Integration and Differentiation as Distinct Dimensions of Personality

Victoria Claire Oleynick

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Integration and Differentiation as Distinct Dimensions of Personality

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A Thesis presented to the Graduate Faculty
of the College of William and Mary in Candidacy for the Degree of
Master of Arts

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The College of William and Mary
This Thesis is submitted in partial fulfillment of the requirements for the degree of Master of Arts

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ABSTRACT

Despite longstanding interest in integration and differentiation, these constructs have not been formally conceptualized and measured as dimensions of personality. To address this gap, a trait measure of integration and differentiation was developed (Study 1) and found to have strong psychometric properties. Integration and differentiation formed two distinct, positively correlated factors (Studies 1 and 2). The integration and differentiation constructs were further validated by examining their distinct nomological networks (Studies 1 and 2). Both integration and differentiation related to the big five trait of openness to experience, but integration converged more strongly with the openness facet, and differentiation converged more strongly with the intellect facet. Consistent with our hypotheses, integration was uniquely related to agreeableness, positive affect, life satisfaction, reflection, and inspiration, and differentiation was uniquely related to conscientiousness, need for precision, rumination, and an arrogant-calculating interpersonal style. Finally, in Study 3, despite their positive correlation, integration and differentiation had opposite effects on object sorting behavior. By formally conceptualizing and operationalizing integration and differentiation at the between-person level, we set the foundation for future research into these important constructs.
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This thesis is dedicated to my brother, Griffin, who inspired me to quit my job and pursue a graduate education.
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"Some people say there are two kinds of psychological scientists: lumpers and splitters. Lumpers like to synthesize apparent differences under a few overarching principles, seeking similarities. Splitters like to analyze precise distinctions, dealing in differences."

- Susan T. Fiske, former president of the Association for Psychological Science

The lumper-splitter distinction is not new. For centuries, academics have placed their colleagues within this typology. Darwin (1887) recognized that "lumpers and hair-splitters" emphasized similarities and differences, respectively, in the classification of organisms into species. In nosology, the study of the classification of disease, medical geneticists are "lumpers" to the extent they pull together pleiotropic manifestations of genetic syndromes and "splitters" to the extent they identify genetic heterogeneity (McKusick, 1969). Political scientists discuss policymakers who are primarily informed by general trends in public opinion (lumpers) or by the public’s policy-specific preferences (splitters; Druckman and Jacobs, 2006). To highlight a famous example from psychology, lumpers and splitters debate whether there is one general or multiple specific intelligences. In this literature, Spearman is a quintessential lumper, and Gardner is a splitter. Lay people are also subject to this typology. Furnham (2004) argues that participants themselves are lumpers if they view their own and others’ abilities as highly correlated and splitters if they consider them distinct and only loosely related.

The lumper-splitter distinction is a valuable and convenient tool for discussing thinkers, but like most dichotomies, it is overly simplistic and, in all likelihood, artificial (Berlin, 1967, p. 2). One solution to this problem may be to conceptualize these tendencies not as types but as a continuum, ranging from...
“splitting” at one extreme to “lumping” at the other. This bipolar model presents a new problem, however, in that a neutral or median score on this variable represents a tendency to detect and emphasize similarities and differences to the same degree, but the “degree” is unspecified. It is unclear whether a given individual with a median score on this dimension sees no connections or distinctions in the world around them or constantly detects similarities and differences. Furthermore, although folk theory would indicate otherwise, there is no evidence for the mutual exclusivity of these cognitive processes at the trait level. Indeed, in the humanities, there is some recognition that a scholar can be both a lumper and a splitter, even within the same paper, to the extent that he or she both points out connections and emphasizes distinctions (Lerman, 2014). The lumper-splitter dichotomy may thus conflate two separate underlying abilities.

In an effort to overcome these problems, in the present research, we seek to formally conceptualize, measure, and validate these constructs. We propose a model (illustrated in Figure 1) in which the tendency to perceive similarities and see a need for integration and the tendency to perceive differences and see a need for differentiation, hereafter labeled “integration” and “differentiation,” are conceptually distinct, unipolar dimensions of personality. This model implies that some individuals are high in both integration and differentiation, and conversely, that some people are low in both of these traits. In this model, “lumpers” and “splitters” are clusters of individuals who display high levels of either integration or differentiation, respectively. For simplicity and to emphasize their distinctness,
integration and differentiation are pictured as orthogonal dimensions, but the actual correlation between these two traits remains an open empirical question.

**Integration and Differentiation as Distinct Dimensions**

The notion that integration and differentiation (or more generically, the detection of similarities and the detection differences) constitute distinct processes has support from diverse subfields of psychology. We review the most relevant literature below.

**Evidence from Developmental Psychology**

In developmental psychology, the acquisition of capacities for integration and differentiation are often considered to be temporally distinct, lending support to the hypothesis that integration and differentiation are separate faculties. For example, Inhelder and Piaget (1958) placed the capacity for detecting relations at Stage I in the development of formal operations, but at this stage, the child is over-inclusive and her classes are generic and undifferentiated. It is not until Stage II that the child is capable of differentiated classification. Harvey, Hunt, and Schroder (1961) argued that young infants respond in a diffuse, undifferentiated manner, and it is through the process of differentiation that independent parts of the system are established. The parts are then interlinked through a process of integration. The human adult can engage any or all aspects of the system simultaneously as the situation dictates, an ability they referred to “psychological parsimony” (p. 73). More recently, Slater, Rose, and Morison (1984) found that for new-born infants, differences between 2-and 3-dimensional objects are more
salient and more readily detected than their similarities, further indicating that these are two separate processes.

Steigler and Chen (2008) noted that use of the integration and differentiation concepts was widespread in classical developmental psychology (e.g., Mead, 1913; Gibson & Gibson, 1955; Werner, 1957), but that the concepts have more recently disappeared from use, possibly for several reasons. They cite the varied use of the terms integration and differentiation as a major factor contributing to their demise. For example, Lewin (1935) used the term ‘differentiation’ to describe the process by which the understanding of emotions transitions from more global to nuanced, but Meade (1913) used the same term to describe the delineation of the self into many ‘me’s.’ The varied use of the integration and differentiation constructs by many researchers certainly complicates the literature, but in our opinion, it also points to the underlying significance and broad applicability of these processes.

Evidence from Cognitive Psychology

In cognitive psychology, work on cognitive styles is most relevant.\(^2\) Loosely defined as “the characteristic, self-consistent modes of functioning which individuals show in their perceptual and intellectual activities,” (Witkin, Oltman, Raskin, & Karp, 1971), cognitive styles were developed in part to explain the process of mediation between stimuli and responses as the stimulus-organism-response model overtook the stimulus-response model at the early stages of the so-called cognitive revolution (Lazarus, 1993; Goldstein & Blackman, 1978;
Kelly, 1955). Importantly, cognitive styles were considered “traits” (Brody, 1972) which presumably related to other personality characteristics of individuals, though these nomological nets were somewhat arbitrary and unsystematic.

Though early work in cognitive styles essentially pitted perception of similarities and differences against one another (e.g., field independence versus dependence [Witkin, 1950], leveling versus sharpening [Holtzman & Klein, 1954], equivalence range [Gardner, 1953], and category width [Pettigrew, 1958]), theorists later took a more refined approach in which integration and differentiation were seen as complementary and uniquely important. For example, Zimring (1971) called into question the assumption that the perception of differences is equivalent to the failure to perceive similarities (and inversely, the assumption that a person who integrates is undifferentiated). Similarly, Rokeach (1951) devised a measure of narrow-mindedness, and although he used a paradigm that admittedly could not account for both perceived similarities and differences, he urged for the correction of this methodological weakness in future studies. By instructing participants “to describe not only the interrelationships but also the differences among various concepts,” (p. 230) the researcher could potentially account for integration and differentiation separately.

As Messick (1976, p. 17) pointed out, an emphasis on conceptual similarities (manifest as a participant using fewer groups when sorting objects) may reflect cognitive simplicity if it results from a failure to perceive differences, or it might instead provide an “integrated summary of subsumed differences.”
Likewise, Messick argued, the use of many discrete categories in an object sorting task may reflect compartmentalization, a consistent tendency to isolate ideas and objects into discrete, rigid categories, or it may reflect a high degree of differentiation, indicative of a more cognitively complex style.

Shroder, Driver, and Streufert (1967) argued that differentiation and integration were two basic activities of human information processing. According to their view, an individual must first differentiate the dimensions of the stimuli in his or her environment and then integrate the dimensions that he or she has differentiated. An individual low in both differentiation and integration is said to think concretely, whereas an individual high in both of these dimensions is said to think abstractly. All people can be ordered on this continuum from concrete to abstract. The resulting dimension is referred to as integrative or conceptual complexity (Goldstein & Blackman, 1978, p. 136). In the model proposed above (Figure 1), “abstract” or “conceptually complex” individuals fall in the upper right quadrant, and “concrete” or “conceptually simple” individuals fall in the lower left quadrant.

**Evidence from Social Psychology**

In social and personality psychology, integration and differentiation of social objects are thought to operate in service of different needs and orientations. According to Woike (1992), differentiation refers to perceiving social objects as different, separate, independent, and integration entails perceiving social objects as similar, connected and interdependent. Woike (1994) proposed that integration
and differentiation may be separate cognitive processes that serve distinct social functions. Specifically, integration was posited to foster and maintain communion, whereas differentiation was posited to foster and maintain agency.

Brewer (1991) portrayed assimilation (inclusiveness, belonging, being the same as others) and differentiation (personalization, distinction, being different from others) as orthogonal dimensions, the intersection of which represented a state of “optimal distinctiveness.” In this model, instead of a bipolar continuum from similarity to dissimilarity (p. 477), drives toward social assimilation and differentiation are opposing forces which can be independently activated, depending on the level of unmet needs. Similarly, Imamoglu (1996) developed a Scale of Balanced Differentiation and Integration, which included distinct factors for Interrelational and Self-developmental Orientations. A high score on both of these subscales indicated an orientation towards “balanced integration-differentiation.”

**Evidence from other areas of psychology**

In learning theory and behavior theory, researchers distinguish the processes of stimulus generalization and stimulus discrimination. Stimulus generalization refers to the process by which an increase in the strength of a response learned in one situation gives rise to an increase in the strength of response in a slightly different stimulus situation (Bush & Mosteller, 1951). The amount of generalization is taken to be the operational definition of the degree of similarity between situations. Discrimination, by contrast, is the process by which
an animal learns to make a particular response in one situation but not in another. In this view, generalization and discrimination are fundamental to learning.

Within psychodynamic theory, object relations theorists explore the process by which people come to experience themselves as separate and independent from others while at the same time needing profound attachment to others (Flanagan, 2011). Object relations are seen as the center of emotional life, and disruptions to these processes lead to psychological disorders.

In organizational psychology, complex organizations are differentiated if they have specialized subsystems which differ in terms of function, structure and members’ goal and interpersonal orientations. Integration is defined as the process of achieving unity of effort among the various organizational subsystems. Highly performing and effective organizations are both well integrated and well differentiated (Lawrence & Lorsch, 1967).

**Issues of Operationalization**

As the above review illustrates, psychologists, in particular cognitive psychologists in the mid to late 20th century, have given considerable attention to the integration and differentiation constructs. However, despite the abundance of theorizing and empirical work on cognitive integration and differentiation, no psychometrically sound, domain-general measure of these important traits exists. As Miller and Wilson (1979) indicated, the conceptualization and operationalization of cognitive integration and differentiation have been
ambiguous and confused. In particular, disentangling cognitive integration and
differentiation at the operational level has been difficult. For example, The Free
Sorting Test (Gardner, 1953), a popular measure of equivalence range (also called
conceptual differentiation; Gardner & Moriarity, 1968), consists of a task in
which the subject is given 73 common objects and is instructed to sort the objects
that seem to belong together into groups. (There is also a 50-item version of this
task developed by Clayton and Jackson [1961].) The subject's score is the total
number of groups formed, with lower scores indicating a broader equivalence
range and a low level of conceptual differentiation and higher scores indicating a
narrower equivalence range and a high level of conceptual differentiation. Though
this paradigm is seemingly straightforward, it is problematic in that it cannot
distinguish use of intentional differentiation from the failure to recognize
connections, as discussed above. Moreover, if personality traits are expected to
correlate only loosely with their situation-specific behavioral manifestations,
counting the number of piles an individual creates in a one-time sorting task with
a specific set of 73 objects can only questionably be interpreted as his or her score
on a personality variable.

Another problem with the conceptualization and measurement of these
traits has been the use of the perceptual system as a “window to the person’s
cognition” (Grigorenko & Sternberg, 1995). Although cognitive style variables
presumably included consistencies in intellectual as well as perceptual activity,
measurement was often limited to perceptual activity and extrapolated to
intellectual domains (e.g., Witkin, Moore, Goodenough, & Cox, 1975). In an exception to this, Wyer (1964) measured intellectual integration and differentiation, as well as identification of conceptual similarities and differences, but he did so using single instance domain-specific tests with no more than 40 participants.

Integrative complexity has been measured using a variety of lab tasks, including the Paragraph Completion test, the “This I Believe” test, the Interpersonal Topical Inventory, Multidimensional Scaling, and the Impression Formation test (Schroder & Streufert, 1962; Harvey, 1964; Schroder, 1971; Blackman, 1966), but these tasks are designed to capture scores on the single dimension from abstract to concrete that arises from differences in integrating and differentiating abilities, rather than integration and differentiation per se. Another problem with the measures of integrative complexity is that they require scoring by trained coders and are often costly, time consuming, and have low test-retest reliability. Finally, virtually all of the work in measurement of integrative complexity has been restricted to the interpersonal domain (Goldstein & Blackman, 1978, p. 173).

A final barrier to operationalization has been the lack of consideration given to integration and differentiation as traits: that is, individual differences in frequency of engaging in these processes. Woike (1994), for example, assumed all individuals have the capacity for integration and differentiation and that the interaction of the situation and underlying needs determines their differential use.
Though other researchers have speculated that stable, between-person differences in integration and differentiation exist (e.g., Gardner & Schoen, 1962; Schroder, Driver, & Streufert, 1967), they did not measure them. Thus, one goal of the present research is to develop and validate a self-report measure of trait integration and differentiation.

**Situating Integration and Differentiation in Contemporary Personality Frameworks**

If integration and differentiation are basic aspects of individual differences, as we and others have argued, then it should be possible to reconcile them with established models of personality structure. As mentioned, previously studied correlates of integration and differentiation were unsystematic and results were inconsistent. In the absence of a consensual structural framework of personality, researchers focused on relating their cognitive style variables to performance on other cognitive style variables, performance on a remote associates or alternate uses task, intelligence, child-rearing styles, or other variables reflecting the zeitgeist, such as authoritarianism and dogmatism (Vannoy, 1965; Tuckman, 1966; Goodenough & Karp, 1961; Dyk, 1969; Schroder, Driver, & Streufert, 1967; Bieri, Bradburn, & Galinsky, 1958; Levy & Rokeach, 1960; Clark, 1968; Bieri, 1965; Rule & Hewitt, 1970; Hession & McCarthy, 1975). Often, sample sizes were unsuitably small (around n = 30; e.g., Dyk & Witkin, 1965; Rudin & Stagner, 1958), and findings were inconsistent. To
overcome these problems, in the present research, we aim to establish a place for integration and differentiation in the contemporary personality literature.

The “Big Five” or Five Factor Model is a consensually accepted general taxonomy of personality traits. It includes five broad, empirically derived domains or dimensions (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) that are used to capture as much of personality as possible in an efficient manner (John & Srivastava, 1999). The big five trait of openness to experience is likely to be particularly relevant to integration and differentiation, because it includes qualities like intellectual, imaginative, and independent minded (p. 105). When a person perceives a need for integration or differentiation, they are, in a sense, rejecting the status quo and failing to conform to conventional interpretations. Furthermore, though the processes of integration and differentiation may begin as passive (e.g., when connections or relationships are revealed to the individual), they close on a more active, assertive note (e.g., when a person concludes that fragmented ideas must be integrated). Therefore, we might expect both integration and differentiation to relate positively to extraversion, a dimension reflecting activity and assertiveness.

If integration and differentiation are distinct traits, however, in addition to their shared correlates, we expect to find relationships that are unique to one trait or the other. At the level of the Big 5, agreeableness and conscientiousness may be relevant to integration and differentiation, respectively. Wokie (1994) argued that perceiving similarities and connections in the social world fosters communion
and even empathy (p. 143). Given that cooperativeness and empathy are central features of agreeableness, we expect integration (but not differentiation) to relate to agreeableness. Conscientiousness includes qualities like ‘thorough’, ‘precise’, and ‘painstaking’, among other things (John & Srivastava, 1999, p. 123). We therefore expect conscientiousness to relate to differentiation (but not integration).

The Present Research

In the present research, we examined integration and differentiation at the between-person level. Though these processes are presumed to vary at the between-person level, little to no research attention has been given to integration and differentiation as traits. In the absence of an adequate measure, we developed a scale as part of Study 1 and examined its psychometric properties. We then validated the integration and differentiation constructs by establishing their distinct nomological nets (Studies 1 and 2) and by correlating them with objective sorting behavior (Study 3).

Study 1

Study 1 served two goals. First, we developed and validated a questionnaire measure of integration and differentiation and evaluated its factor structure and other psychometric properties. Given our conceptualization of integration and differentiation as distinct traits, we expected integration and differentiation items to load onto two factors. Second, we established construct validity by examining the relation of integration and differentiation to other personality variables. We examined correlations between integration and
differentiation and variables representing two major theoretical frameworks, Big Five personality traits and Approach-Avoidance temperament (John, Donahue, & Kentle, 1991; Elliot & Thrash, 2010). Additionally, we examined patterns of correlations with affect, life satisfaction, and one theoretically-relevant trait, action identification.

We hypothesized that both integration and differentiation would relate to the big 5 trait of openness to experience, which includes sub-traits such as imaginativeness, curiosity, and reflection. Openness reflects complexity in information processing and the ability and desire to explore the world cognitively, through both reason and perception (DeYoung, 2014). This conceptualization of openness in particular points to its relevance to cognitive integration and differentiation. Regarding other big 5 traits, we expected integration (but not differentiation) to relate to agreeableness and differentiation (but not integration) to relate to conscientiousness. Regarding approach and avoidance motivation, we expected both integration and differentiation to relate to approach motivation (as engaging in these processes involve active engagement with information), but we expected integration to relate more strongly to approach and differentiation to relate more strongly to avoidance. Differentiation involves an attention to detail and vigilance that is more likely part of avoidance than approach motivation.

Regarding well-being, we expected integration to relate to positive affect and life satisfaction, because positive affect is thought to broaden people’s scope of cognition and attention (Frederickson & Joiner, 2002; Smith & Trope, 2006). We
did not expect to find a relationship between differentiation and well-being. Regarding action identification, we had competing hypotheses. On the one hand, it is plausible that integration and differentiation relate to behavior identification level in opposite directions, with integration relating positively to higher level behavior identification. On the other hand, the items of the BIF are written such that individuals with higher intelligence may feel compelled to choose the higher-level option, thus, it is reasonable to expect both integration and differentiation to relate positively to behavior identification level.

**Method**

**Preliminary instrument development.** In pilot research, we drafted 18 integration items and 18 corresponding differentiation items. All items were written in pairs, such that the wording and content of items within a pair were matched. (See Appendix A for a complete list of drafted items.) Items were administered to undergraduates as part of a larger “mass testing” questionnaire and/or as part of an online pilot study. The order of all items was randomized independently (i.e., not in pairs). Participants responded on a frequency scale ranging from 1 (*rarely or never*) to 7 (*very often*). A promising set of 6 item pairs was selected on the basis of content (even sampling of content universe, interpretability, and inclusion versus exclusion of interpersonal referents) and psychometric criteria (relation to social desirability, internal consistency, and a preliminary CFA). These 6 item pairs were administered along with other items in future studies (including Studies 1-3), but only responses to the 6 originally
identified item pairs were analyzed. We named the 12-item measure of integration and differentiation the Lumping-Splitting Questionnaire, or LSQ.

**Participants.** Participants were 378 (131 males and 247 females) undergraduates enrolled in an introductory psychology course. Participant age ranged from 18 to 23 years with a mean age of 19 years. In accordance with the recommendations of Meade and Craig (2012), various items were included in the study to identify careless responders. We included one instructed response item (*For this question, choose response option 1, “rarely or never”;* 32/378 failed), one “bogus” item (*I was born on February 30th*; 16/378 failed to disagree strongly), and two self-reported study engagement items (*In your honest opinion, should we use your data in our analyses in this study?*; 23/378 said “no,” and *I put forth _____ effort into this study;* 5/378 put “almost no” or “very little”). In total, 50 participants (13.23% of the original sample) were identified as careless responders on the basis of these 4 items and were thus discarded before analyses were conducted. This yielded a final sample of 328 participants (104 males and 224 females).

**Procedure.** Participants completed questionnaires online. Questionnaires were presented in an identical order to all participants, though the order of items within questionnaires was randomized.

**Measures.**

**Big Five Traits.** Oliver, Donauhue, and Kentle’s (1991) 44-item Big Five Inventory was used to assess openness to experience, conscientiousness,
extraversion, agreeableness, and neuroticism. Items were rated on a scale from 1 (Disagree strongly) to 5 (Agree strongly).

Integration and differentiation. Participants then responded to 24 integration and differentiation items, 12 of which were analyzed. As in the pilot research, response options ranged from 1 (Rarely or never) to 7 (Very often).

Approach and avoidance temperament. Elliot and Thrash’s (2010) 12-item Approach-Avoidance Temperament Questionnaire was used to assess approach and avoidance temperament. Response options ranged from 1 (strongly disagree) to 7 (strongly agree).

Circumplex affect. Circumplex affect was assessed with the adjective-based measure of affect developed by Yik, Russell, and Steiger (2011). Participants rated the frequency with which they experienced the 60 core affective states on a scale from 1 (never) to 5 (very often).

Satisfaction with life. Deiner, Emmons, Larson, and Griffin’s (1985) 5-item Satisfaction With Life Scale (SWLS) was used to measure global life satisfaction. Participants responded on a scale from 1 (Strongly disagree) to 7 (Strongly agree).

Social desirability. The Paulhus (1991) Balanced Inventory of Desirable Responding (BIDR) was used to assess social desirability. The scale has two subscales, Impression Management (IM) and Self-deceptive Enhancement (SDE). Responses were recorded on a 5-point scale from 1 (Not true) to 5 (Very true) but were scored using the dichotomous scoring method described in Paulhus (1991).
**Action identification/construal level.** We used Vallacher and Wegner’s (1989) Behavior Identification Form (BIF) to measure individual differences in level of personal agency. Each item on the BIF presents an act followed by two alternative descriptions of that act, one of lower level and one of higher level. For example, typing a paper could be described as “pushing keys” (lower level) or “expressing thoughts” (higher level). Respondents choose the alternative that best describes that action for them. This measure is often used as a proxy for Construal Level (e.g., Fujita, Henderson, Eng, Trope, & Liberman, 2006).

**Results and Discussion.**

**Factor Structure of Integration and differentiation.** We examined the factor structure of the 12-item measure using Confirmatory Factor Analysis (CFA). Analyses were conducted in Mplus 7.3 (Muthen & Muthen, 1998-2012) using maximum likelihood estimation. The 6 integration items and 6 differentiation items were specified to be indicators of latent integration and latent differentiation variables, respectively. The uniquenesses of paired items were permitted to covary. We identified the model by constraining latent variances to 1.00. The model is depicted in Figure 2.

Overall, the model was found to have good fit. The values for all available fit indexes are listed in Table 1. All parameters were significant (with the exception of correlations between 3 pairs of uniquenesses), and all standardized factor loadings exceeded .56. The correlation between latent integration and latent differentiation was positive and significant. The chi-square value was significant,
but with a larger sample, chi-square is almost always significant and therefore
not an informative or useful index of fit (Kenny, 2014).

In addition to the hypothesized 2-factor model, we conceived of two
alternative models in which the correlation between latent integration and
differentiation was constrained to either -1 (which implies that these traits are
opposites, as folk theory suggests) or 1 (which implies that these traits are
indistinguishable). It is of note that latent integration and differentiation were
found to be positively correlated when freely estimated. This is in direct
opposition to the lumper-splitter folk theory. Furthermore, it rendered the testing
of an alternative model in which integration and differentiation are opposites
senseless, and indeed, this model failed to reach a solution when tested. Because
of the robust positive correlation between latent integration and differentiation,
however, it was prudent to test the model in which the correlation between the
factors was constrained to 1. This model was tested and found to have poor fit,
both in an absolute sense and relative to our theorized model. The values for the
fit indices are listed in Table 1. All of the fit indexes listed are outside of the
acceptable cutoff for acceptable fit. Constraining the correlation to 1 also
produced a significant decrement in fit, $\Delta \chi^2 = 228.68, \Delta df = 1, p < .01$. The results
of the CFA are consistent with our hypothesis that integration and differentiation
are two distinct constructs.

**Internal consistency.** On the basis of this evidence for two factors, we
computed separate integration and differentiation scores by summing scores on
the 6 integration and 6 differentiation items, respectively. Both subscales were found to be internally consistent. Chronbach's α's were .79 for the integration subscale and .83 for the differentiation subscale. See Table 2 for descriptive statistics and reliability estimates.

**Relationship to social desirability.** Table 4 displays the correlations between our two variables of interest and the two facts of the BIDR, impression management (IM) and self-deceptive enhancement (SDE). Overall, correlations were descriptively quite low, though they did reach statistical significance. Given that integration and differentiation are inherently desirable traits, this problem is virtually inevitable when assessing them with a face valid self-report questionnaire, such as the one we developed. To minimize the impact of social desirability biases, however, in subsequent analyses, we present the results of nomological net analyses with and without these variables controlled. We also examined the partial correlation between integration and differentiation with impression management and self-deceptive enhancement controlled. The partial correlation was .415, p < .001, indicating that response biases did not account for the positive relationship between these two traits. Finally, we tested for any gender differences in integration and differentiation using independent samples t-tests. Men (M = 28.67, SD = 5.08) reported significantly higher levels of integration than women (M = 27.44, SD = 5.23), t(326) = 2.00, p = < .05. However, when we controlled for social desirability biases using a one-way
ANCOVA, this difference disappeared, $F(1, 324) = 3.01, p = .08$. There were no significant gender differences in differentiation.

Despite modest correlations with social desirability variables, our measure of integration and differentiation (hereafter called the Lumper-Splitter Questionnaire, or LSQ) has strong psychometric properties. It exhibits the hypothesized 2-factor structure and is internally consistent. The development and validation of the LSQ fills a major gap in the literature; these processes have been considered important aspects of individual differences by social, developmental, and cognitive psychologists, yet personality psychology had heretofore failed to formally conceptualize and measure them.

**Relation to other personality variables.** Descriptive statistics and reliability estimates for all Study 1 variables may be found in Table 3. We conducted three sets of analyses. In the first set of analyses, we computed correlations between integration/differentiation and the other personality variables. In the second set, we conducted multiple regressions with integration and differentiation as predictors and all other personality variables as outcomes. This allowed us to examine the unique relationship between integration and differentiation and our outcome variables with the other LSQ variable controlled. Finally, we regressed the individual differences variables onto integration, differentiation, and both social desirability variables. This allowed us to examine the predictive utility of integration and differentiation independent of their relationships with social desirability variables.
The results of these analyses are presented in Tables 4–6. Our hypotheses were largely supported. Results varied slightly depending on which type of analysis was conducted, but the general pattern was consistent. Integration and differentiation were both most strongly related to the big 5 trait of openness. Integration (but not differentiation) was positively associated with agreeableness, and differentiation (but not integration) was positively associated with conscientiousness. Integration and differentiation were both related to approach temperament, and differentiation (but not integration) was related to avoidance when the other variables (including social desirability biases) were controlled. Integration (but not differentiation) was positively associated with life satisfaction and pleasure. Integration and differentiation both correlated with higher action identification level, but when pitted against one another in a multiple regression, only integration uniquely predicted action identification. These results support our hypotheses and are consistent with our conceptualizations of integration and differentiation as distinct aspects of individual differences. They form two factors, and although they share some correlates (in particular, openness), ultimately, they have distinct nomological networks.

**Study 2**

The findings of Study 1 indicate that integration and differentiation are distinct dimensions of personality, rather than opposites. Study 2 had three aims. First, we sought to replicate the CFA results of Study 1. Second, we related integration and differentiation to openness to experience at the aspect level.
Though integration and differentiation had distinct patterns of relationships with personality and well-being variables in Study 1, both integration and differentiation were strongly (positively) correlated with openness to experience. Openness to experience is perhaps the broadest and most heterogeneous of the big 5 traits, qualities reflected in its diversity of labels and conceptualizations (E.g., "Openness to Experience," "Intellect," "Imagination," "Openness/Intellect"). DeYong, Quilton, and Peterson (2007) identified two lower-order aspects of openness to experience, openness and intellect, which together make up the trait domain openness/intellect. The aspect of openness captures the extent to which individuals are creative and see connections. Intellect captures the extent to which individuals can formulate ideas clearly, can solve complex problems, and have a rich vocabulary. Based on the descriptions above, we expected to integration to converge more strongly with openness and differentiation to converge more strongly with intellect. Finally, the third aim of Study 2 was to extend the nomological network of integration/differentiation. In Study 2, we went beyond major frameworks of personality and measured and assessed relationships with more theoretically-relevant traits.

Given that integration and differentiation both involve explicit cognitive processes, we expected both of these dimensions to relate to rational, but not experiential processing styles (Epstein, Pacini, Denes-Raj, & Heier, 1996). An experiential thinking style is “crudely” integrated and differentiated, whereas a rational thinking style is highly integrated and differentiated. Regarding
rumination and reflection, we expected a double dissociation, such that integration (but not differentiation) would be related to reflection, and differentiation (but not integration) would be related to rumination. Both rumination and reflection involve heightened attention to the self, but they differ in underlying motivation and affective nature. Reflection is self-attentiveness motivated by curiosity and an epistemic interest in the self, whereas rumination is self-attentiveness motivated by perceived threat to the self (Trapnell & Campbell, 1999). Differentiation involves making fine-grained distinctions, and we therefore expected it to be related to Need for Precision (Viswanatian, 1997), which is a preference for engaging in a relatively fine-grained mode of processing and intolerance for "ball park" answers. We did not expect a relationship between integration and need for precision. Absorption (Tellegen & Atkinson, 1974) is a trait characterized by "openness to absorbing and self-altering experiences" and involves engrossed attention to stimulus qualities, such as beauty. Absorption is particularly related to facets of openness having to do with imaginative involvement. We therefore expected both integration and differentiation to relate to absorption, the former more strongly so.

Regarding motivation variables, both integration and differentiation are related to approach temperament. We therefore expected integration (and less strongly so, differentiation) to relate to inspiration, an approach motivation state often involving insight (Thrash & Elliot, 2003). Self-control, the exertion of control by the self over the self, consists of actions that seek to decrease
discrepancies between a perceived aspect of the self and a standard (Carver & Scheier, 1982; Muraven & Baumeister, 2000). Thus, self-control involves elements of agency and the capacity for detecting discrepancies. Therefore, we expected differentiation (but not integration) to relate to self-control.

Finally, we examined the relationship between integration and differentiation and interpersonal style (Wiggins, Trapnell, & Phillips, 1988). Because integration (but not differentiation) is related to agreeableness, we expected integration to relate more to warmth. Differentiation was expected to converge more strongly than integration with cold/dominant interpersonal styles. This prediction is consistent with research by Tetlock, Peterson, and Berry (1993), who found that agentic orientation (high power motivation) was related to making distinctions through contrasts.

**Method**

**Participants and procedure.** Participants were 170 undergraduates (93 men, 77 women) enrolled in an introductory psychology course. Mean age was 19.38 years with a range of 18 – 25 years. As in Study 1, we included special items to identify careless responders (Mead & Craig, 2012). There was 1 instructed response item (“choose 1 for this item”; 29/170 failed), 1 bogus item (“I was born on February 30th”; 19/170 failed), and two self-reported study involvement items (“In your honest opinion, should we use your data in our analyses”; 27/170 answered “no” and “I put forth ___ effort into this study”; 9/170 put “almost no” or “very little” effort). 44 participants failed at least one of
these items, bringing the final sample size to 126 participants (67 men, 59 women). Participants completed online questionnaires at a location of their choosing. The order of the questionnaires was randomized. The order of the items within questionnaires was randomized. Participants were instructed to complete the entire questionnaire in one sitting. After the questionnaires, participants completed a pilot task. The data from the pilot task was not analyzed.

**Measures.**

**Integration and differentiation.** We administered the 12-item Lumper-Splitter Questionnaire we developed in Study 1, along with other pilot items, which were not included in any analyses. Response options ranged from 1 (*Rarely or never*) to 7 (*Very often*).

**Approach and avoidance temperament.** Elliot and Thrash’s (2010) 12-item Approach-Avoidance Temperament Questionnaire was used to assess approach and avoidance temperament. Response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*).

**Rational and experiential thinking styles.** To measure rational and experiential thinking styles, we administered Epstein, Pacini, Denes-Raj, Heier’s (1996) Rational-Experiential Inventory. Response options ranged from 1 (*Definitely not true of my self*) to 5 (*Definitely true of myself*).

**Need for precision.** To measure need for precision, we administered the 13-item Need For Precision Scale (Viswanatian, 1997). Response options ranged from 1 (*Strongly disagree*) to 7 (*Strongly agree*).
Absorption. Absorption was assessed by the Absorption scale from Tellegen’s (1982) Multidimensional Personality Questionnaire. This scale consists of 34 true–false statements.

Openness/Intellect. Openness and intellect were assessed by the Openness and Intellect subscales from DeYong, Quilty, and Peterson’s (2007) Big Five Aspect Scale. Response options ranged from 1 (Disagree strongly) to 5 (Agree strongly).

Rumination and reflection. To assess rumination and reflection, we administered the Rumination-Reflection Questionnaire (Trapnell & Campbell, 1999). Response options ranged from 1 (Strongly disagree) to 5 (Strongly agree).

Inspiration. Inspiration was assessed via the Inspiration Scale (Thrash & Elliot, 2003). Response options for the frequency subscale ranged from 1 (Never) to 7 (Very often), and response options for the intensity subscale ranged from 1 (Not at all) to 7 (Very strongly or deeply). Scores from the two subscales were summed to form an overall inspiration index.

Self-control. Self-control was assessed by the 13-item Brief Self-Control Scale (Tangney, Baumeister, & Boone, 2004). Response options ranged from 1 (Not at all) to 5 (Very much).

Interpersonal styles. Interpersonal styles were assessed using the 64-item Wiggins, Trapnell, and Phillips (1988) Revised Interpersonal Adjective Scales. Response options ranged from 1 (Not at all) to 5 (Extremely).

Results and Discussion
**Replication of factor structure.** We tested the same model as in Study 1. Fit indices can be found in Table 1. As in Study 1, our hypothesized 2-factor model was found to have good fit in a Confirmatory Factor Analysis, $\chi^2 (47, N=126) = 63.42, p > .05$. As in Study 1, the correlation between latent integration and latent differentiation was positive and significant, $r(126) = .55, p < .01$.

**Nomological net.** Having replicated the two-factor structure, we turned to nomological net analyses. Descriptive statistics and reliability estimates for all variables may be found in Table 7. We performed two sets of analyses. First, we computed raw correlations between integration/differentiation and the other variables. The results of these analyses may be found in Table 8. Next, we conducted multiple regression analyses to examine the unique associations of integration and differentiation with the other variables (with the other LSQ variable controlled). The results of these analyses may be found in Table 9.

Our hypotheses were generally supported. When we examined the unique associations of integration and differentiation with Openness/Intellect, we found the hypothesized double dissociation; Integration (but not differentiation) uniquely related to openness, and differentiation (but not integration) uniquely related to intellect. Integration and differentiation both correlated with rational (but not experiential) processing modes, consistent with our conceptualization of integration and differentiation as intentional, analytical processes, which, like rational thought, are experienced actively and consciously. As predicted, differentiation (but not integration) correlated with need for precision. When
controlling for differentiation, integration was a significant negative predictor of need for precision, while differentiation remained a significant positive predictor. Integration (but not differentiation) showed a consistently strong positive relationship with absorption; though both integration and differentiation significantly correlated with absorption, only integration uniquely predicted absorption in the multiple regression analysis. Regarding rumination and reflection, our hypotheses were supported. Integration (but not differentiation) uniquely predicted reflection, and differentiation (but not integration) uniquely predicted rumination. Our hypotheses regarding inspiration and self-control were only partially supported. Both integration and differentiation correlated with inspiration, but only integration uniquely predicted inspiration. (Differentiation was a marginal unique predictor of inspiration.) Neither integration nor differentiation exhibited any statistically significant relationship with self-control, though the unique relationship between differentiation and self-control (beta = .07) was descriptively larger than the unique relationship between integration and self-control (beta = .01). We found some degree of divergence in the relationships between integration/differentiation and interpersonal styles. For example, differentiation (but not integration) was related to the Arrogant-Calculating angle of the interpersonal circumplex, consistent with our conceptualization of differentiators as cunning and dominant.

Together, the findings of Study 2 demonstrate that integration and differentiation relate to other constructs in meaningful, differentiated, and...
expected ways; Integration relates to openness, inspiration, and reflection, and differentiation relates to intellect, rumination, and need for precision.

Study 3

A limitation of Studies 1 and 2 was their sole reliance on self-report to measure integration and differentiation. The purpose of study 3 was to relate scores on the LSQ to objective behavior. In the spirit of methods used by Gardner (1953) and Clayton and Jackson (1961) to assess equivalence range, participants free sorted items into categories based on perceived similarities and differences. We then related participants’ scores on LSQ variables to the average normalized height of their sorts (Coxon, 1999), a metric reflecting both average number of and size of participants’ categories. We expected integration and differentiation to relate in opposite directions to height scores on the sorting task. Though this method does not provide separate criteria for validating integration and differentiation, it does permit discrimination in the sense that integration and differentiation, which are positively related, are expected to have opposite effects on height.

Method

Participants. Participants were 186 undergraduates enrolled in an introductory psychology course. Only participants whose first language was English were allowed to begin the study. Data from 3 participants who did not finish the study was dropped. Data from 7 participants who failed to respond appropriately to an instructed response item ("For this item, choose 1 [rarely or
never]”) was also dropped before any analyses were conducted. Data from one participant whose height score was an extreme outlier (Z > 5) was dropped before analyses. The final sample consisted of 175 participants (84 males, 91 females) with a mean age of 19.29 years.

Procedure. Participants came to the lab individually for a study titled, “How you think about things.” After granting informed consent, participants were left alone to complete the Lumping Splitting Questionnaire via Qualtrics. Items were randomized. Participants then completed another pilot questionnaire as a filler task. After the filler task, participants saw a message to inform the experimenter they were finished with the first part of the study. The experimenter then explained Part 2 of the study, a sorting task. The sorting task was programmed using usabilitytools.com, an online card sort tool. The experimenter read the following instructions aloud to each participant:

The second part of this study involves sorting "cards" into "piles." (This will be done entirely on the computer - no physical cards will be involved.) Each card will contain an item. We'd like you to sort these items into categories. Items that are most similar should be sorted into the same category, and items that are the most different should be sorted into different categories. The goal is to create categories that are as natural as possible.

As you are going through this task, it is imperative that you use ALL of the cards provided and name ALL of the piles you create. The arrangement of the cards within a pile doesn't matter. The arrangement of the piles in space doesn't matter either. This will make more sense to you once you complete a practice card sort with the experimenter.
Now, the experimenter will provide you with additional verbal instructions and walk you through one practice round of the task. You will then complete 12 card sorts on your own.

The experimenter then watched as the participant completed a practice round of the sorting task. The experimenter answered any questions then left the participant to complete twelve rounds of the sorting task on their own. The items within each round were randomized, but the rounds appeared in a consistent order for every participant. (UsabilityTools does not have a feature that allows the rounds to be randomized.) The items are listed in Appendix B. Items were selected for this study based of several criteria. First, we wanted to ensure that items were universally understood and familiar to all of our participants. Next, we chose items that could be sorted in a variety of logical ways. Finally, we sought to select items from diverse domains.

After completing the 12 rounds of sorting, participants completed a brief demographic questionnaire (via usabilitytools.com) before leaving the lab.

Results and discussion

We computed integration and differentiation scores by summing scores on the 6 integration items and 6 differentiation items, respectively. Descriptive statistics and reliability estimates can found in Table 2. We then computed height scores for each participants based on card sorting data. Coxon (1999) describes two extreme types of sorting behavior. At one extreme is the lump, who recognizes no differences between items, and places all items in the same, single category. At the other extreme is the splitter, who recognizes no similarity or
communality among items and places each item in its own category. All individuals fall on a continuum, known as the "lumper-splitter axis" between these two extremes. The height variable is a more sophisticated metric than counting categories, as it accounts for both number of piles and the "aggregativeness" of those piles (i.e., how many pairs of items fall into those piles). Using the following formula described by Coxon (1999), we computed raw height scores for each participant for each round by summing the number of pairs in each category over all categories.

\[ \text{Raw height} = \sum c_i (c_i - 1)/2 \]

Where \( c_i \) is the number of pairs that can be formed in each category, summed across categories.

An extreme splitter (who puts each item in its own category) has no categories containing any pairs and therefore receives a height score of 0. An extreme lumper (who puts all items into a single category) receives a height score of \( p(p-1)/2 \), where \( p \) is the total number of items. Though the raw height variable is useful, it depends heavily on the number of items in the domain set (or round).

We thus computed a normalized height score for each participant/round by dividing by the raw height value by its maximum value, that of an extreme lumper. Therefore,

\[ \text{Normalized height} = \frac{\sum c_i (c_i - 1)/2}{p (p-1)/2} \]
This metric also fits intuitively into the lumper-splitter framework described above; an extreme splitter receives a normalized height score of 0, and an extreme lumner receives a normalized height score of 1.

Because we obtained 12 normalized height scores for each participant (one per round), we were able to compute reliability estimates for this variable. Chronbach's $\alpha$ for normalized height scores was .88, indicating good internal consistency. We therefore computed a single normalized height score for each participant by taking the average of his or her 12 normalized height scores. We then correlated integration and differentiation with this average normalized height score. We also regressed normalized height onto integration and differentiation to examine unique influences of these traits on categorization behavior.

Results are in Tables 10 and 11. As predicted, integration [$r(175) = .21, p = .004$], and differentiation [$r(175) = -.17, p = .027$] correlated with height in opposite directions, and these effects were stronger when the other variable was controlled ($\beta = .27, p < .001, \beta = -.23, p = .002$, respectively). This pattern of results indicates that these cognitive processes, as measured by our novel self-report measure, contribute to overt behavior in meaningful and expected ways. We note that, while this task cannot itself disentangle integration from failure of differentiation (and vice versa), our self-report measure does have this benefit. For that reason (among others) we encourage the use of the self-report measure when assessing trait integration and differentiation.

**General discussion**
We have argued that integration and differentiation are important and distinct dimensions of personality. To examine this, we developed a measure of trait integration and differentiation (the LSQ) and examined its factor structure. Study 1 revealed that integration and differentiation constitute two positively correlated factors. We replicated this structure in Study 2. Both subscales of the LSQ were found to be internally consistent. It is not surprising that integration and differentiation were found to be positively correlated, given that both of these dimensions in part reflect the extent to which individuals are cognitively engaged. Integration and differentiation were not perfectly correlated, however, leaving open the possibility for the existence of lumpers (who display high levels of integration and low levels of differentiation) and splitters (who display high levels of differentiation and low levels of integration). Indeed, as illustrated in Figure 1, the 2-factor model indicates that all four quadrants are populated. In future studies, we hope to show how integration and differentiation may be used together to create "complex" thinking.

In Studies 1 and 2, we found that integration and differentiation have distinct nomological nets. Both traits were related to the broad Big 5 dimension of openness to experience, but integration was related to the openness facet and differentiation was more strongly related to the intellect facet. Consistent with this finding, integration (but not differentiation) was uniquely related to absorption, a trait reflecting imaginative involvement, and differentiation (but not integration) was related to need for precision, a trait reflecting a preference for engaging in a
relatively fine-grained mode of processing. Woike (1994) posited that integration and differentiation serve communion (affiliative) and agency (power) functions, respectively. Our findings from Studies 1 and 2 support this claim. In Study 1, integration (but not differentiation) was positively correlated with agreeableness, and in Study 2, differentiation (but not integration) was related to the arrogant-calculating angle of the interpersonal circumplex. Overall, integration appeared to have stronger positive (or weaker negative) unique relationships with the angles of circumplex representing warm or submissive interpersonal styles. With regards to self-attentive dispositions, we saw a further dissociation of the integration and differentiation constructs; integration was uniquely related to reflection and not rumination, whereas differentiation was uniquely related to rumination and not reflection. This is consistent with the findings that integration was more closely tied to approach temperament and well-being, whereas differentiation, when controlling for integration and social desirability biases, was related to avoidance temperament. Therefore, despite the shared variance between integration and differentiation, these traits display unique patterns of relationships with other individual difference variables.

Finally, in Study 3, we showed that integration and differentiation predict behavior in an object sorting task in opposite directions. Participants sorted 12 sets of objects into categories based on perceived similarities and differences. The criterion was normalized height, a metric capturing the average “aggregativeness” of the categories and average number of categories, holding number of objects
constant. We found that integration was positively correlated with average normalized height, whereas differentiation was negatively correlated with average normalized height. This served as a direct behavioral validation of our measure. Furthermore, average normalized height scores were internally consistent for the 12 sorts, indicating that processes of integration and differentiation may contribute similarly across diverse domains.

**Limitations and closing comments**

Two limitations of this research should be noted. First, our samples consisted entirely of undergraduates at an elite public university. Though the use of undergraduate samples is almost always problematic, it may be particularly thorny when assessing cognitive traits. The use of this particular population may have led to a restricted range of scores on the LSQ or shifts in referent groups. In future studies, it will be important to establish the generalizability of our findings. Second, self-report is only accurate to the extent that participants are willing and able provide the information. Because integration and differentiation are comparatively low in observability but high in evaluativeness (Vazire, 2010), it is unclear whether self or informant reports are potentially more accurate. Ideally, in future research, we will use both self and other ratings of these traits to gain a more accurate picture. It should be noted, however, that integration and differentiation were only moderately related to social desirability and were related to objective sorting behavior, indicating that the use of self-report is an appropriate method for measuring these traits.
Finally, we note that despite centuries of interest in lumpers and splitters from academics from diverse disciplines, and despite decades of interest in integration and differentiation from psychologists from various subfields, until now, no validated measure of these traits existed. We hope that, by filling this gap, research into these critical aspects of individual differences will become possible. Alfred Nobel once claimed that, “One can state, without exaggeration, that the observation of and the search for similarities and differences are the basis of all human knowledge” (Frängsmyr, 2006). This and future research, then, has the potential to inform not just personality psychology, but any party in the business of knowledge creation.
Appendix A
Lumper-splitter Questionnaire (LSQ)

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item</th>
<th>Subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>I see core similarities that unite all people or all things.</td>
<td>Integration</td>
</tr>
<tr>
<td>D1</td>
<td>I see fundamental differences that distinguish types of people or types of things.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I2</td>
<td>I recognize that things that were previously distinct should be grouped together as examples a broader category.</td>
<td>Integration</td>
</tr>
<tr>
<td>D2</td>
<td>I recognize that an existing category should be split into specific kinds or types.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I3</td>
<td>I see that seemingly unrelated ideas, people, or things can be integrated into a single, unified system.</td>
<td>Integration</td>
</tr>
<tr>
<td>D3</td>
<td>I see that a set of ideas, people, or things that are usually treated alike can be divided into distinct parts, types, or roles.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I4</td>
<td>I recognize how the separate parts of a group or system may be unified by a shared purpose or principle.</td>
<td>Integration</td>
</tr>
<tr>
<td>D4</td>
<td>I recognize how a group or system may be divided into parts that serve distinct, specialized roles.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I5</td>
<td>I focus on similarities and analogies between things.</td>
<td>Integration</td>
</tr>
<tr>
<td>D5</td>
<td>I focus on differences and contrasts between things.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I6</td>
<td>I draw conclusions about general patterns, while others are distracted by exceptions.</td>
<td>Integration</td>
</tr>
<tr>
<td>D6</td>
<td>I draw nuanced conclusions, while others overgeneralize.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I7</td>
<td>Rather than get distracted by specifics, I draw a general or universal conclusion.</td>
<td>Integration</td>
</tr>
<tr>
<td>D7</td>
<td>Rather than overgeneralize, I draw specific conclusions based on fine-grained distinctions.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I8</td>
<td>I find myself noticing the “big picture” of the situation.</td>
<td>Integration</td>
</tr>
<tr>
<td>D8</td>
<td>I find myself noticing the specifics and details of the situation.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I9</td>
<td>I find myself organizing things into general, integrative categories.</td>
<td>Integration</td>
</tr>
<tr>
<td>D9</td>
<td>I find myself splitting things into specific, precise categories.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I10</td>
<td>My attention is drawn to similarities and opportunities for integration/unification.</td>
<td>Integration</td>
</tr>
<tr>
<td>D10</td>
<td>My attention is drawn to differences and the need for differentiation/specialization.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I11</td>
<td>I see a key similarity or connection between things that others consider unrelated.</td>
<td>Integration</td>
</tr>
<tr>
<td>D11</td>
<td>I see an important difference between things that others consider similar.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I12</td>
<td>As other people overlook important similarities between things, I think (or say), “these two things are really the same!”</td>
<td>Integration</td>
</tr>
<tr>
<td>D12</td>
<td>As other people overlook key differences between things, I think (or say), “those two things are NOT the same!”</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I13</td>
<td>Rather than “split hairs” or make useless distinctions, I draw a general or universal conclusion.</td>
<td>Integration</td>
</tr>
<tr>
<td>D13</td>
<td>Rather than overgeneralize, I draw specific conclusions based on fine-grained distinctions</td>
<td>Differentiation</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Integration/Differentiation</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>I14</td>
<td>I detect a general pattern, without getting distracted by specifics</td>
<td>Integration</td>
</tr>
<tr>
<td>D14</td>
<td>I detect nuances and exceptions to a general pattern, without overgeneralizing</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I15</td>
<td>I see similarities that others overlook.</td>
<td>Integration</td>
</tr>
<tr>
<td>D15</td>
<td>I see differences that other people overlook</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I16</td>
<td>I focus on the “big picture” of what is happening in a situation.</td>
<td>Integration</td>
</tr>
<tr>
<td>D16</td>
<td>I focus on the specifics and details of what is happening in a situation.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I17</td>
<td>I sort things into a small number of broad categories.</td>
<td>Integration</td>
</tr>
<tr>
<td>D17</td>
<td>I sort things into a large number of narrow categories.</td>
<td>Differentiation</td>
</tr>
<tr>
<td>I18</td>
<td>I see all people as fundamentally the same.</td>
<td>Integration</td>
</tr>
<tr>
<td>D18</td>
<td>I see each person as unique and unlike all others.</td>
<td>Differentiation</td>
</tr>
</tbody>
</table>

**Note.** The following instructions appeared at the top of the scale: “Below are items that concern how you think about things (people, concepts, objects, feelings, experiences, and so on). For each item, please indicate how frequently you experience what is described. Be sure to consider each item independently, and answer as accurately and honestly as possible.” Items are rated on a scale for 1 (never) to 7 (very often). Items in bold (pairs 1-6) are included in the final 12-item scale.

- Additional unanalyzed items included in Study 1
- Additional unanalyzed items included in Study 2
- Additional unanalyzed items included in Study 3
Practice round:
Romance
Action
Comedy
Historical Fiction
Mystery
Poetry
Science Fiction
Short Story
Fable
Autobiography
Textbook
Essay
Biography
Narrative non-fiction
Reference book

Round A:
Dress
Skirt
Pants
Shirt
Tank top
Coat
Jacket
Socks
Shoes
Gloves
Mittens
Hat
Scarf
Necktie
Tuxedo
Swimsuit
Cape
Boots
Jersey
Overalls
Diaper
Jeans

Round B:
Scrabble
Netflix
Candy crush
Angry birds
Nintendo
Twister
NFL
NBA
Monopoly
Nightclubs
Theatre
Festivals
Concerts
Books
Amusement parks

Appendix B
Card Sort Items

Round C:
Carrot
Pear
Donut
Salad
Cheese
Egg
Beef
Taco
Banana
Bread
Honey
Vinegar
Milk
Cereal
Sandwich
Chicken
Rice
French fries
Bubble gum
Cake
Coffee
Hamburger
Granola bar
Pizza

Round D:
Cell phone
Electric Guitar
Desktop computer
Radio
Steam engine
Wheel
Light bulb
Record player
Internet
Alarm clock
Aerosol spray can
Plastic
Hearing aid
Telescope
Smoke detector
Computer mouse
Push lawn mower
Screw driver
Microphone
Remote control
GPS
Typewriter
Wifi
Laptop computer
Can opener

Round E:
Fine
Superior
Quality
Suitable
Appropriate
Fitting
Special
Dear
Great
Pleasurable
Agreeable
Nice
Delightful
Poor
 Inferior
Deficient
Negligent
Harmful
Unfavorable
Adverse
Worst
Rotten
Evil
Worthless
Miserable
Inadequate

Round F:
sunny
cloudy
rainy
snow
sleet
winter mix
warm
hot
hazy
humid
cold
freezing
wind
hail
thunder
lightning
tornado
hurricane
tropical storm
dark sky
foggy
icy
dew
frost
overcast
cool
mild
crisp
clear
breezy

Round G:
fall
drop
descend
slope
sink
slant
plunge
dip
collapse
pour
crumble
sag
slump
flop
droop
drip
decline
leak
ooze
spill
spill
spill
tumble
dive
ton
toys
televisions
vacuum cleaners

Round I:
1
7
2
146
-789
0
17/16
-222
%
8,909,2387.46677777
2 - √(34.5)
1.33
1 1/3
-49
-7,777
4.567
√5
%
-34,567,893,456.1
-444,555
34234
-9
-876
187

Round J:
Airplane
Baby carriage
Bicycle
Bus
Cab
Canoe
Skateboard
Wagon
Elevator
Ferry
Golf-cart
Helicopter
Hot air balloon
Jet
Jet ski
Jet pack
Kayak
Limo
Magic carpet
Motorcycle
Motorhome
Rowboat
School bus
Subway
Wheelchair

Round K:
psychology
neuroscience
astrophysics
theoretical physics
computer science
microeconomics
law
organic chemistry
cell biology
ecology
evolutionary biology
american studies
american history
medieval history
linguistics
18th century literature
creative writing
english
statistics
applied mathematics
mathematics
political science
sociology
earth sciences
medicine
agriculture
journalism
electrical engineering

Round L:
Content
Pleased
Proud
Enthusiastic
Energetic
Excited
Hyperactivated
Intense
Anxious
Nervous
Scared
Upset
Miserable
Unhappy
Sad
Gloomy
Bored
Tired
Quiet
Still
Relaxed
Calm
Serene
Peaceful
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Footnotes

1. In order to accurately portray the collaborative mentor-protégé relationship involved in this work, I have decided not to conform to the practice of using singular, first-person pronouns that would depict the research presented in this thesis as though it were strictly my own.

2. A systematic review of cognitive style variables is beyond the score of this introduction. For a succinct yet thorough review, see Kozhevnikov, Evans, and Kosslyn (2014).

3. Meade and Craig (2012) found a similar incidence (10 – 12%) of careless responding in an undergraduate sample completing a lengthy survey for course credit.
Table 1.  
Fit indexes for CFAs

<table>
<thead>
<tr>
<th>Model</th>
<th>$x^2$</th>
<th>$df$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
<th>$\Delta x^2$</th>
<th>$\Delta df$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1: 2-Factor</td>
<td>89.41**</td>
<td>47</td>
<td>.97</td>
<td>.95</td>
<td>.05</td>
<td>.04</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Study 1: 1-Factor</td>
<td>318.09**</td>
<td>48</td>
<td>.78</td>
<td>.69</td>
<td>.13</td>
<td>.09</td>
<td>228.68**</td>
<td>1</td>
</tr>
<tr>
<td>Study 2: 2-Factor</td>
<td>63.42</td>
<td>47</td>
<td>.96</td>
<td>.94</td>
<td>.05</td>
<td>.05</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: In study 1, we arrived at the 1-factor model by constraining the correlation between the 2 latent variables from the 2-factor model to 1. For chi-square in Study 1, $N = 328$. For chi-square in Study 2, $N = 126$. CFA = Confirmatory Factor Analysis; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root-mean square error of estimation; SRMR = Standardized root mean square residual.  
$p < .05$; ** $p < .01$. 
### Descriptive Statistics and reliability estimates for LSQ variables

<table>
<thead>
<tr>
<th>Study and Variable</th>
<th>Study 1</th>
<th></th>
<th>Study 2</th>
<th></th>
<th>Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>Min</td>
<td>Max</td>
<td>Chronbach’s α</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Integration</td>
<td>27.83 (5.23)</td>
<td>11</td>
<td>42</td>
<td>.79</td>
<td>28.28 (5.19)</td>
</tr>
<tr>
<td>Differentiation</td>
<td>27.56 (5.36)</td>
<td>11</td>
<td>42</td>
<td>.83</td>
<td>27.54 (5.00)</td>
</tr>
</tbody>
</table>

**Note:** Study 1 N = 328; Study 2 N = 126; Study 3 N = 175
Table 3. Descriptive Statistics and reliability estimates for Study 1 Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD)</th>
<th>Min</th>
<th>Max</th>
<th>Chronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>27.83 (5.23)</td>
<td>11</td>
<td>42</td>
<td>.79</td>
</tr>
<tr>
<td>Differentiation</td>
<td>27.56 (5.36)</td>
<td>11</td>
<td>42</td>
<td>.83</td>
</tr>
<tr>
<td>Self-deceptive enhancement</td>
<td>2.47 (2.56)</td>
<td>0</td>
<td>15</td>
<td>.72</td>
</tr>
<tr>
<td>Impression management</td>
<td>4.43 (3.19)</td>
<td>0</td>
<td>17</td>
<td>.75</td>
</tr>
<tr>
<td>Approach temperament</td>
<td>31.95 (5.91)</td>
<td>12</td>
<td>42</td>
<td>.85</td>
</tr>
<tr>
<td>Avoidance temperament</td>
<td>26.55 (7.59)</td>
<td>6</td>
<td>42</td>
<td>.83</td>
</tr>
<tr>
<td>Openness</td>
<td>36.91 (6.40)</td>
<td>16</td>
<td>50</td>
<td>.83</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>32.54 (6.41)</td>
<td>16</td>
<td>45</td>
<td>.85</td>
</tr>
<tr>
<td>Extraversion</td>
<td>25.23 (7.00)</td>
<td>9</td>
<td>40</td>
<td>.88</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>34.15 (5.92)</td>
<td>17</td>
<td>45</td>
<td>.81</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>24.06 (6.26)</td>
<td>8</td>
<td>37</td>
<td>.83</td>
</tr>
<tr>
<td>Life Satisfaction</td>
<td>25.23 (6.66)</td>
<td>7</td>
<td>35</td>
<td>.88</td>
</tr>
<tr>
<td>Circumplex Affect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasure</td>
<td>14.97 (3.02)</td>
<td>4</td>
<td>20</td>
<td>.87</td>
</tr>
<tr>
<td>Activated Pleasure</td>
<td>9.78 (2.26)</td>
<td>3</td>
<td>15</td>
<td>.67</td>
</tr>
<tr>
<td>Pleasant Activation</td>
<td>29.89 (5.40)</td>
<td>11</td>
<td>44</td>
<td>.83</td>
</tr>
<tr>
<td>Activation</td>
<td>8.71 (2.20)</td>
<td>3</td>
<td>15</td>
<td>.54</td>
</tr>
<tr>
<td>Unpleasant Activation</td>
<td>11.34 (9.07)</td>
<td>4</td>
<td>20</td>
<td>.72</td>
</tr>
<tr>
<td>Activated Displeasure</td>
<td>24.53 (6.08)</td>
<td>10</td>
<td>45</td>
<td>.85</td>
</tr>
<tr>
<td>Displeasure</td>
<td>10.23 (3.157)</td>
<td>4</td>
<td>19</td>
<td>.83</td>
</tr>
<tr>
<td>Deactivated Displeasure</td>
<td>13.08 (4.19)</td>
<td>5</td>
<td>25</td>
<td>.90</td>
</tr>
<tr>
<td>Unpleasant Deactivation</td>
<td>17.61 (4.06)</td>
<td>8</td>
<td>29</td>
<td>.78</td>
</tr>
<tr>
<td>Deactivation</td>
<td>6.14 (1.57)</td>
<td>2</td>
<td>10</td>
<td>.46</td>
</tr>
<tr>
<td>Pleasant Deactivation</td>
<td>15.96 (3.46)</td>
<td>6</td>
<td>25</td>
<td>.81</td>
</tr>
<tr>
<td>Deactivated Pleasure</td>
<td>16.39 (3.68)</td>
<td>8</td>
<td>25</td>
<td>.85</td>
</tr>
<tr>
<td>Action Identification</td>
<td>39.42 (5.05)</td>
<td>26</td>
<td>50</td>
<td>.82</td>
</tr>
</tbody>
</table>

Note: N = 328
Table 4.   
Study 1: Correlates of Integration and Differentiation

<table>
<thead>
<tr>
<th>Individual-differences Variable</th>
<th>Integration</th>
<th>Differentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
<td>1</td>
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<tr>
<td>Differentiation</td>
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<td>1</td>
</tr>
<tr>
<td>Self-deceptive enhancement</td>
<td>.20**</td>
<td>.28**</td>
</tr>
<tr>
<td>Impression management</td>
<td>.15**</td>
<td>.16**</td>
</tr>
<tr>
<td>Approach temperament</td>
<td>.30**</td>
<td>.26**</td>
</tr>
<tr>
<td>Avoidance temperament</td>
<td>-.03</td>
<td>.04</td>
</tr>
<tr>
<td>Openness to experience</td>
<td>.41**</td>
<td>.35**</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.09</td>
<td>.22**</td>
</tr>
<tr>
<td>Extraversion</td>
<td>.15**</td>
<td>.11*</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>.11*</td>
<td>.01</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-.17**</td>
<td>-.10'</td>
</tr>
<tr>
<td>Life Satisfaction</td>
<td>.21**</td>
<td>.09</td>
</tr>
</tbody>
</table>

** Circumplex Affect  

<table>
<thead>
<tr>
<th></th>
<th>Integration</th>
<th>Differentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasure</td>
<td>.146**</td>
<td>.05</td>
</tr>
<tr>
<td>Activated Pleasure</td>
<td>.25**</td>
<td>.31**</td>
</tr>
<tr>
<td>Pleasant Activation</td>
<td>.21**</td>
<td>.24**</td>
</tr>
<tr>
<td>Activation</td>
<td>.20**</td>
<td>.24**</td>
</tr>
<tr>
<td>Unpleasant Activation</td>
<td>-.04</td>
<td>.04</td>
</tr>
<tr>
<td>Activated Displeasure</td>
<td>-.09</td>
<td>.01</td>
</tr>
<tr>
<td>Displeasure</td>
<td>-.09</td>
<td>.001</td>
</tr>
<tr>
<td>Deactivated Displeasure</td>
<td>-.09</td>
<td>.01</td>
</tr>
<tr>
<td>Unpleasant Deactivation</td>
<td>-.08</td>
<td>.06</td>
</tr>
<tr>
<td>Deactivation</td>
<td>-.02</td>
<td>.02</td>
</tr>
<tr>
<td>Pleasant Deactivation</td>
<td>.14*</td>
<td>.09'</td>
</tr>
<tr>
<td>Deactivated Pleasure</td>
<td>.20**</td>
<td>.14**</td>
</tr>
<tr>
<td>Action Identification</td>
<td>.22**</td>
<td>.09'</td>
</tr>
</tbody>
</table>

Note: N = 328

' p < .10; * p < .05; ** p < .01
Table 5.
Prediction of individual-differences variables from integration and differentiation simultaneously in multiple regression: Standardized regression coefficients (Study 1)

<table>
<thead>
<tr>
<th>Individual-differences Variable</th>
<th>Integration</th>
<th>Differentiation</th>
<th>R^2 for model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach temperament</td>
<td>.24**</td>
<td>.16**</td>
<td>.12</td>
</tr>
<tr>
<td>Avoidance temperament</td>
<td>-.04</td>
<td>.06</td>
<td>.003</td>
</tr>
<tr>
<td>Openness to experience</td>
<td>.32**</td>
<td>.20**</td>
<td>.20</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.01</td>
<td>.22**</td>
<td>.05</td>
</tr>
<tr>
<td>Extraversion</td>
<td>.13*</td>
<td>.06</td>
<td>.03</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>.14*</td>
<td>-.05</td>
<td>.02</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-.16*</td>
<td>-.03</td>
<td>.03</td>
</tr>
<tr>
<td>Life Satisfaction</td>
<td>.21**</td>
<td>-.003</td>
<td>.04</td>
</tr>
<tr>
<td><strong>Circumplex Affect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasure</td>
<td>.17**</td>
<td>-.03</td>
<td>.03</td>
</tr>
<tr>
<td>Activated Pleasure</td>
<td>.15*</td>
<td>.25**</td>
<td>.12</td>
</tr>
<tr>
<td>Pleasant Activation</td>
<td>.14*</td>
<td>.18**</td>
<td>.08</td>
</tr>
<tr>
<td>Activation</td>
<td>.12^</td>
<td>.19**</td>
<td>.07</td>
</tr>
<tr>
<td>Unpleasant Activation</td>
<td>-.05</td>
<td>.08</td>
<td>.01</td>
</tr>
<tr>
<td>Activated Displeasure</td>
<td>-.10^</td>
<td>.06</td>
<td>.01</td>
</tr>
<tr>
<td>Displeasure</td>
<td>-.12^</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Deactivated Displeasure</td>
<td>-.10^</td>
<td>.06</td>
<td>.01</td>
</tr>
<tr>
<td>Unpleasant Deactivation</td>
<td>-.12^</td>
<td>.12^</td>
<td>.02</td>
</tr>
<tr>
<td>Deactivation</td>
<td>-.04</td>
<td>.04</td>
<td>.001</td>
</tr>
<tr>
<td>Pleasant Deactivation</td>
<td>.11^</td>
<td>.04</td>
<td>.02</td>
</tr>
<tr>
<td>Deactivated Pleasure</td>
<td>.16**</td>
<td>.07</td>
<td>.04</td>
</tr>
<tr>
<td>Action Identification</td>
<td>.22**</td>
<td>-.01</td>
<td>.05</td>
</tr>
</tbody>
</table>

*Note: N = 328
^p < .10; * p < .05; ** p < .01
Table 6. 
Prediction of individual-differences variables from integration, differentiation, IM, and SDE simultaneously in multiple regression: Standardized regression coefficients (Study 1)

<table>
<thead>
<tr>
<th>Individual-differences Variable</th>
<th>Integration</th>
<th>Differentiation</th>
<th>IM</th>
<th>SDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach temperament</td>
<td>.21**</td>
<td>.11†</td>
<td>.10†</td>
<td>.19**</td>
</tr>
<tr>
<td>Avoidance temperament</td>
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<td>.28**</td>
</tr>
<tr>
<td>Openness to experience</td>
<td>.30**</td>
<td>.16**</td>
<td>.07</td>
<td>.14*</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>-.04</td>
<td>.14*</td>
<td>.21**</td>
<td>.242**</td>
</tr>
<tr>
<td>Extraversion</td>
<td>.11†</td>
<td>.02</td>
<td>-.02</td>
<td>.18**</td>
</tr>
<tr>
<td>Agreeableness</td>
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<td>-.05</td>
<td>.37**</td>
<td>-.173**</td>
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<tr>
<td>Neuroticism</td>
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<td>.06</td>
<td>-.10†</td>
<td>-.30**</td>
</tr>
<tr>
<td>Life Satisfaction</td>
<td>.18**</td>
<td>-.05</td>
<td>.13*</td>
<td>.14*</td>
</tr>
<tr>
<td>Circumplex Affect</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Pleasure</td>
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<td>-.08</td>
<td>.21**</td>
<td>.14*</td>
</tr>
<tr>
<td>Activated Pleasure</td>
<td>.13*</td>
<td>.20*</td>
<td>.06</td>
<td>.15*</td>
</tr>
<tr>
<td>Pleasant Activation</td>
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<td>Activation</td>
<td>.12†</td>
<td>.18**</td>
<td>-.15*</td>
<td>.13*</td>
</tr>
<tr>
<td>Unpleasant Activation</td>
<td>-.01</td>
<td>.15*</td>
<td>-.07</td>
<td>-.28**</td>
</tr>
<tr>
<td>Activated Displeasure</td>
<td>-.06</td>
<td>.13*</td>
<td>-.23**</td>
<td>-.18**</td>
</tr>
<tr>
<td>Displeasure</td>
<td>-.08</td>
<td>.10†</td>
<td>-.21**</td>
<td>-.11†</td>
</tr>
<tr>
<td>Deactivated Displeasure</td>
<td>-.07</td>
<td>.11†</td>
<td>-.25**</td>
<td>-.11†</td>
</tr>
<tr>
<td>Unpleasant Deactivation</td>
<td>-.07</td>
<td>.19**</td>
<td>-.26**</td>
<td>-.18**</td>
</tr>
<tr>
<td>Deactivation</td>
<td>-.02</td>
<td>.06</td>
<td>-.02</td>
<td>-.07</td>
</tr>
<tr>
<td>Pleasant Deactivation</td>
<td>.09</td>
<td>.02</td>
<td>.05</td>
<td>.07</td>
</tr>
<tr>
<td>Deactivated Pleasure</td>
<td>.13*</td>
<td>.03</td>
<td>.14*</td>
<td>.13*</td>
</tr>
<tr>
<td>Action Identification</td>
<td>.21**</td>
<td>-.03</td>
<td>.09</td>
<td>.07</td>
</tr>
</tbody>
</table>

Note: N = 328
† p < .10; * p < .05; ** p < .01
Table 7.
Descriptive Statistics and reliability estimates for Study 2 Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M \ (SD)$</th>
<th>Min</th>
<th>Max</th>
<th>Chronbach’s $\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
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<td>42</td>
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</tr>
<tr>
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<td>27.54 (5.00)</td>
<td>11</td>
<td>42</td>
<td>.77</td>
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<tr>
<td>Approach temperament</td>
<td>31.17 (5.41)</td>
<td>18</td>
<td>42</td>
<td>.81</td>
</tr>
<tr>
<td>Avoidance temperament</td>
<td>26.17 (7.97)</td>
<td>7</td>
<td>42</td>
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</tr>
<tr>
<td>Openness</td>
<td>39.66 (6.39)</td>
<td>20</td>
<td>50</td>
<td>.81</td>
</tr>
<tr>
<td>Intellect</td>
<td>36.77 (6.37)</td>
<td>19</td>
<td>50</td>
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<td>Rational processing</td>
<td>72.47 (11.82)</td>
<td>43</td>
<td>98</td>
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<tr>
<td>Experiential processing</td>
<td>67.85 (9.50)</td>
<td>42</td>
<td>96</td>
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</tr>
<tr>
<td>Need for precision</td>
<td>56.81 (10.47)</td>
<td>25</td>
<td>81</td>
<td>.83</td>
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<tr>
<td>Absorption</td>
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<td>34</td>
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<tr>
<td>Reflection</td>
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<td>60</td>
<td>.92</td>
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<tr>
<td>Rumination</td>
<td>45.36 (8.65)</td>
<td>19</td>
<td>60</td>
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<tr>
<td>Inspiration</td>
<td>37.59 (8.13)</td>
<td>12</td>
<td>56</td>
<td>.91</td>
</tr>
<tr>
<td>Self-control</td>
<td>37.63 (9.54)</td>
<td>20</td>
<td>64</td>
<td>.88</td>
</tr>
<tr>
<td>Interpersonal Circumplex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assured-dominant</td>
<td>22.84 (5.40)</td>
<td>9</td>
<td>39</td>
<td>.81</td>
</tr>
<tr>
<td>Gregarious-extraverted</td>
<td>26.40 (5.76)</td>
<td>10</td>
<td>40</td>
<td>.86</td>
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<tr>
<td>Warm-agreeable</td>
<td>28.58 (5.43)</td>
<td>15</td>
<td>40</td>
<td>.88</td>
</tr>
<tr>
<td>Unassuming-ingenuous</td>
<td>18.02 (4.72)</td>
<td>8</td>
<td>31</td>
<td>.72</td>
</tr>
<tr>
<td>Unassured-submissive</td>
<td>17.87 (5.62)</td>
<td>8</td>
<td>35</td>
<td>.85</td>
</tr>
<tr>
<td>Arrogant-Calculating</td>
<td>20.43 (5.33)</td>
<td>10</td>
<td>34</td>
<td>.78</td>
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<tr>
<td>Cold-hearted</td>
<td>13.21 (4.54)</td>
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<td>28</td>
<td>.82</td>
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<tr>
<td>Aloof-introverted</td>
<td>15.79 (5.31)</td>
<td>8</td>
<td>31</td>
<td>.85</td>
</tr>
</tbody>
</table>

Note: $N = 126$

$p < .10; * p < .05; ** p < .01$
Table 8.  
**Study 2: Correlates of Integration and Differentiation**

<table>
<thead>
<tr>
<th>Individual-differences Variable</th>
<th>Integration</th>
<th>Differentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration</td>
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</tr>
<tr>
<td>Differentiation</td>
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<td>1</td>
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<tr>
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<td>.30**</td>
</tr>
<tr>
<td>Avoidance temperament</td>
<td>.09</td>
<td>.12</td>
</tr>
<tr>
<td>Openness</td>
<td>.35**</td>
<td>.25**</td>
</tr>
<tr>
<td>Intellect</td>
<td>.28**</td>
<td>.33**</td>
</tr>
<tr>
<td>Rational processing</td>
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<td>.34**</td>
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<tr>
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<td>.14</td>
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<tr>
<td>Need for precision</td>
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<td>.43**</td>
</tr>
<tr>
<td>Absorption</td>
<td>.39**</td>
<td>.31**</td>
</tr>
<tr>
<td>Reflection</td>
<td>.37**</td>
<td>.20**</td>
</tr>
<tr>
<td>Rumination</td>
<td>.14</td>
<td>.25**</td>
</tr>
<tr>
<td>Inspiration</td>
<td>.37**</td>
<td>.31**</td>
</tr>
<tr>
<td>Self-control</td>
<td>.04</td>
<td>.07</td>
</tr>
<tr>
<td>Interpersonal Circumplex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assured-dominant</td>
<td>.19*</td>
<td>.21*</td>
</tr>
<tr>
<td>Gregarious-extraverted</td>
<td>.27**</td>
<td>.27**</td>
</tr>
<tr>
<td>Warm-agreeable</td>
<td>.32**</td>
<td>.30**</td>
</tr>
<tr>
<td>Unassuming-ingenuous</td>
<td>-.01</td>
<td>-.19*</td>
</tr>
<tr>
<td>Unassured-submissive</td>
<td>.02</td>
<td>-.11</td>
</tr>
<tr>
<td>Arrogant-Calculating</td>
<td>.06</td>
<td>.23**</td>
</tr>
<tr>
<td>Cold-hearted</td>
<td>-.03</td>
<td>-.04</td>
</tr>
<tr>
<td>Aloof-introverted</td>
<td>-.15*</td>
<td>-.12</td>
</tr>
</tbody>
</table>

*Note: N = 126

\(^*\ p < .10; \ ^*\ p < .05; \ ^{**}\ p < .01\)
Table 9. Prediction of individual-differences variables from integration and differentiation simultaneously in multiple regression: Standardized regression coefficients (Study 2)

<table>
<thead>
<tr>
<th>Individual-differences</th>
<th>Integration</th>
<th>Differentiation</th>
<th>R² for model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach temperament</td>
<td>.20*</td>
<td>.21*</td>
<td>.12</td>
</tr>
<tr>
<td>Avoidance temperament</td>
<td>.04</td>
<td>.10</td>
<td>.02</td>
</tr>
<tr>
<td>Openness</td>
<td>.29**</td>
<td>.12</td>
<td>.13</td>
</tr>
<tr>
<td>Intellect</td>
<td>.16*</td>
<td>.26**</td>
<td>.13</td>
</tr>
<tr>
<td>Rational processing</td>
<td>.22*</td>
<td>.24*</td>
<td>.15</td>
</tr>
<tr>
<td>Experiential processing</td>
<td>.05</td>
<td>.12</td>
<td>.02</td>
</tr>
<tr>
<td>Need for precision</td>
<td>-.19*</td>
<td>.52**</td>
<td>.22</td>
</tr>
<tr>
<td>Absorption</td>
<td>.32**</td>
<td>.17*</td>
<td>.18</td>
</tr>
<tr>
<td>Reflection</td>
<td>.35**</td>
<td>.04</td>
<td>.14</td>
</tr>
<tr>
<td>Rumination</td>
<td>.04</td>
<td>.23*</td>
<td>.06</td>
</tr>
<tr>
<td>Inspiration</td>
<td>.28**</td>
<td>.18*</td>
<td>.16</td>
</tr>
<tr>
<td>Self-control</td>
<td>.01</td>
<td>.07</td>
<td>.005</td>
</tr>
<tr>
<td>Interpersonal Circumplex</td>
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<td></td>
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<tr>
<td>Assured-dominant</td>
<td>.12</td>
<td>.16</td>
<td>.06</td>
</tr>
<tr>
<td>Gregarious-extraverted</td>
<td>.19*</td>
<td>.18*</td>
<td>.10</td>
</tr>
<tr>
<td>Warm-agreeable</td>
<td>.24*</td>
<td>.19*</td>
<td>.13</td>
</tr>
<tr>
<td>Unassuming-ingenuous</td>
<td>.09</td>
<td>-.23*</td>
<td>.04</td>
</tr>
<tr>
<td>Unassured-submissive</td>
<td>.09</td>
<td>-.15</td>
<td>.02</td>
</tr>
<tr>
<td>Arrogant-Calculating</td>
<td>-.06</td>
<td>.26**</td>
<td>.06</td>
</tr>
<tr>
<td>Cold-hearted</td>
<td>-.01</td>
<td>-.04</td>
<td>.002</td>
</tr>
<tr>
<td>Aloof-introverted</td>
<td>-.12</td>
<td>-.07</td>
<td>.03</td>
</tr>
</tbody>
</table>

Note: N = 126

*p < .10; *p < .05; **p < .01
Table 10.  
*Correlations among key study variables (Study 3)*

<table>
<thead>
<tr>
<th></th>
<th>1. Integration</th>
<th>2. Differentiation</th>
<th>3. Average Normalized Height</th>
</tr>
</thead>
<tbody>
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<td>.214**</td>
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<tr>
<td>2. Differentiation</td>
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<td>-.17*</td>
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</tr>
<tr>
<td>3. Average Normalized Height</td>
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<td></td>
</tr>
</tbody>
</table>

Notes: N = 175

* †p < .10; *p < .05; **p < .01
Table 11.
Prediction of Average Normalized Height from Integration and Differentiation (Study 3)

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>p</th>
<th>β</th>
<th>F</th>
<th>df</th>
<th>p</th>
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<td>.000</td>
<td>.27</td>
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</tr>
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</table>

Notes: dependent variable = average of normalized height from 12 rounds of object sorting; N = 175
Figure 1. *Proposed model in which integration and differentiation are distinct dimensions of personality.*
Figure 2. CFA of 2-factor model from Study 1. Fit indices can be found in Table 1. Parameters are presented in standardized form.