully compare results.

Second, although reaction time tasks like the IAT can validly be administered online (Hilbig, 2015), various factors might have played a role when respondents completed the IAT online, at home. Additionally, when assessing variables such as cheating and honesty-humility (either implicitly or explicitly), various situational and contextual factors may influence individuals’ responses. However, fully understanding and accounting for contextual constraints might be complex, since contextualized attitudes might vary from one person to another and even within individuals (Gawronski et al., 2018). Our research did not account for situational or environmental differences.

Third, generating evidence on the validity for the implicit test for honesty-humility may be a complex process (Binning & Barrett, 1989), not only because the implicit method of honesty-humility is complex, but also because understanding the relationship between honesty-humility and actual behavior might be associated with various challenges. For instance, spontaneous (implicit) and self-reported (explicit) honesty-humility is conceptually distinct from (dis)honest behavior (Doliński, 2018), which makes finding significant correlations more difficult. Alternatively, one might also argue that honesty-humility (as an independent variable) is best used with cheating behavior (as the dependent variable) to determine concurrent validity, but not predictive validity. In our previous results, administering honesty-humility and
cheating on the same day showed a significant relationship (Janse van Rensburg et al., 2018), but not when they were administered almost two months apart.\(^3\) Further research needs to be conducted to determine whether honesty-humility (whilst accounting for situational circumstances) is able to predict actual unethical behavior, such as cheating (De Vries et al., 2017).

In establishing whether the IAT-HH is valid, Cronbach and Meehl (1955, p. 290) state that the challenge “is not to conclude that the test is valid for measuring the construct”, but to determine “the degree of validity”. By viewing validity as a unitary concept and as a matter of degree (Messick, 1998), we could only establish that the IAT-HH scores related to relevant criteria, at least in the expected positive or negative direction as hypothesized, but all the relations we tested were non-significant. Therefore, and like other researchers who also attempted to develop and validate IATs to assess personality traits (e.g., self-esteem, conscientiousness, emotional stability and competence need satisfaction; Karpinski, 2004; Siets & Christiansen, 2013; Van der Kaap-Deeder et al., 2018), we too could not establish sufficient support to claim that the IAT-HH is a valid test to predict desirable and undesirable student criteria.

**Future Research Opportunities**

Recent meta-analyses have confirmed that as the correlation between implicit and explicit measures increase, so do the predictive validity of the implicit test (Greenwald et al., 2015; Greenwald et al., 2009; Kurdi et al., 2018). Additionally, researchers are suggesting that implicit evaluations might reshape explicit cognition, which in turn drives behavior (Greenwald & Banaji, 2017; Kurdi et al., 2018). If this hypothesizing is correct, researchers should first aim to establish a stronger relationship between the implicit and explicit measures of honesty-humility, before attempting to predict behavior with an implicit test. In one case, where the IAT was used to measure emotional stability and conscientiousness, the implicit–explicit scores did not relate, and hence was unable to predict behavior (Siers & Christiansen, 2013).

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\(^3\) When aiming to establish criterion-related validity, criteria can be assessed either at the same time of the new test (called concurrent validity, as conducted in our previous cross-sectional study), in the future (called predictive validity, as in the current study), or in the past (postdictive validity) as in the case where students report on counter-academic behavior committed in the past (Nunnally Jr & Bernstein, 1994). Predictive validity involves correlating the results of one test with the results of a second test, administered later, to assess how well the test predicts expected future observations (Litwin, 1995).
One way to improve the implicit–explicit intercorrelation is with the use of conceptual correspondence (Ajzen & Fishbein, 1977), where measures are tailored to the same level of specificity. Conceptual correspondence can be created by adding text (e.g., to the explicit honesty-humility test items) to create a frame of reference by specifying the target-object being assessed (e.g., an individual at home versus a student at school), to a context or situation (e.g., being alone versus amongst others). Given that the category labels and contextual cues used in IATs may influence IAT scores (Foroni & Mayr, 2005; Govan & Williams, 2004; Steffens & Schulze König, 2006) and because adding tags (e.g., at school or at home) to test-items have improved the criterion validity of the HEXACO personality inventory (Holtrop et al., 2014), one might also contextualize IAT stimuli to reduce the malleability of IAT scores. In doing so, the validity estimates of the IAT-HH might also improve. Therefore, in line with the idea of conceptual correspondence and creating a frame of reference by tagging items, future researchers might think of experimenting with IAT-HH stimuli to increase the strength of relationships between implicit and explicit measures. Consequently, this might improve the criterion-related validity of the IAT-HH to predict behavior (Greenwald et al., 2015; Greenwald et al., 2009; Kurdi et al., 2018).

**Conclusion**

The aim of this study was to investigate whether the IAT-HH can be used to predict desirable and undesirable academic criteria as well as (or better than) explicit measures of honesty-humility. Our results indicate that the IAT-HH does not show criterion-related validity. Researchers should continue with validation studies to further establish the criterion-related validity of personality IATs (Perugini et al., 2018). In the meantime, it is recommended to continue using the explicit (self-report) measure of honesty-humility measure, given that explicit fairness showed postdictive validity in predicting the counter-academic behavior of students.
Appendix D: Supplementary Material for the Improved Cheating Task

We improved the first version of the cheating task (as presented in Janse van Rensburg et al., 2018). We added ten additional general knowledge questions (i.e., found on the internet), each with five response options and only one correct answer. Whilst answering these ten questions, respondents could select an option (presented as an electronic Save Me button) in which one could view the correct answer when clicking on the button. Our instructions clearly stated that test-takers were only allowed to use this help function (i.e., the electronic Save Me button) two times. Respondents were warned that by pressing the Save Me button more than twice, would constitute cheating.

It should be noted that after data were collected, respondents were debriefed and the true purpose of the research was made known (i.e., the development and validation of an implicit test of honesty-humility and how implicit honesty-humility relates to various criteria). Next, respondents had the opportunity to withdraw their informed consent, thus excluding their data. Finally, respondents had the opportunity to confess to whether they cheated during the online cognitive task or not (i.e., confessed cheating).

The matrix presented in Figure 5.2 provides deeper insight into understanding cheating behavior. The results found that of the total number of respondents that participated in the cheating task (N = 170), n = 37 really cheated (as detected by our online task) and confessed to have cheated (true positive); whilst n = 23 confessed to have cheated, but was undetected by our cheating task, since they used other means to cheat such as using the internet or asking a friend’s help (i.e., false positive). Of the sample, n = 4 participants cheated (as detected by our task) but deny having cheated (false negative); and finally, n = 106 participants said that they did not cheat and this was also confirmed by the task, because cheating was not detected (true negative). The results of the total amount of respondents cheating (both confessed and objective cheating) is 35.3%, which is in line with previous findings on how many students cheat (32.5% reported in Janse van Rensburg et al., 2018; McCabe, 2016, reports 37.3%). To elicit cheating behavior, individuals were put under time pressure (Shalvi, 2012) whilst completing the task and prize money was offered (Gino & Pierce, 2009).

One way to assess the validity of our cheating task was to determine the sensitivity and specificity to see how well the test correctly identified honest and dishonest individuals (Freund

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4 During the data collection of the first empirical study (presented in Chapter 3), we were not able to detect objective cheating. In fact, collegiate cheating, as described in Chapter 3, refers to self-confessed cheating behavior. For this reason, we extended the cheating task by including 10 additional questions to assess actual, objective cheating that could be captured online with Qualtrics.
The sensitivity of our cheating task (90.24%), also known as the detection rate in clinical settings, refers to the task’s ability to correctly detect dishonest participants. Whilst the specificity (82.17%) relates to the task’s ability to correctly identify honest participants in the sample. With the number of false positives and few false negatives, our task showed above average accuracy (positive predicted value = 61.7%) in confirming dishonest behavior and correctly identified 90.24% of dishonest participants (sensitivity). The task showed high accuracy in confirming honest behavior (negative predicted value = 96.4%) and correctly identified 82.2% of those who were honest. One limitation of this cheating task was that we could not say with 100% confidence that those respondents who reported to not having cheated, truly did not cheat, because participants were at home (unmonitored) whilst completing the online cheating task (i.e., making other ways of cheating possible, like using the internet).

<table>
<thead>
<tr>
<th>Predicted Condition (Confession)</th>
<th>True Condition (Objective Cheating)</th>
<th>Predictive Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive Condition</td>
<td>Negative Condition</td>
</tr>
<tr>
<td></td>
<td>(did cheat)</td>
<td>(did not cheat)</td>
</tr>
<tr>
<td>True Positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 37 (21.76%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detected cheating and respondents confess to having cheated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>False Positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Type I error)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 23 (13.53%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undetected cheating but respondents confess to having cheated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True Negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 106 (62.35%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undetected cheating and Respondents report to not having cheated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>False Negative</td>
<td></td>
<td></td>
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<tr>
<td>(Type II error)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 4 (2.36%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detected cheating but respondents deny having cheated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to detect (dis)honest respondents</td>
<td>Sensitivity</td>
<td>Specificity</td>
</tr>
<tr>
<td>TP / (TP + FN)</td>
<td>= 37 / (37 + 4)</td>
<td>= 106 / (23 + 106)</td>
</tr>
<tr>
<td>= 90.24%</td>
<td></td>
<td>= 82.17%</td>
</tr>
</tbody>
</table>

*Figure 5.2. Matrix illustrating the true condition (objective cheating) and predicted condition (confessed cheating)*
Appendix E: Cheating Measure

Instructions

You are to answer 6 questions, all presented on a single page. Take note of the mark allocation for each question indicated in brackets.

This is a timed task where you have only 20 minutes to complete all the questions. You must monitor your time the moment you start with question 1 (you will see the count-down clock on the "question paper" when you start). Completing the task in less time will not provide you with a higher score/better ranking, but you can electronically submit your assignment when you are ready to do so. However, you are NOT allowed to go over the 20 minutes allocated. An “answer sheet” will then be presented to you (after answering the questions). You are then to score/grade your own answers. At this point, you are not allowed to change your answers before submitting them.

Bonus: If you get all the answers correct, you will be entered into a pool to stand the chance of winning money.

Rules of the game

- You may not use any other sources to find answers to these questions (e.g., you may not use the internet, cellphone or friends to help you).
- You may only use scrap paper for calculations (get your scrap paper and pencil ready before you start!).
- You are to continue with the next question as soon as you have typed in your answer.
- All answers will be made known at the end of the task where you have to score your own answers from a presented Answer Sheet. Changing answers during this stage is not allowed.
- You may finish before the 20 minutes are over, but you may not take longer than the given time.
- There are to be no interruptions during this task. See that your environment is conducive for testing (i.e., no disturbances).
- Ensure to work on a computer and not any other electronic devices. Your time starts when you click “Start”. Good Luck!!!
[After clicking “start”, a digital count-down timer is displayed on screen where 20 minutes starts counting down]

1. If one cent is equal to one second, how much money would you have after two and a half minutes? (1)

2. Sophie spent 75c on two sweets. One of the sweets cost 35c more than the other. How much did each sweet cost? (2)

3. Bert won a cent-counting contest. He was given 8c on the first day, 88c on the second day, and 888c on the third day. How many cents did Bert make on average? (1)

4. A mother has two children who want chewing gum (bubblegum) from a "bubblegum ball machine" that takes only 10c coins. The children want the same color chewing gum. There are three different colored chewing gumballs: red, green, and yellow. How many cents will the mother have to put into the gumball machine to make sure that the children get gumballs of the same color? (1)

5. You are to complete an anagram. An anagram is the rearrangement of the letters of a word/phrase into another word/phrase that describes something of the original words, but in a different way. ALL the letters of the presented name/phrase must be used ONLY ONCE. For example, an anagram from "Eleven plus two" = "Twelve plus one” OR Another example is “Debit Card” = "Bad Credit"

Note that every letter was used only once. The answer also describes something of the original anagram in a clever way.

Like in the examples, you must now do an anagram with “A DECIMAL POINT” by typing something that describes something of the original words, but in a different way and using each letter only once. Type your anagram in the space provided. (1)

[The test is finished and an electronic answer sheet is presented on screen for participants to “mark” their own answers. Respondents are able to change their own answers on the electronic answer sheet (which constitutes cheating). Both the original and the changed answer is captured without the participant knowing.]
Answer Sheet

You are now to check your own answers. Do not change your answers as this will not be fair towards other participants.

Question 1. If one cent is equal to one second, how much money would you have after two and a half minutes? (1)
Correct answer 1: You would have R1.50. There are 120 seconds in two minutes and 30 seconds in one half of a minute. Since each second equals one cent, 120 seconds + 30 seconds = 150 seconds, or R1.50. (1)
Your answer 1: Participant’s answer is presented with the possibility to change (cheat).

Question 2. Sophie spent 75c on two sweets. One of the sweets cost 35c more than the other. How much did each sweet cost. (2)
Correct answer 2: One sweet costs 55c, the other costs 20c. (2)
Your answer: Participant’s answer is presented with the possibility to change (cheat).

Question 3. Bert won a cent-counting contest. He was given 8c on the first day, 88c on the second day, and 888c on the third day. How many cents did Bert make on average? (1)
Correct answer 3: Bert averaged 328c a day. To find the average, add the three different amounts of cents together and divide by three. (1)
Your answer 3: Participant’s answer is presented with the possibility to change (cheat).

Question 4. A mother has two children who want chewing gum (bubblegum) from a "bubblegum ball machine" that takes only 10c coins. The children want the same color chewing gum. There are three different colored chewing gumballs: red, green, and yellow. How many cents will the mother have to put into the gumball machine to make sure that the children get gumballs of the same color? (1)
Correct answer 4: 40c. Even if the mother gets three different-colored gumballs with the first three cents, she will get a match with the fourth 10c (1)
Your answer 4: Participant’s answer is presented with the possibility to change (cheat).

Question 5. You are to complete an anagram. An anagram is the rearrangement of the letters of a word/phrase into another word/phrase that describes something of the original words, but in a different way. ALL the letters of the presented name/phrase must be used ONLY ONCE.
For example, an anagram from "Eleven plus two" = "Twelve plus one" OR
Another example is “Debit Card” = "Bad Credit"
Note that every letter was used only once. The answer also describes something of the original anagram in a clever way.
Like in the examples, you must now do an anagram with “A DECIMAL POINT” by typing something that describes something of the original words, but in a different way and using each letter only once. Type your anagram in the space provided. (1)
Correct answer 5: A decimal point = I’m a dot in place OR A mini dot place (1)
Your answer 5: Participant’s answer is presented with the possibility to change (cheat).
You can now submit your Answer Sheet by clicking on "Submit".

Instructions

Well done for completing Part 1 of the cognitive test. You qualify for the bonus round! This is a Knowledge Speed Test which will only take 4 minutes to complete. In this round, you get a "saving grace" called a mulligan. A mulligan is a second chance to perform an action, usually after the first chance went wrong through bad luck or a blunder. Its best-known meaning is in golf, whereby a player is informally allowed to replay a stroke, even though this is against the formal rules of golf. Your mulligan is presented as a "SAVE ME" button. You can click on it whenever you feel you need to, then the answer will appear, and you must then select the correct answer. The rule is that you may only use 2 mulligans (i.e., Save Me).

Take note there are ten general knowledge questions and you only have 24 seconds for each question. When your time runs out, you will go to the next question and you can never go back to the previous question. Remember, you are now under time pressure so work fast. Good Luck!! [Click and continue when you are ready to start.]

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5 Adding to the cheating task, as presented in Chapter 3, the task continued with additional instructions and questions (i.e., the cheating task reported in Chapter 5).
Questions

1. Grand Central Terminal, Park Avenue, New York is the world's
   - Largest railway station
   - Highest railway station
   - Longest railway station
   - Most famous railway station
   - None of the above

   *Click (button) if you wish to use your mulligan and see the correct answer*

   SAVE ME [Largest railway station]

2. Entomology is the science that studies
   - Behavior of human beings
   - Insects
   - The origin and history of technical and scientific terms
   - The formation of rocks
   - None of the above

   *Click (button) if you wish to use your mulligan and see the correct answer*

   SAVE ME [Insects]

3. Eritrea, which became the 182nd member of the UN in 1993, is in the continent of
   - Asia
   - Africa
   - Europe
   - Australia
   - None of the above

   *Click (button) if you wish to use your mulligan and see the correct answer*

   SAVE ME [Africa]

4. Garampani sanctuary is located
   - Junagarh, Gujarat
   - Diphu, Assam
   - Kohima, Nagaland
• Gangtok, Sikkim
• None of the above

Click (button) if you wish to use your mulligan and see the correct answer
SAVE ME [Diphu, Assam]

5. For which of the following disciplines is Nobel Prize awarded
   • Physics and Chemistry
   • Physiology or Medicine
   • Literature, Peace and Economics
   • All of the above
   • None of the above

Click (button) if you wish to use your mulligan and see the correct answer
SAVE ME [All of the above]

6. Galileo was an Italian astronomer who
   • Developed the telescope
   • Discovered four satellites of Jupiter
   • Discovered that the movement of pendulum produces a regular time measurement
   • All of the above
   • None of the above

Click (button) if you wish to use your mulligan and see the correct answer
SAVE ME [All of the above]

7. When light passes from air into glass it experiences change of
   Frequency and speed
   • Wavelength and speed
   • Frequency, wavelength and speed
   • Frequency and wavelength
   • Speed
   • None of the above

Click (button) if you wish to use your mulligan and see the correct answer
SAVE ME [Wavelength and speed]
8. When a moving bus stops suddenly, the passengers are pushed forward because of the
   - Friction between the earth and the bus
   - Friction between the passengers and the earth
   - Inertia of the passengers
   - Inertia of the bus
   - None of the above

**Click (button) if you wish to use your mulligan and see the correct answer**

SAVE ME [Inertia of the passengers]

9. Philology is the
   - Study of bones
   - Study of muscles
   - Study of architecture
   - Science of languages
   - None of the above

**Click (button) if you wish to use your mulligan and see the correct answer**

SAVE ME [Science of languages]

10. In a lake, there is a patch of lily pads. Every day the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of it?
   - 10 days
   - 24 days
   - 47 days
   - 20 days
   - None of the above

**Click (button) if you wish to use your mulligan and see the correct answer**

SAVE ME [in 47 days lily pads will cover half the lake and 48th day it will double]
This final chapter provides a comprehensive summary and discussion of the main research findings, from the studies presented in Chapter 2 through 5. Furthermore, the strengths and limitations of this dissertation are acknowledged. In addition, theoretical and practical implications are discussed. Based on what has been learned during the past years in undertaking this project, ideas are proposed to future researchers who wish to employ implicit measures of honesty-humility.
Summary and Discussion of Research Questions

At the outset of this dissertation the rationale for undertaking the main project goal (i.e., the development and validation of an implicit measure of honesty-humility) was presented. Additionally, the broad research objectives and several research questions, supporting the central theme of the dissertation, were introduced. A comprehensive summary and discussion of the main research findings, from the studies presented in Chapter 2 through 5, are presented next.

Implicit Measures in Practice

Keeping the main project goal in mind, it was needed to organize the literature field by composing a large-scale taxonomy of implicit measures. Therefore, Chapter 2 (Going implicit: Using implicit measures in organizations) presents the findings of a systematic literature overview of implicit measures to investigate which types of measures can be distinguished (Research Question 2) by integrating available paradigms on implicit measures. In doing so, the taxonomy presented by Uhlmann et al. (2012) was expanded by presenting 49 measures, clustered into three broader psychological assessment techniques (i.e., automaticity, projection and justification). One test, from each of the three broader clusters (i.e., the Implicit Association Test [IAT], Picture Story Exercise [PSE], and Conditional Reasoning Test [CRT]), was taken as an exemplar to address the assessment quality of each test. In doing so, better insight was gained into how implicit constructs are operationalized (Research Question 3) and how implicit tests could be applied in practice (Research Question 4). Further, each exemplar was used to illustrate how each test works, areas of application, psychometric properties (reliability, construct and criterion validity), perceptions of fairness, procedural justice and faking potential. By weighing the evidence on each of these criteria, one might conclude that the limited number of empirical studies show indications of poor psychometric properties of implicit measures and that empirical evidence is currently insufficient to recommend large-scale adoption of implicit measures in organizations for important decision-making. Future empirical evidence may strengthen insight into the limitations of implicit tests. For this reason, ways in which the validity of implicit measures could be improved, were addressed.

In deciding which implicit measure would be the most suitable to measure the construct of honesty-humility (i.e., in comparing the IAT, PSE and CRT), the IAT was found to be the most popular implicit measure (in terms of the number of citations, good internal reliability as compared to other reaction-timed tests, easy to develop, administer and score). Therefore, it was decided to use the IAT method to assess the construct of honesty-humility.
The Relationship between Explicit Honesty-Humility and Criteria

Prior to developing and validating the IAT-HH, or any psychological measure for that matter, it is also important to understand how the predictor and criteria relate (Farr & Tippins, 2013). Given that the assessment of implicit honesty-humility is novel, results on how implicit honesty-humility (as measured with the IAT-HH) relates to outcomes are not reported in literature. Therefore, it was first necessary to gain insight into how explicit (self-report) honesty-humility and the narrow facets it comprises (i.e., fairness, sincerity, greed avoidance and modesty) relate to criteria; because the broad versus the narrow facets of honesty-humility might predict general and specific behavior with more or less accuracy (Soto & John, 2017). Therefore, Chapter 3 (Narrow facets of honesty-humility predict collegiate cheating), reports how the narrow facets of explicit honesty-humility relate to criteria, namely general counter-academic behavior (which includes several, varied outcomes) and more specific academic dishonesty (i.e., cheating) (Research Question 5). An empirical study was conducted, where data were collected amongst South African students, $N = 308$ (157 women and 151 men), aged between 18 and 47 years ($M = 22.9$ years; $SD = 5.23$). Results of this cross-sectional study found that the narrow facet, fairness, played an important role in predicting self-reported counter-academic behavior. Whereas the explicit narrow facet, greed avoidance, showed to be important in predicting actual cheating (when monetary reward is involved).

Additionally, given that researchers often follow a design where cheating is represented by an aggregate pattern (i.e., given the statistical baseline probability of winning) (Zettler et al., 2015), a novel feature of this study was to improve the operationalization of dishonesty criteria (i.e., cheating) by developing an objective online cheating task for use in a subsequent study (see Chapter 5).

Development of the Implicit Association Test of Honesty-Humility (IAT-HH)

Chapter 4 (Development and construct validation of the implicit association test for honesty-humility) reports the findings of two research objectives. First, the development of the implicit association test for honesty-humility (i.e., called the IAT-HH) is described. During the development of the IAT-HH, three subject matter experts (SMEs) gave advice on which IAT stimuli would best capture implicit honesty-humility. A pilot study (i.e., volunteers in the field of psychology, consisting of 16 master’s students, four PhDs, two post-doc students and one professor) was conducted to confirm that the IAT-HH stimuli were comprehensible. Additionally, given that personality IATs might be confounded with positive–negative valence
(Siers & Christiansen, 2013), a second pilot study was conducted amongst South African university students ($N = 35$; 19 women and 16 men) aged between 19 and 45 years ($M = 24.2$; $SD = 6.5$). Results found that the IAT-HH was unrelated to valence. Therefore, the IAT-HH was based on the assessment of some semantic content (i.e., based on the narrow facets that honesty-humility comprise), which implied that the IAT-HH might have been suitable for the assessment of honesty-humility, but only if validity could be established. Therefore, the construct validity of the IAT-HH was investigated next.

**Construct Validity of the IAT-HH**

Apart from developing the IAT-HH, the second aim (presented Chapter 4) was to determine what the IAT-HH measured (Research Question 6). In doing so, a second empirical study was conducted, where data were collected from Flemish university students ($N = 178$; 137 women and 41 men) aged between 21 and 53 years ($M = 24.34$; $SD = 4.7$). In determining the construct validity of the IAT-HH, the implicit and explicit measures of honesty-humility were related, thus both tests were measuring the same underlying construct. However, these two constructs were also distinct, because honesty-humility was operationalized using two different methods (to assess both implicit and explicit cognition). Therefore, there was some indication of convergent validity.

In further establishing the convergent validity of the IAT-HH, social desirability showed a strong relation to explicit honesty-humility, but not to implicit honesty-humility. This medium to strong relation between explicit honesty-humility and social desirability was in line with previous research that found social desirability is positively related to actual honest behavior (De Vries et al., 2018). In terms of the non-significant relationship between implicit honesty-humility (i.e., IAT-HH scores) and social desirability, two possible explanations are provided: either the IAT-HH did not capture the honesty-humility personality trait (implying that the IAT-HH is not a valid measure) or the IAT-HH successfully captured honesty-humility, but without the positive self-descriptive bias, generally associated with high social desirability. To further investigate this finding, it was also necessary to explore how participants’ ability to identify the criteria (ATIC), related to implicit honesty-humility (as compared to explicit honesty-humility). Results found that implicit honesty-humility and ATIC were significantly, positively related. However, given that IAT-HH stimulus items were defined to respondents, prior to commencing with the IAT-HH (as suggested by SMEs and recommended in literature; Brunel et al., 2004), this might have influenced the results. Therefore, no substantial inferences could be drawn from the fact that implicit honesty-humility and ATIC significantly related
positively. However, there was no significant relationship between ATIC and explicit honesty-humility scores, which implies that participants were not able to identify which criteria were assessed with self-report honesty-humility items. Finally, given that cognitive ability neither related to implicit (IAT-HH) nor explicit (self-report) honesty-humility, the discriminant validity of the IAT-HH was established.

Although the discriminant validity of the IAT-HH could be established, some questions remained unanswered in terms of the construct validity of the IAT-HH (i.e., exactly what construct the IAT-HH measured). However, given that validity is a unitary approach (Binning & Barrett, 1989) where validity includes the full range of validity ‘types’ (construct and criterion-related validity), more data were needed to establish whether the IAT-HH could predict relevant criteria. Therefore, building on the finding that the IAT-HH and the self-report measure of honesty-humility were distinct, but related, the criterion-related validity was investigated next.

**Criterion-related and Incremental Validity of the IAT-HH**

Chapter 5 (Criterion-related validity of an implicit association test for honesty-humility) reports on whether the IAT-HH can be used to predict desirable academic criteria (grade point average scores) and undesirable academic criteria (i.e., counter-academic behavior, objective cheating and self-confessed cheating) in the same way as explicit honesty-humility does (Research Question 7). Specifically, in line with prior research, it was hypothesized that explicit honesty-humility would relate negatively to counter-academic behavior, objective cheating and self-confessed cheating, and positively to grade point average scores (GPA). Subsequently, since implicit and explicit honesty-humility showed to be measuring the same construct, it was also expected that implicit honesty-humility would relate to the mentioned criteria in the same way.

The only significant relationship found in this study was between explicit honesty-humility and counter-academic behavior, which is now well-establish in literature (De Vries et al., 2011; Holtrop et al., 2014; Janse van Rensburg et al., 2018; Marcus et al., 2007; McAbee et al., 2014). In these studies, it is the narrow facet, fairness, that explains most (approximately 70%) of the variance in counter-academic behavior. This finding is clarified in that fairness is a product of moral judgment (Peterson & Seligman, 2004), which is associated with both care reasoning (i.e., having empathy and compassion) and justice reasoning (i.e., how people refer to others in terms of equity and what is right or wrong) (Kohlberg, 1984). Therefore, students who score high on fairness avoid counter-academic behavior, because they adhere to social
norms (Leone et al., 2012), do not take advantage of others (De Vries et al., 2011) and do not break the rules (Hilbig et al., 2014). Additionally, because counter-academic behavior scores are generated by instructing participants to self-report on academic ethical transgressions, committed in the past (e.g., plagiarizing, having low standards, misrepresentation), when explicit honesty-humility is used to explain variance in counter-academic behavior, this might be referred to as the *postdictive* validity of explicit honesty-humility (Nunnally Jr & Bernstein, 1994).

Further, neither the implicit nor explicit honesty-humility measures could predict GPA results. Nonetheless, the small, but non-significant relation between IAT-HH scores and GPAs were at least in the hypothesized direction. However, the results found that the relationship between (implicit versus explicit) honesty-humility and GPA scores were non-consistent. Also in literature, results about how GPA scores relate to honesty-humidity are mixed (De Vries et al., 2011; Kajonius, 2016). Therefore, more research is needed to determine what regulates the relationship between GPA and (explicit) honesty-humility before GPAs can be used to establish the criterion-related validity of honesty-humility. Finally, although personality IATs have been applied to incrementally predict shy and anxious behavior (Egloff & Schmukle, 2002; Schnabel et al., 2006) the IAT-HH did not show incremental predictive validity in determining desirable or undesirable student criteria.

Furthermore, to test the predictive validity of the IAT-HH—and also to avoid common method bias (Podsakoff et al., 2003)—data on the implicit, explicit and behavioral criteria (related to honesty-humility e.g., objective cheating, self-report cheating) were collected at various timepoints. In doing so, insight was gained into the predictive value of implicit and explicit honesty-humility and how these measures relate to real dishonest (future) behavior, which is thinly-spread in literature (De Vries et al., 2017). In the first empirical study, administering honesty-humility and cheating on the same day showed a significant relationship (Janse van Rensburg et al., 2018); however, when administered almost two months apart, cheating and honesty-humility did not relate. Prior studies have found that various situational and environmental factors may influence whether individuals will cheat or not (Iyer & Eastman, 2008). Some researchers have even gone so far as to say that dishonesty is not a characteristic of the person, but rather of the situation (Hartshorne & May, 1928). Therefore, whether individuals will cheat or not, is not only based on personality, but also as a function of the situation, environment, or context that they are in (Heck et al., 2018; Mazar et al., 2008). Furthermore, establishing significant relationships between spontaneous (implicit) and self-
reported (explicit) honesty-humility and (dis)honest behavior is rather difficult to start with, given that these concepts are conceptually and theoretically distinct (Doliński, 2018).

Apart from fact that data were collected cross-sectionally (Chapter 3) versus at various timepoints (Chapter 4 and 5), three other differences between the two empirical studies should be noted: The sample in the first empirical study consisted of university students from South Africa (Chapter 3), whereas in the second study, data were collected amongst university students from Flanders (Chapters 4 and 5). Research exploring the personality structure of South Africa (in the 11 official language groups) revealed that personality comprise nine broad clusters, namely, conscientiousness, emotional stability, extraversion, facilitating, integrity, intellect, openness, and relationship (Nel et al., 2012). The integrity cluster is best described by adjectives, such as fair, pretending, honest, loyal, trustworthy, morally conscious, and truthful. The results from the South African sample (presented in Chapter 3) found the honesty-humility items showed acceptable internal reliability for the narrow facets, namely fairness (α = .71), greed avoidance (α = .76), modesty (α = .60) and sincerity (α = .60). Similarly, research findings of a Dutch lexical study (De Vries, Ashton, & Lee, 2009) also revealed a sixth personality trait, honesty-humility.¹ Data from the Flemish sample (presented in Chapters 4 and 5) also showed acceptable internal consistency for each of the narrow facets, namely fairness (α = .71), greed avoidance (α = .70), modesty (α = .65) and sincerity (α = .75). Nel et al. (2012) reports that integrity is similar to that of the honesty-humility factor, but with greater emphasis on issues of fairness and discrimination. However, given that the results and findings, as presented in Chapter 3, were in line with previous research in a Western European context (De Vries, De Vries, & Born, 2011; Hilbig & Zettler, 2015), there was no reason to doubt the validity of the self-report honesty-humility measure (i.e., when administered amongst a South African student sample).

Additionally, in the second empirical study (Chapters 4 and 5), participants were briefed and debriefed in person (although the purpose of the research was not revealed until all data were collected), whereas data were collected online (with no interpersonal contact) in the first study (Chapter 3). One might question whether making contact with the participants, prior to collecting data, might have influenced respondents’ results (e.g., to act in a more socially desirable way). In line with the person-situation interactionist perspective (Mischel, 2004) which suggests that individuals’ personality interacts with a specific situation, which will

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¹ Note that the global trait, honesty-humility, is termed ‘integrity’ or ‘integriteit’ in Dutch (De Vries et al., 2009).
determine how they act, it should be noted that for both the first and second empirical study, data were collected online (for implicit, explicit and honesty-humility criteria) when students were at home. Therefore, data were collected in the same conditions. Additionally, in questioning whether participants might have acted in a more desirable fashion, it should be noted that in both empirical studies, the cheating prevalence was similar in both studies (i.e., 32.5% respondents cheated in the first study, whereas 35.3% cheated in the second) and is in line with the cheating prevalence of students (McCabe, 2016).

Lastly, in both empirical studies prizemoney was offered to create a motive for participants to cheat. In both studies, respondents were told that best performing individuals (i.e., on the cheating task which was disguised as a cognitive test) would be entered into a pool to win the available cash. However, in the first study, the total amount of prizemoney was mentioned (5000 rand or more or less 330 euro in total) and was paid to the ten best-performing individuals as R500 or €33 each. Whereas in the second empirical study, the specific amount of prizemoney was not explicitly mentioned (given that research funds were depleted). In the second study, only 60 euro was paid. However, in both studies, approximately the same percentage of respondents cheated. In the first study 32.5% of the respondents cheated (Chapter 3) and in the second study 35.3% cheated (Chapter 5), which is in line with other research about the prevalence of cheating amongst students (e.g., 37.3% in McCabe, 2016).

To summarize, the IAT-HH was successfully developed and there was initial empirical evidence to establish discriminant validity. Given that the implicit and explicit honesty-humility measures were found to be distinct, but related, some support for convergent validity was established. However, what remained undermined was which construct the IAT-HH measured and what criteria it could predict (i.e., construct and criterion-related validity; Cronbach & Meehl, 1955). One challenge is that there is no golden standard against which the IAT-HH can be validated against, because using different implicit measures (i.e., using different methods such as the PSE, CRT and IAT) to assess the same construct (i.e., honestly-humility) is also not ideal, because these implicit tests are methodologically different; therefore, correlations between such measures might be attenuated (Slabbinck et al., 2013). In line with other researchers, who also attempted to develop and validate IATs to assess personality traits (e.g., Karpinski, 2004; Siers & Christiansen, 2013; Van der Kaap-Deeder et al., 2018), the results of the current research did not support to claim that the IAT-HH was a valid measure of honesty-humility. Various reasons might be ascribed to these non-significant results in terms of the validity of the IAT-HH, which are discussed in the next section.
Whereas Figure 6.1 provides a summary of the (supported and non-supported) hypotheses that were tested in the two empirical studies, Figure 6.2 presents the summary findings of each chapter.
### Chapter 3: Narrow facets of honesty-humility predict collegiate cheating (Cross-sectional empirical study I)

<table>
<thead>
<tr>
<th>Hypothesis 1a, b, c, d, e = Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The narrow facets of fairness (H1a), sincerity (H1b), greed avoidance (H1c) and modesty (H1d) will relate negatively to counter-academic behavior, with fairness relating more negatively to counter-academic behavior than sincerity, greed avoidance and modesty (H1e).</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothesis 2e = Supported</th>
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</thead>
<tbody>
<tr>
<td>- The narrow facets of fairness (H2a), sincerity (H2b), greed avoidance (H2c) and modesty (H2d) will relate negatively to collegiate cheating, with fairness relating more negatively to collegiate cheating than sincerity, greed avoidance and modesty (H2e).</td>
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</table>

<table>
<thead>
<tr>
<th>Hypothesis 3 = Supported</th>
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<tbody>
<tr>
<td>- Hypothesis 3. The set of honesty-humility narrow facets (fairness, sincerity, greed avoidance, modesty) will explain more variance in collegiate cheating than a model containing only the global trait (honesty-humility).</td>
</tr>
</tbody>
</table>

### Chapter 4: Development and construct validation of the implicit association test for honesty-humility (Cross-sectional empirical study II)

<table>
<thead>
<tr>
<th>Hypothesis 1a &amp; b = Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The relationship between implicit honesty-humility (i.e., the IAT-HH) and explicit (self-report) honesty-humility will show low to medium, positive correlation (H1a); but that implicit and explicit honesty-humility will also be distinct (H1b), since they use different measurement methods to capture the same construct.</td>
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<table>
<thead>
<tr>
<th>Hypothesis 2b = Supported</th>
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<tbody>
<tr>
<td>- Social desirability will relate positively to both implicit honesty-humility (H2a) and explicit honesty-humility (H2b), and both implicit and explicit honesty-humility will be related to social desirability in a similar way (H2c).</td>
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</table>

<table>
<thead>
<tr>
<th>Hypothesis 3a &amp; b = Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Cognitive ability will be unrelated to implicit honesty-humility (H3a) and explicit honesty-humility (H3b).</td>
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</table>

<table>
<thead>
<tr>
<th>Hypothesis 4 = Not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Implicit and explicit honesty-humility will relate in a similar way to the ability to identify criteria (ATIC).</td>
</tr>
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</table>

### Chapter 5: Determining if the implicit association test for honesty-humility predicts positive and negative academic criteria (Empirical study II cont. as ‘longitudinal’)

<table>
<thead>
<tr>
<th>Hypothesis 1a = Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Explicit honesty-humility will relate negatively with counter-academic behavior (H1a), cheating (H1b), self-confessed cheating (H1c), and will relate positively to GPA (H1d).</td>
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</table>

<table>
<thead>
<tr>
<th>Hypothesis 2a-d = Not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Implicit honesty-humility will relate negatively with counter-academic behavior (H2a), cheating (H2b), self-confessed cheating (H2c), and will relate positively to GPA (H2d).</td>
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</table>

<table>
<thead>
<tr>
<th>Hypothesis 3a-d = Not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Implicit honesty-humility will add to explicit honesty-humility by incrementally predicting counter-academic behavior (H3a), objective cheating (H3b), self-confessed cheating (H3d), and grade point averages (H3d).</td>
</tr>
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**Figure 6.1.** Results of hypotheses for empirical research conducted to investigate the validity of the IAT-HH
**Chapter 6: What did we learn and how should researchers proceed?**

- Enhanced conceptual correspondence may increase implicit–explicit–behavioral intercorrelations, which might improve the construct and criterion-related validity of the IAT-HH.
- Practitioners and researchers may continue using explicit (self-report) honesty-humility measures until a valid IAT-HH is found.
- One might consider developing separate IATs for each narrow facet of honesty-humility to predict more specific criteria.
- Future researchers might apply the *theory of assumed similarity* (a value-driven bias) to assess honesty-humility (a value-driven trait).

**Chapter 5: What can the IAT-HH predict?**

- Explicit (self-report) honesty-humility shows predictive validity in predicting counter-academic behavior.
- Implicit honesty-humility (IAT-HH) predicts neither students’ counter-academic behavior, objective, self-report cheating, nor grade point averages.
- Given that behavior (cheating), implicit (IAT-HH) and explicit (self-report) measures of honesty-humility are conceptually and theoretically distinct, researchers/practitioners should consider contextualizing test items and situational cues to increase conceptual correspondence.

**Chapter 4: What does the IAT-HH measure?**

- The IAT-HH, which represents the four narrow facets of honesty-humility, is neither confounded with valence nor with cognitive ability.
- Implicit (IAT-HH) and explicit (self-report) honesty-humility are distinct, but related constructs.
- Implicit honesty-humility relates to the ability to identify criteria (ATIC), but exactly what the IAT-HH measures remains undetermined.

**Chapter 3: How does explicit honesty-humility predict dishonesty criteria?**

- In a cross-sectional study, the narrow facets of explicit honesty-humility predict general and specific dishonesty criteria differently.
- Fairness relates to counter-academic behavior whilst greed avoidance relates to cheating (i.e., when monetary reward is involved).

**Chapter 2: Which implicit measures can be distinguished and how do they operationalize constructs in practice?**

- More than 49 implicit tests exist, which can be clustered into three broader categories: automaticity, projection and justification.
- The IAT is a widely-held test (highly cited and shows good internal reliability) which can be easily developed, administered and scored.
- Before implicit tests can be legitimately applied in practice (e.g., for important decision-making), more validation research is needed.

**Chapter 1: Why is the current research necessary?**

- Honesty-humility outperforms all personality traits (in the self-report Big-5 and revised HEXACO personality inventory) in predicting integrity-related behavior. However, personality tests can be faked. One way to address this concern, is by using the Implicit Association Tests (IAT) to assess personality.
- Given that human behavior emanates from both explicit/rational and implicit/spontaneous cognitions, it makes sense to develop an IAT to assess honesty-humility (IAT-HH) that might be used to predict integrity-related behavior.

**Figure 6.2. Summary findings of each chapter in the current dissertation**
Implications for Theory and Practice

The first implication of the current research relates to the dual-process system theory (Evans, 2008). As illustrated in Chapter 1, human behavior is not always rational and initiated by fully-considered decisions alone (Cropanzano & Becker, 2013; Pratt & Crosina, 2016). Especially integrity-related behavior might best be understood and studied from a dual-process system perspective (Van Gelder & De Vries, 2014; Van Gelder et al., 2009). Therefore, the need exists to assess honesty-humility with an implicit measure. Although relationships between explicit honesty-humility and various criteria, such as cheating and counter-academic behavior are well established in the current literature (De Vries et al., 2011; Hilbig & Zettler, 2015), what remains unclear is how implicit honesty-humility manifests behavior. Exactly how implicit tests predict criteria remains a challenge, because the implicit–explicit–behavior interface (and how these measures relate or interact to predict behavior) are not fully established (Perugini et al., 2010). For instance, it could be that implicit honesty-humility might influence explicit honesty-humility, which then determines behavior (Kurdi et al., 2018), or implicit and explicit honesty-humility might serve as distinct components of personality which predict behavior differentially (Bing et al., 2007), or both assessments of honesty-humility might be combined to enhance the manifestation of personality (Bing et al., 2007). Given that implicit and explicit cognitions are both important to predict real-world (organizational) behavior (e.g., bias in organizations; Derous et al., 2016), researchers should investigate how implicit–explicit measures relate or interact to predict criteria.

Second, another implication relates to when the implicit association test (as a method) is used to assess honesty-humility (i.e., the construct). Although it is reported that the IAT can successfully capture personality traits such as extraversion and agreeableness, findings on how the IAT successfully measures other personality traits are mixed (De Cuyper et al., 2017). Also, inconclusive findings on the criterion-related validity of personality IATs, have hampered researchers to draw firm conclusions about the usefulness of IATs to predict personality-related criteria (Perugini et al., 2018). The literature overview (Chapter 2) highlights that different implicit tests may measure and predict criteria differentially (e.g., the IAT may be best suited to assess risky behavior, the PSE to identify achievement orientation, and the CRT to predict aggression). It may be that the IAT method might be less suited to assess the honesty-humility construct. In fact, irrespective of the construct being assessed, the IAT method has been associated with various shortcomings, for example the attenuation of measurement error, method variance, and low temporal stability (Azar, 2008; Blanton, Jaccard, Strauts, Mitchell, & Tetlock, 2015; Fiedler et al., 2006). Additionally, the literature overview, conducted as part
of this research, concluded that empirical evidence on the psychometric properties of implicit tests may be insufficient to recommend large-scale adoption of implicit measures in organizations. Therefore, researchers and practitioners should continue to investigate the psychometric properties of IATs, since empirical evidence may strengthen insight into the limitations of implicit measures.

Third, results in Chapter 3 found that the narrow facets of explicit honesty-humility outperform the global trait in predicting specific criteria. Fairness showed postdictive validity in determining counter-academic behavior (i.e., when measured both cross-sectionally and longitudinally, as illustrated in Chapters 3 and 5 respectively). Whereas explicit greed avoidance showed concurrent validity in predicting cheating (i.e., measured cross-sectionally in Chapter 3). However, this was not the case when greed avoidance and cheating behavior were assessed at different points in time (i.e., objective cheating after five weeks and self-confessed cheating after seven weeks). In practice, this implies that explicit honesty-humility (specifically fairness) can be used to identify students who have engaged in counter-academic behavior (in the past). Further, explicit greed avoidance might be used to predict cheating (when assessed concurrently and when monetary reward is offered). Another implication (and challenge) for research, is to understand and confirm the predictive value of honesty-humility, given that little is known about how honesty-humility predicts longitudinal, real-world, specific integrity-related behavior (De Vries et al., 2017).

Fourth, as addressed in Chapter 4, the test-retest reliability of the IAT-HH was not assessed, given that it has already been documented that the reliability estimates of response latency measures are generally low (Lane et al., 2007). Meta-analysis findings confirmed that implicit measures have a low average temporal stability (.54; Gawronski et al., 2017), with no meaningful decrement when measured a week (.58), a month (.62) or one year apart (.47; Back et al., 2005, 2009). Additionally, the IAT has also been found sensitive to contextual constraints (Gschwendner et al., 2008), because IAT scores are malleable according to the contextual cues and the situational variables they are presented with (Barden et al., 2004; Blair, 2002; Dasgupta, 2009; Gawronski et al., 2018; Nosek, Greenwald, & Banaji, 2007). In fact, the situationist view of implicit tests suggests that the IAT does not measure a stable construct (e.g., people’s biases), but rather the “transient, situational variations in the strength of the connections of conceptual networks” (Machery, 2017, p. 288). Therefore, practitioners and researchers could consider accounting for situational and environmental factors when administering the IAT-HH, given that these factors may influence IAT scores.
Fifth, in Chapter 5 the explicit (self-report) measure of honesty-humility was found to predict behavior more accurately, compared to implicit honesty-humility. Additionally, Chapter 4 reports that participants were not able to identify which criteria were assessed (ATIC) when the self-report test items of explicit honesty-humility were administered. However, the results also indicated that explicit honesty-humility and social desirability were positively related. Together, these findings imply that researchers and practitioners should not yet replace the explicit measure of honesty-humility and might continue using honesty-humility self-report tests, until the validity of the IAT-HH can be improved. Furthermore, although self-report measures are highly reliable and effective in predicting criteria, it is recommended to use both implicit and explicit measures (Bing et al., 2007) to enhance the prediction of behavior.

Sixth, as illustrated in Chapter 5, spontaneous (implicit) and self-reported (explicit) honesty-humility are both conceptually and empirically very different from actual (dis)honest behavior (Doliński, 2018). This makes finding significant correlations between these constructs difficult (Back et al., 2009). A trivial, but nevertheless important reason for low correlations between implicit, explicit and behaviorally assessed representations of honesty-humility may be due to the lack of conceptual correspondence (Gawronski et al., 2007). To address this issue, Ajzen and Fishbein (1977) have suggested that the impact of (implicit/explicit) attitudes on behavioral measures can be increased by creating conceptual correspondence. In reviewing more than hundred studies, these researchers found that when measures corresponded in terms of content/specificity, correlations were above $r = .40$, whereas measures with low correspondence showed non-significant correlations. More relevant to this research, meta-analyses evidence demonstrated that correlations between IATs and standard self-report measures were also generally higher when the implicit and explicit constructs conceptually corresponded with each other, compared to when they did not (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). This implies that researchers and practitioners might alter self-report test-items and IAT-HH stimuli to create conceptual correspondence. Adding this line of thought, researchers also found that the stronger implicit–explicit correlations are, the stronger criterion-related validity might be (Kurdi et al., 2018). Therefore, by creating conceptual correspondence in the implicit and explicit measures of honesty-humility, the intercorrelations between these measures might be increased. Consequently, researchers and practitioners may then also improve the construct and criterion-related validity of the IAT-HH.

Seventh, when assessing variables such as cheating and honesty-humility (either implicitly or explicitly), various situational, environmental and contextual factors can influence
individuals’ responses. More specifically, the concept of honesty might not only be considered as a trait, but might also be influenced by specific situations (De Vries et al., 2017; Hartshorne & May, 1928; Jackson et al., 2002; Van Gelder & De Vries, 2016). Personality studies have found that people may act very differently, depending on the specific situation they are in (Baumeister et al., 2007; Funder, 2006; Mischel & Shoda, 1995). The person-situation interactionist perspective suggests that individuals’ personality interacts with a specific situation, which will determine how they act (Mischel, 2004). This further implies that the conceptualization of specific personality traits might be done only within the context of the specific setting in which personality is assessed. Although Chapter 5 illustrates how honesty-humility and different situational characteristics predict real-world integrity-related behavior, still needs clarification, because previous studies have studied criminal behavior as hypothetical self-reported actions (e.g., based on vignettes) in a cross-sectional way (e.g., De Vries et al., 2017). Therefore, more longitudinal research designs are needed to understand how honesty-humility and real-world dishonesty relates. In the current research, accounting for differing situations and/or environments were not addressed or accounted for in the research design. This implies researcher and practitioners who wish to study the predictive value of honesty-humility (assessed longitudinally), should also account for situational and environmental factors. Additionally, researchers who aim to determine the construct and criterion-related validity of an implicit test for honesty-humility, should consider various aspects (e.g., environmental, situational, contextual cues and conceptual correspondence). How these ideas could be applied in practice, are elaborated on in the Future Research Avenues section.

**Strengths, Contributions and Limitations**

Results and findings of the current research add to the understanding of (explicit) honesty-humility in four ways. First, at two occasions fairness predicted counter-academic behavior, thus replicating results of previous research (De Vries et al., 2011; Holtrop et al., 2014; Janse van Rensburg et al., 2018; Marcus et al., 2007; McAbee et al., 2014). Second, the relationship between honesty-humility and academic results (i.e., grade point average scores) were undetermined. Given that researchers have found both positive and negative significant relationships between GPA and honesty-humility, more empirical research is needed to establish a concrete relationship between GPA and honesty-humility and whether other variables might be moderating this relationship (e.g., social economic status, up-bringing, family values, parental education, etc.). Third, explicit honesty-humility showed a significant
relation to age and gender. Thus, women and older students appeared to score higher on self-reported honesty-humility. However, independent-samples t-tests showed no significant difference between older versus younger participants, and men versus women on either explicit or implicit honesty-humility. Fourth, honesty-humility showed a medium to strong relation with social desirability, additionally (although not formally investigated as hypothesis in the current research) results also found a negative relationship between social desirability and counter-academic behavior ($r = -.25$, $p < .01$). This finding is in line with previous research who found that social desirability relates to honesty-humility, because it reflects actual (dis)honest behavior (De Vries et al., 2018). However, whether social desirability is a personality trait, a self-report bias, or perhaps both (and what the magnitude of both these elements are) is yet to be established.

Additionally, the research also contributes to the understanding and operationalization of two constructs, namely cheating behavior and the ability to identify criteria (ATIC). Researchers often follow a design where the true outcome of an individual respondent’s cheating behavior is not always possible. Most often, cheating is captured as the aggregate pattern, given the statistical baseline probability of winning (Zettler et al., 2015). The novel cheating task (in Chapters 3 and 5) adds value to the operationalization of the dishonesty criteria (i.e., capturing cheating online). In both empirical studies, results found that the cheating task scores correlated with counter-academic behavior (which is to be expected given that counter-academic behavior also entails cheating). In terms of assessing ATIC, a scoring system (specifically related to honesty-humility) was developed to assess the respondents’ ability to identify criteria. Results found that ATIC scores significantly related to cognitive ability, which is in line with previous research (Melchers et al., 2009). Given these two findings (i.e., the significant correlation between cheating and counter-academic behavior, and ATIC and cognitive ability, respectively) gives some confidence that these two constructs might have been operationalized in acceptable ways. Future researchers are encouraged to conduct further studies using the cheating task and the ATIC measure, either for research related to implicit and explicit honesty-humility, or within other areas of research.

Although the current research offers novel and valuable findings, limitations should be addressed. First, given that the task was completed online and at home, individuals might have cheated in ways that that were not detected with the cheating task (e.g., asking a friend for help). Future research could conduct the same research in a classroom setting to test if the results of the present research can be replicated.
Second, another shortcoming was the fact that during the establishment of the construct validity of the IAT-HH, the IAT-HH item-labels were explained to participants, and in doing so might have influenced respondents’ performance on the ability to identify criteria (ATIC). Consequently, the relationship between the IAT-HH and ATIC could not be determined with full confidence, because explaining the IAT stimuli might have influenced respondents’ ability to identify what the IAT-HH was measuring. Researchers solely interested in assessing ATIC should refrain from defining criteria during the research they undertake (either in implicit or explicit measures), because this might influence participants’ performance (i.e., make it easier for respondents to identify criteria).

Third, another shortcoming, but also an opportunity for researchers to expand the present research, was that other HEXACO traits were not included in the research. By assessing all six traits, one could investigate the structural relations between personality traits and their underlying narrow facets to predict various behavioral outcomes. For example, conscientiousness strongly relates to moral character (Cohen et al., 2014) and the narrow facet fairness shows considerable secondary loadings on conscientiousness (Ashton et al., 2014; Lee & Ashton, 2016). By conducting bifactor latent variable modelling (McAbee et al., 2014), one might explain why various narrow facets predicts various behavioral outcomes better than other facets (e.g., determining how GPA scores relate to the narrow facets of conscientiousness might lead to better insight into how and why GPAs relate to honesty-humility).

Fourth, given the differential setup (or design) of the two empirical studies, the findings from both studies (i.e., presented in Chapters 3 and 5) could not be fully compared. More studies following similar designs are needed, allowing to compare findings and consequently accumulate knowledge about how (implicit and explicit) honesty-humility and criteria are related.

**Future Research Avenues**

The results of the current dissertation contribute to a better understanding of the functioning of implicit honesty-humility. With this newly-gained knowledge, three core ideas for future research are proposed. Whereas the first idea is focused on refining test stimuli through contextualization and increasing conceptual correspondence to improve validity estimates of the IAT-HH, the second idea is based on developing four separate IATs for each of the narrow facets of honesty-humility. Finally, the third idea is focused on a new, simplified (projective) measure to assess honesty-humility (which is a value-driven personality trait), by applying the theory of *assumed similarity* (i.e., a value-driven bias).
The first idea is based on improving the validity of the current IAT-HH. By creating conceptual correspondence, the relationship between implicit–explicit honesty-humility should be strengthened, which in-turn, may improve the predictive validity of the IAT-HH to predict dishonesty criteria (e.g., cheating). According to the principle of compatibility, the degree of correspondence or consistency between attitudinal and behavioral entities may also affect how strongly the measures relate (Mitchell & Tetlock, 2015; Oswald et al., 2013). Therefore, one can tailor measures (e.g., items assessing explicit and implicit honesty-humility) to the same level of specificity of the outcome or the behavior to be predicted. There are four elements of specificity which could be aligned: the action or behavior (e.g., an act committed in real life or does the act refer to a hypothetical example); the target-object being assessed (e.g., an individual at home versus a student in in classroom); the given context or situation should be specified (e.g., being alone versus amongst others); and the timeframe should be specified (e.g., how the respondent acts or feels toward a specific action at various points in time like cheating during exams in the past, in the present or in the future). This principle of compatibility can be applied to the implicit, explicit and behavioral criteria to assess honesty-humility. One way of aligning these elements of compatibility is through contextualization.

Honesty-humility measures could be contextualized by using different tags (for a better understanding of tagged contextualization see Holtrop et al., 2014). For example, in a ‘typical’ student’s life, many personal experiences are mostly encountered either at school or at home. For this reason, the tags at school or at home might be used in the implicit and explicit measurement of honesty-humility. Also cheating can be assessed both at school (e.g., in a laboratory-setting) and at home (e.g., online) to test whether honesty-humility can be prompted differentially to test whether the IAT-HH shows stronger evidence of construct and criterion-related validity.

On the contextualization of the IAT, it should be noted that fully understanding and accounting for contextual constraints in implicit personality measures might be complex, because whether changes in implicit scores generalize across contexts, or whether they are limited to the context in which the new information was learned, is unclear (Cone, Mann, & Ferguson, 2017). Whether certain social contexts or psychological states could increase cognitive control, which in turn might change implicit bias measures, is also still unclear and should be further investigated (Dasgupta, 2009; Gawronski & Cesario, 2013; Rydell & Gawronski, 2009).

Additionally, by reviewing various studies, researchers determined that—much like other personality traits—implicit motives may also change according to recent experiences
Therefore, the IAT-effect can also be promoted in terms of one’s direct environment or recent situations experienced. For instance, after being exposed to respected female leaders, females’ automatic gender stereotype beliefs changed (Dasgupta & Asgari, 2004). In another study, being in the presence of a competent Black experimenter activated a positive implicit attitude toward Blacks (Lowery, Hardin, & Sinclair, 2001). Also, brief media contact (e.g., viewing admired homosexual exemplars) or prolonged interpersonal contact reduced subjects’ antigay implicit bias (Dasgupta & Rivera, 2008); whilst participants’ situational roles (i.e., having a more powerful position) activated higher automatic racial bias attitudes (Richeson & Ambady, 2003). Additionally, by reading a counter-stereotype scenario, respondents’ IAT scores were substantially weakened, changing connotations of the categories to be evaluated from negative (insects = negative; flowers = positive) to positive (insects = positive; flowers = negative) (Foroni & Mayr, 2005). As illustrated above, given that IAT scores are malleable according to recent experiences and contextual cues, and because behavioral indicators of honesty-humility might be susceptible to situational and environmental cues, when designing IATs to assess honesty-humility, various stimuli might be changed or contextualized to capture honesty-humility in a more specific way. Therefore, by experimenting with different situational/contextual prompts (administered both cross-sectionally and longitudinally), one may gain deeper insight as to how implicit, explicit and actual (dis)honest behavior relate. To give an example, the IAT-HH might be administered directly before and/or after reading a scenario prompting morality (e.g., reading the Ten Commandments; Mazar et al., 2008), before and/or after experiencing an ethical dilemma (e.g., vignettes reading; De Vries et al., 2017), and before and/or after experiencing acts of real dishonesty (e.g., cheating; Hilbig & Zettler, 2015). Also, researchers might even consider including pictures in the IAT to see how the IAT-HH scores might be affected by including images prompting moral cues (e.g., including an image of watching eyes; Pfattheicher et al., 2019). By applying these ideas, one might be able to align implicit, explicit and behavioral measures of (dis)honesty in a better way to gain insight into how and when relationships between these measures are stronger or weaker. By establishing stronger relationships between implicit and explicit measures, higher construct and criterion-related validity can also be expected (Kurdi et al., 2018).

The second idea that researchers might apply when aiming to assess honesty-humility with an IAT-HH, is to lean on the idea of Costantini et al. (2015). To assess the personality trait, conscientiousness, these researchers developed four separate IATs, each representing a separate narrow facet of conscientiousness. Costantini et al. (2015) argued that since the narrow
facets of conscientiousness are associated differentially with psychological criteria, having four separate IATs may improve the overall construct and criterion-related validity of their implicit assessment of conscientiousness. Also, as seen in our previous research (Janse van Rensburg et al., 2018), the narrow facets of honesty-humility showed to relate stronger to various criteria. Therefore, researchers might consider developing four separate IATs for each narrow facets of honesty-humility and use each individually to predict specific behavioral criteria (e.g., fairness to predict counter-academic behavior and greed avoidance to predict cheating). Although the criterion-related validity of the four IATs could not be established, a novel network analyses provided insight into how the four narrow facets of implicit conscientiousness related to various criteria (Costantini et al., 2015).

Third, the final idea is based on the thought that honesty-humility can also be captured with an alternative implicit method. Given that honesty-humility has successfully been assessed with other novel methods, such as a situational judgment test (Oostrom, De Vries, & De Wit, 2019), this final idea proposes to assess honesty-humility by using a projective measure. Projective techniques, originally developed for clinical screening, gauge implicit cognition through how respondents describe stimuli presented to them (Lilienfeld et al., 2000). Alike in the example to assess implicit psychological capital (see Appendix A for an illustration in Harms & Luthans, 2012, p. 594), implicit honesty-humility can also be assessed in a similar way. In the example of Harms and Luthans (2012), psychological capital is assessed by instructing the test-takers to think of a story and a character (in their imagination) and to then answer test items based on the character.

Additionally, and important to note, the current idea builds on that of Harms and Luthans (2012) in that it rests on the theory of assumed similarity. The theory of assumed similarity is a value-related bias and refers to the tendency of a person to perceive others as similar to themselves (Cronbach, 1955). For some personality constructs (like extroversion, conscientiousness, agreeableness and emotionality) this perception of similarity is not always accurate. However, for traits like honesty-humility and openness to experience, assumed similarity shows to have a basis in reality (Lee et al., 2009). For example, assumed similarity is higher for honesty-humility and openness to experience among politicians of a preferred party, as compared to politicians of non-preferred parties (De Vries & Van Prooijen, 2019). Specifically, Lee et al. (2009) found that for the trait of honesty-humility, assumed similarity tends to show modest levels of real similarity ($r = .25$). These authors also found that when two dyad members are asked to self-report on their honesty-humility, the assumed similarity between the ratings of friends ($r = .48$) and non-friends ($r = .26$) tend to be significant. Thus,
the strong convergence between self-reports and observer reports of honesty–humility (which is also found for guilt proneness), imply that people tend to project their own moral character traits onto their peers (Cohen, Panter, Turan, Morse, & Kim, 2013). More specifically, researchers have found that people choose partners and friends, based on the resemblance of their own self-perception (Todd, Penke, Fasolo, & Lenton, 2007). Therefore, using assumed similarity as an assessment method, shows some degree of accuracy, and can therefore be a helpful tool to assess moral character (Cohen et al., 2013). However, when evaluating assumed similarity as a rating heuristic, it would make sense to also evaluate actual similarity at the same time (Paunonen & Hong, 2013), since actual self-observer agreement for honesty–humility is also high \((r = .54; \text{Lee et al., 2009})\).

Figure 6.3 illustrates the difference between similarity, self-observer agreement, and assumed similarity (Lee et al., 2009, p. 461). Thus, assumed similarity is when an individual (e.g., Person A) is asked to complete a self-report on him/herself assessing honesty-humility. Next, person A is then asked to complete the same items on honesty-humility, but in the name of another person (i.e., an observer report for a close friend or acquaintance such as Person B). When Person B is asked to complete the honesty-humility items for him/her self, the correlation between the honesty-humility scores for Person A and Person B will constitute similarity (and the relation between Person B’s self-report and the Person A’s observer-report about Person B is referred to as self-observer agreement).

![Diagram](image)

*Figure 6.3. Illustrating the difference between assumed similarity, similarity and self-observer agreement (Lee et al., 2009, p. 461)*

To summarize, when future researchers aim to validate the IAT to assess honesty-humility, then contextualization and increased conceptual correspondence should be
considered (in terms of the environment, situation or test stimuli). Also, since narrow facets of personality predict criteria differently, researchers should consider developing separate IATs to assess each narrow facet of the personality trait, since this can improve construct and criterion-related validity. Finally, honesty-humility might also be assessed with a projective test by applying the theory of assumed similarity (i.e., a value-driven bias relevant to honesty-humility).

Finally, since the criteria used to validate the IAT-HH was relevant to academia, data were collected amongst student samples. Ideally, future studies that continue to validate the construct and criterion-related validity of the IAT-HH should consider conducting the research within organizational settings (with organizational relevant criteria e.g., counter-productive work behavior and organizational citizenship behavior). Moreover, validation on personality IATs within organizational settings are especially needed, because such studies are limited (De Cuyper et al., 2017; Perugini et al., 2018) and findings might lead to a better understanding of how implicit tests can be used to predict behavior.

**Conclusion**

This research sought to develop and validate an implicit measure of honesty-humility. In doing so, initial insight was gained into how (implicit and explicit) honesty-humility relate to desirable and undesirable student criteria. Given that both implicit and explicit aspects of personality may be important in predicting integrity-related behavior, more research is needed to determine the validity of the IAT-HH.
SUMMARY

Honesty-humility is a personality trait in the revised HEXACO model (Honesty-humility, Emotionality, eXtraversion, Agreeableness, Conscientiousness, and Openness to experience; Lee & Ashton, 2004, 2016). The honesty-humility trait shows the best predictive validity (as compared to the traits in the HEXACO and the traditional Big-5 structure of personality) when predicting counter-productive work behavior (Ashton & Lee, 2007; Pletzer et al., 2019). Specifically, honesty-humility predicts counter-academic behavior (which includes a broad range of behavior such as plagiarizing, misrepresentation and low personal standards) and cheating amongst university students (De Vries et al., 2011; Hilbig & Zettler, 2015; Zettler et al., 2015). However, honesty-humility is traditionally measured with self-report tests which are vulnerable to socially desirable responding, faking, self-report bias and being prone to a lack of introspective accuracy (Fan et al., 2012). To address the limitations associated with self-report measures, researchers have explored the potential utility of implicit measures to assess various personality traits (De Cuyper et al., 2017; Steffens, 2004). One widely-held (popular) implicit test that is applied in the assessment of personality, is the implicit association test (IAT; Greenwald et al., 1998). Assessing both implicit and explicit cognition seems to be important when it comes to predicting personality-related behavior (i.e., dual-process theory; Evans & Stanovich, 2013). Therefore, drawing on this dual-process theory, the main project goal pursued within this dissertation was to develop and validate an implicit measure of honesty-humility (IAT-HH). To this end, eight research questions were posed and are discussed in the respective chapters of the dissertation.

The Current Dissertation

Chapter 1 addresses why the implicit assessment of honesty-humility might be important (Research Question 1). The rationale for developing the IAT-HH was built on four theoretical pillars: 1) the added value of including honesty-humility in the assessment of personality; 2) shortcomings associated with self-report (personality and integrity) testing; 3) the theoretical framework underlying implicit and explicit cognition (and why it is important to use both implicit and explicit measures in the assessment of personality); and 4) the difference between implicit and explicit measurement to assess variables (such as personality).

Keeping the main project goal in mind, it was necessary to organize the literature field by composing a large-scale taxonomy of implicit measures. Therefore, Chapter 2 reports on
the findings of a systematic literature overview of implicit measures to investigate which types of measures can be distinguished (Research Question 2) by integrating available paradigms on implicit measures. In doing so, the taxonomy presented by Uhlmann et al. (2012) was expanded by presenting 49 implicit measures, clustered into three broader psychological assessment techniques (i.e., automaticity, projection and justification which are different reactions towards an implicit test). One test, from each of the three broader clusters was discussed as an exemplar (i.e., the Implicit Association Test [IAT], Picture Story Exercise [PSE], and Conditional Reasoning Test [CRT]). In particular, it was important to illustrate how each test works, how they can be applied in practice, to evaluate the psychometric properties (reliability, construct and criterion validity), and to discuss perceptions of fairness, procedural justice and faking potential. Hence, more insight was gained into how implicit constructs are measured (Research Question 3) and how implicit tests could be applied in practice (Research Question 4). Given that the IAT was found to be the most renowned implicit test (in terms of citations, good internal reliability and being easy to develop, administer and score, as compared to the PSE and CRT), it was decided to use the IAT method to assess the construct of honesty-humility.

Apart from knowing why it might be important to assess honesty-humility with an IAT, it was also important to understand exactly how honesty-humility relates to criteria (Farr & Tippins, 2013). This was studied using the four narrow facets, namely sincerity, fairness, greed avoidance and modesty. Therefore, Chapter 3 reports the results of how the narrow facets of explicit honesty-humility relate to criteria, namely general counter-academic behavior and more specific academic dishonesty (i.e., collegiate cheating) (Research Question 5). An empirical study was conducted, where data were collected amongst students studying at a South African university (N = 308). Results of this cross-sectional study indicated that the narrow facet, fairness, played an important role in predicting self-reported counter-academic behavior, whereas the explicit narrow facet, greed avoidance, showed to be important in predicting actual cheating (when monetary reward is involved).

Chapter 4 first describes the development of the implicit association test for honesty-humility (i.e., called the IAT-HH). During the development of the IAT-HH, three subject matter experts (SMEs) gave advice on which IAT stimuli would best capture implicit honesty-humility. Two pilot studies were conducted to (1) establish whether the IAT-HH stimuli were comprehensible and (2) determine whether the IAT-HH was a confounding measure of positive–negative valence (Siers & Christiansen, 2013). Results confirmed the IAT-HH stimuli were comprehensible and unrelated to valence.
The second aim (as presented in the chapter) was to investigate the construct validity of the IAT-HH (Research Question 6). Therefore, a second empirical study was conducted with students of a Flemish university \((N = 178)\) and both convergent and discriminant validity were investigated (with explicit honesty-humility, social desirability, ability to identify criteria, and cognitive ability). Given that cognitive ability neither related to implicit (IAT-HH) nor explicit (self-report) honesty-humility, the discriminant validity of the IAT-HH was established. In determining the convergent validity of the IAT-HH, the implicit and explicit measures of honesty-humility showed to be distinct constructs, but also related. Further, social desirability showed a strong relation with explicit honesty-humility, which is in line with previous research (De Vries et al., 2018). However, social desirability and implicit honesty-humility did not relate. Two possible explanations might be that (1) either the IAT-HH did not capture the honesty-humility construct (implying lack of construct validity), or (2) the IAT-HH successfully captured honesty-humility, but without the bias (i.e., presenting oneself in a more positive way) generally associated with high social desirability. To further investigate this finding, it was also necessary to explore how participants’ ability to identify the criteria (ATIC) related to implicit honesty-humility (as compared to explicit honesty-humility). Results found that implicit (but not explicit) honesty-humility and ATIC were significantly, positively related. Given that IAT-HH stimulus items were defined to respondents prior to commencing with the IAT-HH (as suggested by SMEs and in literature e.g., Brunel, Tietje, & Greenwald, 2004) might have influenced the results. Therefore, no substantial inferences could be drawn. The non-significant relationship between ATIC and explicit honesty-humility implied that participants were not able to identify which criteria were assessed with the self-report honesty-humility measure.

Chapter 5 addresses whether the IAT-HH could predict desirable academic criteria (grade point average scores) and undesirable academic criteria (i.e., counter-academic behavior, objective cheating, and self-confessed cheating) as well as, or better than explicit measures of honesty-humility (Research Question 7). To avoid common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), data were collected amongst Flemish university students \((N = 178)\) over a period of four months at various points in time. In this study, the only significant relationship was between explicit honesty-humility and counter-academic behavior, a finding well-establish in literature (De Vries et al., 2011; Holtrop et al., 2014; Janse van Rensburg et al., 2018; Marcus et al., 2007; McAbee et al., 2014). However, no significant relations could be established between implicit honesty-humility and the criteria. Additionally, implicit honesty-humility did not show incremental predictive validity over that
of explicit honesty-humility to predict the relevant (desirable and undesirable) academic criteria. Based on the results, the key findings are summarized and discussed in Chapter 6 and implications for research and practice are described. The final chapter concludes by outlining three core ideas on how future researchers and practitioners should proceed in assessing implicit honesty-humility (Research Question 8). Given that IAT scores may be vulnerable to situational cues (Barden et al., 2004; Blair, 2002; Dasgupta, 2009; Gawronski et al., 2018; Nosek et al., 2007) and that various situational and environmental factors may influence (dis)honest behavior (McCabe et al., 2012; McCabe et al., 2008; Oda et al., 2015), it is suggested to contextualize IAT stimuli.

Conclusion

The research presented in this dissertation sought to develop and validate an implicit measure of honesty-humility, with the ultimate objective of predicting integrity-related criteria. By investigating eight research questions, preliminary insight was gained into how (implicit and explicit) honesty-humility relate to criteria. Overall, results showed limited construct validity and negligible criterion-related and incremental validity of implicit over explicit honesty-humility. Given that both implicit and explicit aspects of personality may be important in predicting behavior, more research is needed to further investigate the validity of the IAT-HH.

In dit proefschrift bestuderen we impliciete tests. Impliciete tests zijn namelijk één manier om dergelijke vertekeningen tegen te gaan (De Cuyper et al., 2017; Steffens, 2004). Een wijdverbreide (populaire) impliciete test om persoonlijkheid te beoordelen, is de Impliciete Associatie Test (IAT; Greenwald et al., 1998). Onderzoek toont aan dat zowel expliciete als impliciete cognitie belangrijk zijn voor het voorspellen van gedrag en persoonlijkheid (i.e., duale proces theorie; zie Evans & Stanovich, 2013). Verder bouwend op de duale proces theorie was het voornaamste doel van dit proefschrift dan ook om een IAT voor honesty-humility te ontwikkelen en (initieel) te valideren (IAT-HH). Het proefschrift stelde hiervoor acht onderzoeksvragen voorop, die elk onderzocht werden in de afzonderlijke hoofdstukken.

HET HUIDIGE PROEFSCHRIFT

HOOFTSTUK 1 richt zich op de vraag waarom de impliciete meting van honesty-humility belangrijk zou kunnen zijn (Onderzoeksvraag 1). De ontwikkeling van de IAT-HH is gebaseerd op vier pijlers: 1) de meerwaarde van het opnemen van honesty-humility in het meten van persoonlijkheid; 2) de nadelen van self-reportage (zoals eigen aan de meeste persoonlijkheids- en integriteitstesten); 3) het theoretische kader dat aan de basis ligt van de impliciete en expliciete cognitie (en dus waarom het belangrijk is om beide te meten); en 4) het
In Hoofdstuk 2 worden door middel van een systematisch literatuuroverzicht de verschillende paradigma’s van impliciete metingen beschreven en wordt nagegaan welk type metingen er onderscheiden kunnen worden (Onderzoeksvraag 2). Hiervoor werd de taxonomie van Uhlmann et al. (2012) uitgebreid naar 49 meetinstrumenten, opgedeeld in drie bredere psychologische beoordelingstechnieken (‘automaticity’, ‘projection’ en ‘justification’). Deze drie beoordelingstechnieken worden steeds besproken aan de hand van een populaire meetmethode of test (nl., de ‘Implicit Association Test’ of IAT, de ‘Picture Story Exercise’ of PSE, en de ‘Conditional Reasoning Test’ of CRT). Elke meetmethode is beschreven in termen van opzet, praktische inzetbaarheid, psychometrische eigenschappen (nl., de betrouwbaarheid, construct- en criteriumgerelateerde validiteit), gepercepeerde rechtvaardigheid, procedurele eerlijkheid en mogelijkheid tot vervalsing. Op basis hiervan wordt inzicht verkregen in de manier waarop impliciete constructen gemeten worden (Onderzoeksvraag 3) en hoe impliciete testen in de praktijk kunnen worden toegepast (Onderzoeksvraag 4). Aangezien de IAT één van de meest gerenommeerde impliciete tests is (zowel in termen van aantal citaties, interne betrouwbaarheid, de ontwikkeling, afname en beoordeling ervan in vergelijking met de PSE en de CRT), is besloten om de IAT methode te gebruiken om het construct Honesty-Humility te meten.

Naast het nagaan waarom het belangrijk zou zijn om honesty-humility te beoordelen met een IAT, was het ook belangrijk om precies te begrijpen hoe honesty-humility gerelateerd is aan verschillende criteria (criteriumgerelateerde validiteit; Farr & Tippins, 2013). Dit wordt nagegaan aan de hand van de vier facetten van honesty-humility, namelijk oprechtheid, rechtvaardigheid, hebzucht vermijding en bescheidenheid (vertaald als, sincerity, fairness, greed avoidance, modesty).

Hoofdstuk 3 toont hoe deze vier facetten van het expliciete honesty-humility construct gerelateerd zijn aan twee criteria, namelijk algemeen contra-academisch gedrag en meer specifieke academische oneerlijkheid (zoals bedriegen) (Onderzoeksvraag 5). De crossectionele empirische studie in dit hoofdstuk (N = 308 studenten aan een Zuid-Afrikaanse universiteit) toont dat het facet, rechtvaardigheid, een belangrijke rol speelt in het voorspellen van zelf-gerapporteerde contra-academisch gedrag. Het expliciete facet, hebzucht vermijding, voorspelde het daadwerkelijk bedriegen bij een geldbeloning.

Hoofdstuk 4 beschrijft de ontwikkeling van de IAT voor honesty-humility (IAT-HH). Drie experts gaven advies over welke IAT stimuli het beste het honesty-humility construct
weergeven. Twee piloot-studies werden uitgevoerd om (1) vast te stellen of de IAT-HH stimuli duidelijk genoeg waren en (2) om na te gaan of de IAT-HH iets anders onderzocht dan positieve-negatieve valentie (Siers & Christiansen, 2013). De resultaten bevestigden dat de IAT-HH prikkels voldoende duidelijk waren en geen positieve-negatieve valentie maten.

Het tweede doel was om de construct validiteit van de IAT-HH (Onderzoeks vraag 6) te onderzoeken door middel van een tweede empirische studie bij 178 studenten aan een Vlaamse universiteit. Zowel de convergente als discriminante validiteit werden onderzocht (met expliciete metingen van Honesty-Humility, sociale wenselijkheid, ATIC of iemands’ vermogen om criteria te identificeren en cognitieve vaardigheden). Er was geen verband tussen cognitieve vaardigheden en impliciete (IAT-HH), noch expliciete (zelf-rapportage) honesty-humility metingen, wat initiële evidentie bood voor de discriminante validiteit van de IAT-HH. Wat de convergente validiteit van de IAT-HH betreft, bleken de impliciete en expliciete metingen van honesty-humility gerelateerd maar voldoende onderscheiden te zijn van elkaar. Daarenboven relateerde sociale wenselijkheid sterk aan de expliciete meting van honesty-humility, wat in overeenstemming is met eerder onderzoek (De Vries et al., 2018) maar was er geen verband tussen sociale wenselijkheid en de impliciete meting van honesty-humility. Voor deze laatste bevinding, zien we twee mogelijke verklaringen, nl. (1) een gebrek aan construct validiteit (d.w.z., IAT-HH meet het honesty-humility construct onvoldoende), of (2) een gebrek aan sociale wenselijkheidsbias (d.w.z., de IAT-HH heeft succesvol het honesty-humility construct gemeten, echter zonder sociale wenselijkheidsvertekeningen). Om deze mogelijke verklaringen verder te onderzoeken, onderzochten we hoe iemands’ vermogen om criteria te identificeren (in het Engels: ‘Ability to Identify Criteria’ of ‘ATIC’) gerelateerd was aan de impliciete meting van honesty-humility. Voor deze laatste bevinding, zien we twee mogelijke verklaringen, nl. (1) een gebrek aan construct validiteit (d.w.z., IAT-HH meet het honesty-humility construct onvoldoende), of (2) een gebrek aan sociale wenselijkheidsbias (d.w.z., de IAT-HH heeft succesvol het honesty-humility construct gemeten, echter zonder sociale wenselijkheidsvertekeningen). Om deze mogelijke verklaringen verder te onderzoeken, onderzochten we hoe iemands’ vermogen om criteria te identificeren (in het Engels: ‘Ability to Identify Criteria’ of ‘ATIC’) gerelateerd was aan de impliciete meting van honesty-humility in vergelijking met de expliciete honesty-humility meting. Er was een positief verband tussen het vermogen om criteria te identificeren en de impliciete meting van honesty-humility maar niet voor de expliciete meting. Maar omdat respondenten op voorhand geïnformeerd werden over het doel van de IAT-HH (zoals aangeraden door verschillende IAT experts en literatuur, zie bijv. Brunel, Tietje, & Greenwald, 2004), kan dit onze resultaten beïnvloed hebben en kunnen we geen duidelijke conclusies trekken. De niet-significante relatie tussen het vermogen om criteria te identificeren en de expliciete Honesty-Humility test (waarbij respondenten op voorhand niet geïnformeerd werden over het doel van deze expliciete test) impliceert dat de participanten niet in staat waren om te bepalen wat beoordeeld werd met zelf gerapporteerde honesty-humility items.

Hoofdstuk 5, tot slot, richt zich op de criteriumgerelateerde validiteit van de IAT-HH. In het bijzonder werd nagegaan of de IAT-HH wenselijk academische gedrag (zoals
slaagcijfers) en onwenselijk academisch gedrag (zoals contra-academisch gedrag, objectief bedrog, en toegegeven dat men valspeelde/bedrog pleegde) even goed of zelfs beter kon voorspellen dan de expliciete metingen van honesty-humility (Onderzoeks vraag 7). Om ‘common method bias’ (Podsakoff et al., 2003) te vermijden, werden bij dezelfde steekproef van Vlaamse studenten (N = 178) de IAT-HH en de criteriummaten verzameld op verschillende meetmomenten over een periode van vier maanden. De resultaten toonden aan dat de relatie tussen de expliciete honesty-humility meting en contra-academisch gedrag de enige significante relatie was, wat een bevestiging is van voorgaande literatuur (De Vries et al., 2011; Holtrop et al., 2014; Janse van Rensburg et al., 2018; Marcus et al., 2007; McAbee et al., 2014). Er werden echter geen significante verbanden gevonden tussen de impliciete meting van honesty-humility en de verschillende criteriummaten. De impliciete meting van honesty-humility had dan ook geen incrementele validiteit in het voorspellen van (wenselijk/onwenselijk) academisch gedrag ten opzicht van de expliciete meting van honesty-humility.

Hoofdstuk 6 vat de belangrijkste bevindingen van het proefschrift samen en bespreekt de implicaties voor onderzoek en praktijk. In dit hoofdstuk geven we drie kernideeën voor toekomstig onderzoek naar IAT-HH (Onderzoeks vraag 8). Vervolgonderzoek kan bijvoorbeeld nagaan of IATs meer gecontextualiseerd moeten worden aangezien IAT scores gevoelig kunnen zijn voor contextuele ‘cues’ (Barden et al., 2004; Blair, 2002; De 2009; Gawronski et al., 2018; Nosek, Greenwald, et al., 2007). Bovendien kunnen verschillende contextuele cues een differentiële invloed hebben op het gedrag of criterium waarover men een uitspraak wil doen of tracht te voorspellen (nl., het al-dan-niet bedriegen op het werk of in een academische context) (McCabe et al., 2012; McCabe et al., 2008; Oda et al., 2015).

Conclusie

Dit proefschrift had als doel om een impliciete test van honesty-humility te ontwikkelen en te valideren. Het uiteindelijke doel was om een impliciete test te ontwikkelen waarmee integriteitsgerelateerde gedragscriteria voorspeld kunnen worden. Voor zover ons bekend is, is dit de eerste IAT die het construct honesty-humility meet. Globaal gezien toonden de resultaten beperkte construct validiteit en een verwaarloosbare criterium-gerelateerde validiteit van de impliciete honesty-humility test in vergelijking met de expliciete honesty-humility test. Aangezien zowel impliciete als expliciete aspecten van persoonlijkheid belangrijk kunnen zijn bij het voorspellen van gedrag, is meer onderzoek nodig om de validiteit van de IAT-HH verder te onderzoeken.
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—Nelson Mandela, Long Walk to Freedom

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As a last thought, I share the idea of the French philosopher, Montaigne: “True science is a known ignorance”. In my search to find answers about honesty-humility and how it relates to integrity, I discovered that the word ‘integer’ refers to a whole number—not a fraction—which can either be positive, negative or zero. I am of the opinion that integrity is not an attribute that we possess. Integrity might be best understood as work that needs to be done within ourselves, a daily choice in order to become whole.

Yolandi-Eloise Janse van Rensburg, Malmedy, Belgium May 2019
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   - name: Yolandi-Eloise Janse van Rensburg
   - address: Henri Dunantlaan 2, 9000 Gent
   - e-mail: YolandiEloise.JansevanRensburg @UGent.be

1b. Responsible Staff Member (ZAP)
   -----------------------------------------------------------------------
   - name: Eva Derous
   - address: Henri Dunantlaan 2, 9000 Gent
   - e-mail: Eva.Derous@UGent.be

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- address: Henri Dunantlaan 2, 9000 Gent
- e-mail: YolandiEloise.JansevanRensburg@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Eva Derous
- address: Henri Dunantlaan 2, 9000 Gent
- e-mail: Eva.Derous@UGent.be

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- name: Yolandi-Eloise Janse van Rensburg
- address: Henri Dunantlaan 2, 9000 Gent
- e-mail: YolandiEloise.JansevanRensburg@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Eva Derous
- address: Henri Dunantlaan 2, 9000 Gent
- e-mail: Eva.Derous@UGent.be

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1a. Main researcher

- name: Yolandi-Eloise Janse van Rensburg
- address: Henri Dunantlaan 2, 9000 Gent
- e-mail: YolandiEloise.JansevanRensburg@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Eva Derous
- address: Henri Dunantlaan 2, 9000 Gent
- e-mail: Eva.Derous@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

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