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Between Facets and Domains: 10 Aspects of the Big Five

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Factor analyses of 75 facet scales from 2 major Big Five inventories, in the Eugene-Springfield community sample ($N = 481$), produced a 2-factor solution for the 15 facets in each domain. These findings indicate the existence of 2 distinct (but correlated) aspects within each of the Big Five, representing an intermediate level of personality structure between facets and domains. The authors characterized these factors in detail at the item level by correlating factor scores with the International Personality Item Pool (L. R. Goldberg, 1999). These correlations allowed the construction of a 100-item measure of the 10 factors (the Big Five Aspect Scales [BFAS]), which was validated in a 2nd sample ($N = 480$). Finally, the authors examined the correlations of the 10 factors with scores derived from 10 genetic factors that a previous study identified underlying the shared variance among the Revised NEO Personality Inventory facets (K. L. Jang et al., 2002). The correspondence was strong enough to suggest that the 10 aspects of the Big Five may have distinct biological substrates.

Keywords: personality, Big Five, five factor model, aspects, facets

Personality trait dimensions can be categorized by arranging them into hierarchies, based on their intercorrelations. Broad domains (e.g., Extraversion), each encompassing many related traits, are located near the top of the hierarchy, and very specific patterns of behavior and experience (e.g., talking a lot) are located near the bottom. The arrangement of these hierarchies has been a central preoccupation of personality psychologists for the better part of a century. Considerable progress has been made, leading to a reasonable degree of consensus regarding the makeup of an adequate categorization scheme. The five-factor model, or Big Five, which originated from studies of trait-descriptive adjectives drawn from the lexicon, is the most widely used classification system for personality traits, identifying five broad domains of personality: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness/Intellect (Costa & McCrae, 1992a; Digman, 1990; Goldberg, 1993; John & Srivastava, 1999). Like any dominant paradigm, the Big Five model has drawn its fair share of criticisms and proposals for alternatives (e.g., Ashton et al., 2004; Saucier, 2003; Waller, 1999; Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993). Nonetheless, the Big Five has proved extremely useful in providing a common language for researchers and organizing personality research.

Much research on the Big Five has focused on a two-level hierarchy, with the five domains at the top subsuming narrower traits called "facets" at a second level. This approach is exemplified by the widely used Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992b), which breaks each of the five domains down into six facets.[1] More than two levels can be identified, however. Since the discovery by Digman (1997) that the regular pattern of correlations among the Big Five has a higher order factor solution, there has been increasing discussion of levels of the hierarchy above the Big Five domains (DeYoung, 2006; DeYoung, Peterson, & Higgins, 2002; Jang et al., 2006; Markon, Krueger, & Watson, 2005; Saucier, 2003). Two constructs, labeled *Alpha* and *Beta* (Digman, 1997), or *Stability* and *Plasticity* (DeYoung, 2006; DeYoung et al., 2002), appear to constitute the highest level of personality organization in the hierarchy built around the Big Five and have been described as "metatraits." Less attention has been paid to a level of trait organization located between facets and domains. Reasons exist, however, to suspect that this level might be both interesting and important.

A behavior genetic study in large Canadian and German samples found that two genetic factors are responsible for the shared variance of the six facet scales that make up each of the Big Five in the NEO-PI-R (Jang, Livesley, Angleitner, Riemann, & Vernon,

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[1] One might well argue that this approach includes three levels, as the items that make up each facet scale typically describe multiple distinguishable patterns of behavior and experience (Digman, 1990). Most research linking personality ratings to other phenomena does not investigate individual items, however, for psychometric reasons.

2002). Each of the Big Five domains, therefore, appears potentially divisible into two subdomains with distinct biological sources. This finding would, by itself, be sufficient to motivate investigation into an intermediate level of personality structure. Additional sources of motivation can be found in the personality literature, where the possibility that one or more of the Big Five might subsume two separable subdomains has been raised in a variety of contexts.

Depue and Collins (1999) reviewed the literature on Extraversion, for example, and noted a primary division within the domain, between *agency* ("social dominance and the enjoyment of leadership roles, assertiveness, exhibitionism, and a subjective sense of potency in accomplishing goals," p. 492) and *sociability*. (They note a third traditional conception of Extraversion as *impulsivity* but argue that impulsivity is in fact a compound trait combining Extraversion with low Conscientiousness or Constraint.) Some empirical support for such a division can be found in factor analyses of the NEO Personality Inventory (NEO-PI; McCrae & Costa, 1985, which predated the NEO-PI-R and did not include facet scales for Agreeableness and Conscientiousness). These analyses demonstrated that the Assertiveness and Activity facets of Extraversion split off in a separate factor from the other four Extraversion facets (Church, 1994; Church & Burke, 1994). At least one widely used instrument loosely based on the Big Five, the Hogan Personality Inventory, reflects this division, dividing the assessment of Extraversion between "Ambition" and "Sociability" scales (Hogan & Hogan, 1992).

Costa, McCrae, and Dye (1991) described Conscientiousness "as having both proactive and inhibitive aspects" (p. 887), the proactive aspect including such traits as "need for achievement and commitment to work," and the inhibitive aspect including such traits as "moral scrupulousness and cautiousness." Empirical support for a similar division is offered by a study that performed factor analysis of scales from seven major personality inventories, including only scales identified by their authors as conceptually related to Conscientiousness (Roberts, Chernyshenko, Stark, & Goldberg, 2005). Two of these instruments, the NEO-PI-R and the Abridged Big Five Circumplex scales from the International Personality Item Pool (AB5C-IPIP; Goldberg, 1999) were specifically designed to assess facets of the Big Five. Although Roberts et al. found six factors in total, all but two of the NEO and AB5C facets were subsumed within two factors, labeled *Industriousness* and *Order*, suggesting that, at least as defined in Big Five space, Conscientiousness has two primary subdomains. This finding is similar to that of Jackson, Paunonen, Fraboni, and Goffin (1996), who found that a factor solution splitting Conscientiousness into Achievement and Methodicalness was better than the standard Big Five solution in their instrument, the Personality Research Form.

In relation to Agreeableness, Ashton and Lee (2005) have recently noted that two facets of Agreeableness in the NEO-PI-R, Straightforwardness and Modesty, have relatively weak loadings on Agreeableness. They demonstrated that these two facets were good markers of a factor labeled *Honesty-Humility*, in their six-factor model presented as an alternative to the Big Five. This finding suggests the possibility that, within the Big Five, Agreeableness might be separable into two subdomains. Perhaps, rather than adding a sixth domain, as Ashton and Lee (2005; Ashton et al., 2004) suggest, one could instead discriminate between two aspects of Agreeableness at a level of personality organization between facets and domains.

Some of the most intense debate on the Big Five has centered on how best to characterize the fifth factor, commonly labeled either *Openness to Experience* or *Intellect*. The compound label *Openness/Intellect* has become increasingly popular precisely because both labels apparently identify distinct but equally important aspects of the domain (DeYoung, Peterson, & Higgins, 2005; Johnson, 1994; Saucier, 1992). Johnson (1994) noted that two of the purest representations of the Openness/Intellect domain, from a factoring standpoint, are the Ideas and Aesthetics facets of the NEO-PI-R. These were characterized elegantly by Johnson as representing interests in truth and beauty, respectively, which may begin to capture the conceptual distinction between Intellect and Openness.

Less attention has been paid to the presence of different subdomains within Neuroticism. In reviewing lexical studies of personality structure, however, Saucier and Goldberg (2001) identified anxiety/fearfulness and irritability as distinct trait clusters and indicated that irritability does not always fall unambiguously within the Neuroticism factor, though it is included within Neuroticism in the NEO-PI-R's Angry-Hostility facet.

Jang et al.'s (2002) finding that two genetic factors underlie the shared variance of the facets in each of the Big Five suggests that the trend toward identifying exactly two subfactors within each of the Big Five may represent more than mere coincidence or desire for parsimony. The purpose of the present study was to extend the investigation of this level of organization within the Big Five by addressing some of the limitations of Jang et al.'s study. Most important is the necessity of analyzing a reasonably comprehensive selection of facets within each of the Big Five domains. Jang et al. examined the covariance of the six facets within each domain of the NEO-PI-R, but the facet structure of the NEO-PI-R was derived theoretically, based on a review of the literature (Costa & McCrae, 1992b), and nothing guarantees that its facets sample the space within each domain thoroughly. In addition to the NEO-PI-R, therefore, we used another instrument in the present study, the AB5C-IPIP (Goldberg, 1999), whose facet level structure was devised by an algorithm that provided more thorough coverage of the universe of personality descriptors.

The AB5C-IPIP facets were derived from the AB5C lexical model developed by Hofstee, de Raad, and Goldberg (1992). The AB5C model takes advantage of the fact that almost all trait-descriptive adjectives can be represented as a blend of two Big Five dimensions. Each of the 10 possible pairs of Big Five dimensions can therefore be used to define a circumplex, or circular arrangement of traits, with Big Five axes at 0° and 90°. Facets were defined by dividing each of these 10 circumplexes with six axes, located at 15°, 45°, 75°, etc., thus defining 12 sections of 30° each. Adjectives falling within each section or its polar opposite represent a facet. There are two "factor-pure" facets in each circumplex, spanning the *x*- and *y*-axes, plus four facets that represent a positive primary loading on one of the Big Five and a positive or negative secondary loading on the other. Across all 10 circumplexes, 9 facets are thus defined for each of the Big Five domains—1 factor-pure and 8 with secondary loadings. Each of the AB5C-IPIP facets targeted the content of the adjectives in one of the AB5C lexical facets, using short descriptive phrases, which are more consistently interpreted than single adjectives (Goldberg,

1999). The AB5C-IPIP provides the most thorough facet-level coverage of the Big Five of any instrument presently available.

Study 1 reports the factor analysis of facets within each Big Five domain. Study 2 uses the IPIP to characterize the resulting factors at the item level and to provide an instrument for assessing them. Study 3 examines how similar these phenotypic factors are to the genetic factors reported by Jang et al. (2002).

Study 1

We investigated the number of factors present within the facets of two major Big Five personality questionnaires, which provided a total of 15 facets for each domain. The NEO-PI-R was used because it is the most widely used measure of the Big Five and it facilitated comparisons with Jang et al.'s (2002) genetic findings. The AB5C-IPIP was used to achieve more thorough coverage of facet-level traits than would be provided by the NEO-PI-R alone. Our hypothesis was that the most likely result for each domain was a two-factor solution.

Method

Participants. Participants were 481 members of the Eugene-Springfield community sample (ESCS; 200 men and 281 women), ranging in age from 20 to 85 years ($M = 52.51$, $SD = 12.63$), who completed both the NEO-PI-R and AB5C-IPIP. They were recruited by mail from lists of homeowners and agreed to complete questionnaires, delivered by mail, for pay, over a period of many years, beginning in 1994. The sample spanned all levels of educational attainment, with an average of 2 years of postsecondary schooling. Most participants identified as White (97%), and 1% or less (for each category) identified as Hispanic, Asian American, Native American, or did not report their ethnicity.

Measures. The NEO-PI-R (Costa & McCrae, 1992b) contains 240 5-point Likert scale items and breaks each of the Big Five down into six facets, each assessed by eight items. Costa and McCrae (1992b) list internal reliabilities for the facet scales ranging from .62 to .82. Similar reliabilities were obtained in the present sample. The NEO-PI-R was administered to the ESCS in the summer of 1994.

The AB5C-IPIP (Goldberg, 1999) contains 485 5-point Likert scale items and breaks each of the Big Five down into nine facets, each assessed by 9–13 items. The 45 AB5C-IPIP facet scales were created on the basis of the content of the lexical AB5C facets, using the IPIP, which was administered to the ESCS between 1994 and 1996. Internal reliabilities range from .67 to .90.[2]

Analysis. Factor analyses were performed using principal-axis factoring (also known as common factor analysis), with direct oblimin rotation ($\Delta = 0$) to allow correlated factors. For the factor analyses within each domain, the number of factors to extract was determined using Velicer's minimum average partial (MAP) test (O'Connor, 2000). In the MAP test, a complete principal components analysis is performed, after which the first principal component is partialed out of the correlations among the variables, and the average squared partial correlation is noted. This procedure is repeated using the first two principal components, then the first three, and so on. The number of factors to extract is the number of components that resulted in the minimum average squared partial correlation. This is the number of factors that are related to systematic variance in the original correlation matrix.

The MAP test's ability to identify only those factors that are related to systematic variance in the matrix is particularly useful in the present context because of the likelihood of redundancy among facets across the two inventories. Two facet scales measuring the same construct and thus having very similar content might be correlated strongly enough to split off and form their own factor. Such a factor would simply reiterate the existence of that specific facet and would be uninformative for the purpose of investigating a level of organization between facets and domains. The MAP test would be unlikely to identify such a small factor.

Results

Before factoring the 15 facets within each domain separately, we examined the factor structure of all 75 facets together to make sure they conformed to the Big Five structure, as expected.[3] The first 10 eigenvalues were 15.19, 10.47, 8.57, 6.23, 5.02, 1.74, 1.54, 1.42, 1.34, 1.24. After extracting and rotating five factors, all facets had their highest loading on the expected factor, except for Trust and Assertiveness from the NEO-PI-R and Reflection from the AB5C-IPIP, and these three had strong secondary loadings on the expected factor. (Trust loaded at −.52 on Neuroticism and at .43 on Agreeableness; Assertiveness loaded at .56 on Conscientiousness and at .50 on Extraversion; Reflection loaded at .51 on Agreeableness and at .50 on Openness/Intellect.) Thus, there appears to be no reason to exclude any facets from the analysis of individual Big Five domains.

For the 15 facets within each Big Five domain, mere examination of the eigenvalues (see Table 1) might suggest only one large factor. Nonetheless, the MAP test indicated two factors in each domain (see Table 2), with one exception, Extraversion, for which three factors were indicated. However, when Excitement Seeking was excluded from the MAP test for Extraversion, only two factors were indicated (see Table 2). A factor created by the presence of a single-facet scale seems unlikely to be sufficiently broad to represent a meaningful factor at the level between facets and domains. Furthermore, Excitement Seeking is the best marker of impulsivity within Extraversion (Whiteside & Lynam, 2001), and impulsivity is likely to be relatively peripheral to Extraversion (Depue & Collins, 1999). We therefore extracted two factors from each of the Big Five domains. We retained Excitement Seeking in the analysis of Extraversion facets in order to examine its loadings in the two-factor solution. (Excluding it did not noticeably change the solution or scores for this factor, which were correlated at .999, with the factor scores from the analysis reported here.)

Table 3 shows the factor loadings and correlations within each domain and provides labels that attempt to capture the essence of each factor. An additional column at the left in Table 3 contains codes for secondary loadings on the basis of the AB5C lexical model (Goldberg, 1999; Hofstee et al., 1992; Johnson, 1994). Note that these secondary loadings were not derived from the present factor analyses, but from calculations of the AB5C model in other samples. These codes are discussed below.

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[2] The AB5C-IPIP is publicly available at http://ipip.ori.org/

[3] Descriptive statistics, the correlation matrix for all 75 facets, and the factor loadings for the five-factor solution are available from Colin G. DeYoung upon request.

Table 1
Eigenvalues for Factor Analysis of 15 Facets in Each Big Five Domain

Factor	N	A	C	E	O
1	7.70	6.65	7.57	6.59	6.57
2	1.44	1.81	1.27	1.84	1.97
3	1.10	1.20	1.20	1.44	1.15
4	0.87	1.01	0.83	1.09	0.96
5	0.80	0.61	0.71	0.91	0.68
6	0.55	0.57	0.65	0.64	0.62
7	0.44	0.54	0.53	0.42	0.59
8	0.39	0.46	0.48	0.39	0.51
9	0.35	0.43	0.38	0.35	0.40
10	0.31	0.43	0.33	0.28	0.36
11	0.28	0.35	0.26	0.27	0.32
12	0.25	0.30	0.24	0.23	0.25
13	0.20	0.24	0.20	0.20	0.23
14	0.18	0.20	0.19	0.17	0.22
15	0.17	0.20	0.15	0.16	0.18

Note. $N = 481$. Principal-axis factoring. N = Neuroticism; A = Agreeableness; C = Conscientiousness; E = Extraversion; O = Openness/Intellect.

Discussion

Each of the Big Five was found to contain two distinct, though correlated, factors underlying the variance shared among 15 facet scales. Before attempting to interpret the content of these factors, we asked ourselves whether the presence of exactly two factors in all five domains might simply be an artifact stemming from the manner in which the facets of the AB5C-IPIP were constructed. Remember that 40 of the 45 AB5C facets are defined by a positive loading on their primary domain and either a positive or negative secondary loading on one other domain (the other five facets are defined by descriptors loading exclusively on their primary domain and are thus factor-pure). All of the positive poles of the Big Five are socially desirable, whereas all of the negative poles are socially undesirable (Neuroticism is reversed in the AB5C and labeled *Emotional Stability*), which might lead to two-factor solutions in which traits with desirable and undesirable secondary loadings clustered separately.

In other words, our findings could be nothing but a social desirability artifact. In order to evaluate this possibility, we examined the division of positive and negative secondary loadings (noted in Table 3) among the two factors for each domain. Johnson (1994) calculated the AB5C primary and secondary loadings for the NEO-PI-R facets, so we were able to assign all 75 facets' secondary loadings on the basis of the AB5C model. (Note that the codes for NEO Neuroticism facets are reversed in sign in order to maintain the association between positive secondary loadings and social desirability across all scales.)

What is immediately clear is that the facets do not consistently split according to the social desirability of their secondary loadings. All but 2 of the 10 factors are marked by facets with both positive and negative secondary loadings. Of interest as well is that, within Agreeableness, Neuroticism, and Openness/Intellect, factor-pure facets serve as markers of both factors. These findings bolster our supposition that factors within the facets of each Big Five domain are likely to represent substantive and meaningful distinctions in content rather than mere artifacts. (Of course, Jang et al.'s, 2002, finding of two genetic factors within each of the Big Five offers additional support for this position, as genes cannot be affected by social desirability.)

Each of the Big Five can thus be said to have two aspects, representing related but separable trait dimensions. How should these dimensions be interpreted and labeled? The task is most straightforward for Openness/Intellect. The long-running debate over the interpretation of this domain has left us with obvious choices to represent factors marked by facets like Quickness, Ingenuity, and Ideas, on the one hand, and Aesthetics, Imagination, and Fantasy on the other: *Intellect* and *Openness*. As other researchers have noted, it appears that the two sides of this debate were simply focusing on different aspects of the larger domain (DeYoung et al., 2005; Johnson, 1994; Saucier, 1992). The factors that emerged here do not merely reflect the agendas of the authors of our two instruments, who happen to fall on opposite sides of the Openness/Intellect debate, because two AB5C-IPIP facets are good markers of Openness and one NEO-PI-R facet is a good marker of Intellect.

The two aspects of Extraversion are consistent with distinctions drawn in the literature between agency or dominance and sociability. We suggest *Assertiveness* and *Enthusiasm* as labels for these two aspects of Extraversion. While Assertiveness should be relatively uncontroversial as a compromise between the more general and abstract idea of agency and the more socially specific idea of dominance, Enthusiasm probably needs more thorough justification. *Sociability* is problematic as a descriptor of this aspect of Extraversion because it focuses exclusively on the manner in which this trait is manifested socially, ignoring the crucial affective component. Along with Gregariousness and Friendliness, the Positive Emotions facet is a strong marker of this factor, and conceptions of Extraversion often focus on the tendency to experience positive emotions associated with anticipation or enjoyment of reward (Depue & Collins, 1999; Lucas, Diener, Grob, Suh, &

Table 2
MAP Test for Facets in Each Big Five Domain

Component	N	A	C	E	O
0	.238	.175	.229	.177 (.196)	.173
1	.041	.044	.035	.056 (.062)	.051
2	**.031**	**.028**	**.034**	.048 **(.049)**	**.027**
3	.040	.031	.039	**.0448** (.052)	.032
4	.048	.035	.043	.0451 (.051)	.039
5	.052	.046	.049	.050 (.060)	.050
6	.064	.060	.058	.065 (.074)	.059
7	.081	.082	.081	.086 (.090)	.091
8	.100	.108	.113	.100 (.119)	.116
9	.135	.148	.134	.128 (.158)	.137
10	.188	.179	.171	.168 (.210)	.181
11	.262	.226	.226	.218 (.291)	.217
12	.393	.318	.305	.294 (.466)	.316
13	.574	.502	.526	.465 (1.000)	.488
14	1.000	1.000	1.000	1.000	1.000

Note. Numbers in parentheses are based on calculations excluding NEO Excitement Seeking. The lowest average square partial correlation for each domain is in bold. N = Neuroticism; A = Agreeableness; C = Conscientiousness; E = Extraversion; O = Openness/Intellect.

Table 3
Two-Factor Solutions for Each Big Five Domain

Secondary loading code	Facet and instrument	Neuroticism		Secondary loading code	Facet and instrument	Extraversion	
		Volatility	Withdrawal			Enthusiasm	Assertiveness
P	Stability (AB5C)	−.86	−.69	II+	Friendliness (AB5C)	.88	.48
II+	Calmness (AB5C)	−.81	−.53	II+	Warmth (NEO)	.79	.35
II+	Angry hostility (NEO)	.76	.54	P	Gregariousness (AB5C)	.77	.71
V−	Tranquility (AB5C)	−.75	−.52	IV+	Poise (AB5C)	.71	.57
I−	Impulse control (AB5C)	−.70	−.32	IV+	Gregariousness (NEO)	.71	.32
III+	Moderation (AB5C)	−.70	−.63	P	Positive emotions (NEO)	.67	.43
I−	Impulsiveness (NEO)	.59	.43	III−	Self-disclosure (AB5C)	.60	.48
II−	Imperturbability (AB5C)	−.54	−.45	V−	Sociability (AB5C)	.48	.21
III−	Cool-headedness (AB5C)	−.30	−.27	V+	Leadership (AB5C)	.56	.85
I+	Happiness (AB5C)	−.64	−.88	III+	Assertiveness (AB5C)	.42	.83
III+	Depression (NEO)	.57	.85	III+	Assertiveness (NEO)	.40	.72
III+	Vulnerability (NEO)	.59	.78	II−	Provocativeness (AB5C)	.25	.71
P	Anxiety (NEO)	.57	.78	III+	Activity (NEO)	.38	.59
V+	Toughness (AB5C)	−.66	−.77	IV−	Talkativeness (AB5C)	.39	.58
P	Self-consciousness (NEO)	.41	.76	II−	Excitement seeking (NEO)	.27	.27
	Factor correlation	.64			Factor correlation	.53	

		Agreeableness				Openness/Intellect	
		Compassion	Politeness			Intellect	Openness
I+	Warmth (AB5C)	.87	.45	IV+	Quickness (AB5C)	.86	.38
III−	Sympathy (AB5C)	.86	.46	II−	Creativity (AB5C)	.85	.48
P	Understanding (AB5C)	.83	.52	P	Intellect (AB5C)	.81	.57
V+	Empathy (AB5C)	.69	.36	P	Ideas (NEO)	.76	.57
I+	Altruism (NEO)	.65	.64	I+	Ingenuity (AB5C)	.73	.45
IV−	Tenderness (AB5C)	.65	.28	III+	Competence (AB5C)	.71	.20
I+	Tender-mindedness (NEO)	.50	.42	IV−	Depth (AB5C)	.55	.52
IV+	Trust (NEO)	.42	.42	I−	Introspection (AB5C)	.41	.31
V−	Nurturance (AB5C)	.63	.80	P	Aesthetics (NEO)	.33	.87
I−	Cooperation (AB5C)	.37	.74	III−	Imagination (AB5C)	.50	.85
IV+	Pleasantness (AB5C)	.60	.72	II+	Reflection (AB5C)	.27	.73
P	Compliance (NEO)	.35	.71	III−	Fantasy (NEO)	.45	.64
III+	Morality (AB5C)	.40	.67	I+	Feelings (NEO)	.34	.58
III+	Straightforwardness (NEO)	.30	.67	I+	Actions (NEO)	.36	.54
IV−	Modesty (NEO)	.22	.44	III−	Values (NEO)	.32	.44
	Factor correlation	.54			Factor correlation	.51	

		Conscientiousness	
		Industriousness	Orderliness
IV+	Purposefulness (AB5C)	.86	.57
I+	Efficiency (AB5C)	.84	.61
IV+	Self-discipline (NEO)	.83	.55
IV+	Competence (NEO)	.75	.34
V+	Organization (AB5C)	.74	.54
I+	Achievement striving (NEO)	.65	.42
II+	Dutifulness (NEO)	.63	.50
I−	Deliberation (NEO)	.55	.43
II+	Dutifulness (AB5C)	.52	.49
V−	Orderliness (AB5C)	.54	.87
P	Conscientiousness (AB5C)	.78	.79
V−	Order (NEO)	.61	.79
IV−	Perfectionism (AB5C)	.42	.67
II−	Rationality (AB5C)	.60	.60
I−	Cautiousness (AB5C)	.44	.46
	Factor correlation	.64	

Note. $N = 481$. Principal-axis factoring with direct oblimin rotation. AB5C = Abridged Big Five Circumplex Scales from the International Personality Item Pool; I = Extraversion; II = Agreeableness; III = Conscientiousness; IV = Emotional Stability; V = Openness/Intellect; P = factor-pure; see text for discussion of these codes.

Shao, 2000; Watson & Clark, 1997). Social interaction is often rewarding, which appears to provide the motivation for the sociability associated with Extraversion (Lucas & Diener, 2001). Enthusiasm is a good label for this factor because it is broad enough to describe both positive emotion and outgoing friendliness or sociability. John (1990) demonstrated that *enthusiastic* is an excellent descriptor of prototypical Extraversion.

Our two Conscientiousness factors are nearly identical to factors found in the same sample by Roberts et al. (2005), in their analysis of scales conceptually related to Conscientiousness from seven different instruments.[4] We have therefore elected to use labels very similar to theirs, *Industriousness* and *Orderliness.* Orderliness seems preferable to their term "Order" because the former describes a tendency of the individual, whereas the latter describes an outcome of behavior or some other ordering process.

The two aspects of Agreeableness appear to distinguish between compassionate emotional affiliation with others (e.g., Warmth, Sympathy, Tenderness) and a more reasoned (or at least cognitively influenced) consideration of and respect for others' needs and desires (e.g., Cooperation, Compliance, Straightforwardness). We therefore suggest *Compassion* and *Politeness* as labels for these factors. Politeness appears similar to Ashton and Lee's (2005; Ashton et al., 2004) Honesty-Humility factor, as both are marked by the NEO-PI-R facets Straightforwardness and Modesty. Given that AB5C-IPIP facets like Morality and Compliance also mark this factor, Ashton and Lee's (2005) assertion that the NEO-PI-R is unlike other Big Five measures, in containing content that could be included in their Honesty-Humility factor, may be unfounded.

The two factors within Neuroticism, which we labeled *Volatility* and *Withdrawal*, are consistent not only with the lexical division noted by Saucier and Goldberg (2001) between irritability and anxiety/fearfulness but also with a tradition that distinguishes between externalizing and internalizing problems (Achenbach & Edelbrock, 1978, 1984; Krueger, 1999). Facets like Stability (reversed), Angry Hostility, and Impulsiveness imply problems of disinhibition, leading to the outward expression of negative affect, whereas facets like Depression, Vulnerability, and Anxiety imply problems of inhibition, negative affect directed inward. We chose the label *Volatility* because it seems broad enough to encompass emotional lability, irritability or anger, and difficulty controlling emotional impulses. The second factor appears to reflect susceptibility to a class of negative affect that has commonly been described as *withdrawal* (Davidson, 2001). The label *Happiness*, for the facet of the AB5C-IPIP that (reversed in sign) is the strongest marker of the Withdrawal factor, is potentially misleading because its items emphasize negative affect ("Seldom feel blue," "Feel threatened easily") rather than positive affect.

Choosing suitable labels for each factor obviously depends heavily on interpretation of the factors' content, which can be difficult when based merely on facet labels. Furthermore, interpreting factors that are fairly strongly correlated poses an additional challenge, as many facets load strongly on both factors. We therefore defer further justification of our interpretations until Study 2, in which we examine individual items that best mark each of the 10 aspect factors.

Study 2

The IPIP contains over 2,000 public domain items that have been administered to the ESCS, on which we performed our analysis in Study 1. It is thus uniquely well suited to the empirical characterization of factor content at the item level. We examined correlations between scores for the 10 aspect factors presented in Table 3 and every IPIP item.

In addition to allowing more precise characterization of the aspect factors, this undertaking had the advantage of allowing the creation of an instrument to measure the 10 aspects of the Big Five. Such an instrument would allow the aspects to be assessed in other samples without having to administer two very long questionnaires and perform multiple factor analyses. Given that the NEO-PI-R is widely used, another strategy, especially for existing data, would be to use the factor loadings presented in Table 3 to identify NEO facets or combinations of facets that are good markers for each aspect. One limitation of this strategy, however, is that no good markers for Compassion appear in the NEO-PI-R. Two of the NEO-PI-R Agreeableness facets (Altruism and Tender-Mindedness) load strongly on Compassion, but they load almost equally on Politeness. They are good markers, therefore, of Agreeableness as a whole, but they cannot discriminate Compassion from Politeness. Additionally, administration of the NEO-PI-R is costly and time-consuming, and a shorter instrument designed specifically to assess the 10 aspects of the Big Five might be preferable in many situations. We therefore took advantage of the IPIP to develop such an instrument, the Big Five Aspect Scales (BFAS).

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[4] A question raised by differences between Roberts et al.'s (2005) results and ours is why they found six factors, whereas we found only two. The statistical answer is that we used only two of the seven instruments that they used, and, even in their study, all but two of the scales from these two instruments fell within two factors. Of course, the real question is whether the NEO-PI-R and AB5C-IPIP neglect some facets of Conscientiousness. We suspect not. Rather, it appears that Roberts et al.'s (2005) additional factors are best viewed as compound traits, stemming from the conjunction of Conscientiousness with other traits, rather than as aspects or facets of Conscientiousness itself. Roberts et al.'s Self-Control factor is marked by two scales from the Hogan Personality Inventory (HPI; Hogan & Hogan, 1992), Impulse Control and Not Spontaneous, that have their primary loading on Extraversion rather than on Conscientiousness in the AB5C model (Johnson, 1994). Similarly, their Virtue factor is marked by two HPI scales, Moralistic and Virtuous, that do not have their primary or secondary AB5C loadings on Conscientiousness (Johnson, 1994). (This situation highlights one pitfall of personality research: The fact that a scale has been conceptually located in one of the Big Five domains may not be the best guide to determine whether it is statistically located in that domain.) Traditionalism and Responsibility also seem likely to be compound traits (though AB5C codes have not been calculated for all of the scales that mark them). Traditionalism appears to indicate conformity with moral norms, which we (DeYoung et al., 2002) have demonstrated can best be located within the Big Five hierarchy at the metatrait level, as a compound trait resulting from the combination of high Stability (the shared variance of Emotional Stability, Conscientiousness, and Agreeableness) and low Plasticity (the shared variance of Extraversion and Openness/Intellect). Roberts et al. described Responsibility as reflecting enjoyment of cooperation and being of service to others, which suggests Agreeableness as much if not more than Conscientiousness. We conclude that additional Conscientiousness-related factors beyond Industriousness and Orderliness do not appear best described as lower order traits within the domain of Conscientiousness, though they are interesting constructs in their own right and may be useful in the prediction of behavior.

Following selection of items that were good markers of each aspect in the ESCS, these items were administered to a large university sample. Once the final items were selected on the basis of their psychometric properties in the university sample, we were able to examine the reliability and validity of the instrument in both samples.

Method

Initial item selection. Factor scores for each of the 10 factors presented in Table 3 were calculated using the regression method. These scores were then correlated with all of the IPIP items. As an initial item pool, we chose 15 items showing the highest correlations with each factor, excluding those that seemed overly redundant and making sure to include roughly equal numbers of positively and negatively keyed items. In order to provide adequate discrimination between the two aspects in each domain, and to prevent excessive cross-loadings on other domains, we excluded items that showed a correlation with another factor within .10 of the primary correlation. For example, if the strongest correlation for a particular item was .58 with Compassion, then we would exclude it if its correlation with Politeness or any of the other eight aspect factors was .48 or greater.[5]

Having selected 150 IPIP items to mark the 10 aspects, we administered them to a large undergraduate sample, intending to choose 10 items to measure each aspect, based on their psychometric properties in the new sample, for a total of 100 items. Prior to administration, we changed the wording for three of the negatively keyed items selected for Politeness, in order to reverse their keying direction, because only two positively keyed items in the IPIP met our selection criteria for this aspect (see Table 4). Additionally, we added a new item, "Am not a very enthusiastic person," to test our hypothesis that Enthusiasm is a good label for this aspect of Extraversion.

Participants and measures. Participants were 480 undergraduates in southern Ontario (299 women and 180 men; 1 with no gender reported), enrolled at the University of Toronto, Toronto, Ontario, Canada, or the University of Waterloo, Waterloo, Ontario, Canada. They ranged in age from 17 to 61 years ($M = 19.32$, $SD = 3.33$) and came from diverse ethnic backgrounds (45% White; 34% East Asian; 9% South Asian; 3% Black; 3% Middle Eastern; 1% Hispanic; 5% unknown). All participants received course credit for completing the study. The potential BFAS items and the Big Five Inventory (BFI; John & Srivastava, 1999), were completed via the Web, using Likert scales ranging from 1 to 5. The BFI, which was completed by 472 participants, is an excellent short measure of the Big Five and thus makes a good benchmark against which to validate new Big Five scales. (Additionally, 423 of our ESCS participants also completed the BFI, allowing comparison across samples.)

Approximately 1 month following their completion of the study, participants were contacted by e-mail and asked to complete the BFAS items again via the Web in order to obtain an index of test–retest reliability. Ninety participants completed the retest, and the average number of days between first and second completion of the BFAS was 38.44 ($SD = 10.71$).

Results

Final item selection. Principal-axis factoring with direct oblimin rotation ($\Delta = 0$) was used to extract two factors from the items in each of the Big Five domains. In order to reduce collinearity in the final scales, items were included only if their loading on the intended aspect factor was at least .10 greater than on the other aspect factor. This criterion was used to exclude 20 items, but it was relaxed for 5 other items in order to maintain balanced keying. No scale was allowed a ratio of positively to negatively keyed items (or vice versa) greater than 6/4. Additionally, a five-factor solution was extracted from all items across all five domains, and items were excluded if they did not have their highest loading on the intended Big Five domain; 14 items were excluded by this criterion.[6]

Table 4 shows the 10 final items for each of the 10 scales. Right columns in Table 4 show the correlation of each item with the relevant factor score from the ESCS in Study 1 and the factor loading of each item on the relevant aspect factor in the university sample from Study 2. Items were averaged (with appropriate reversals) to create scale scores for each aspect, and these scores were averaged across the two aspects in each domain to create Big Five domain scores. Thus, in addition to 10-item scales for the 10 aspects, the BFAS includes 20-item scales for the Big Five.

Reliability and validity of the BFAS. Table 5 provides descriptive statistics for the BFAS, including Cronbach's alpha for the ESCS ($M = 0.83$, $SD = 0.03$), the initial university sample ($M = 0.81$, $SD = 0.05$), and the retest university sample ($M = 0.83$, $SD = 0.05$). (There were no significant differences in BFI or BFAS scores between those who completed the retest and those who did not, nor did scores change significantly from test to retest.) Correlations between scale scores and factor scores from Study 1 are given for the ESCS ($M = 0.89$, $SD = 0.02$), and test–retest correlations are given for the university sample ($M = 0.81$, $SD = 0.04$). Table 6 contains correlations between all BFI and BFAS scales. Correlations between the same Big Five domains across scales (in bold italics) were high; when corrected for attenuation, based on reliability, they ranged from .85 to .96 ($M = 0.90$, $SD = 0.05$) for the university sample and from .72 to .91 ($M = 0.84$, $SD = 0.07$) for the ESCS. Table 6 also reveals that patterns of correlation among the Big Five within each instrument

[5] One effect of this selection procedure was to exclude items that appear most central to each of the Big Five domains because they are related strongly but almost equally to both aspects. These items are potentially informative conceptually. For example, the item "Have a vivid imagination" was associated almost equally with Intellect and Openness, supporting Saucier's (1992) suggestion of Imagination as an alternative label for the Openness/Intellect domain. The argument that unconventionality is also important to this domain (de Raad, Perugini, Hrebickova, & Szarota, 1998) finds some support in the excluded item "Like to be viewed as proper and conventional." Other insights from these excluded items include the fact that the talkativeness associated with Extraversion is characteristic of both Enthusiasm and Assertiveness ("Usually like to talk a lot"; "Have little to say") and that susceptibility to stress and negative emotions appears common to both Volatility and Withdrawal ("Get stressed out easily"; "Am often in a bad mood").

[6] For example, the item "Tend to vote for liberal political candidates" was a clear marker of Openness in the ESCS but had its strongest loading—negatively—on Conscientiousness in the university sample. This finding is not particularly surprising, as Goldberg and Rosolack (1994) found that conservatives were low in Openness/Intellect but high in Conscientiousness, but it does suggest that this item is not a good specific marker of Openness.

Table 4
The Big Five Aspect Scales

Scale	*r* with factor score (ESCS)	Factor loading (University)
Neuroticism		
Volatility		
Get angry easily.	.67	.75
Rarely get irritated. (R)	−.64	−.64
Get upset easily.	.68	.75
Keep my emotions under control. (R)	−.55	−.51
Change my mood a lot.	.59	.63
Rarely lose my composure. (R)	−.54	−.39
Am a person whose moods go up and down easily.	.56	.71
Am not easily annoyed. (R)	−.54	−.57
Get easily agitated.	.56	.75
Can be stirred up easily.	.56	.70
Withdrawal		
Seldom feel blue. (R)	−.65	−.41
Am filled with doubts about things.	.64	.65
Feel comfortable with myself. (R)	−.63	−.47
Feel threatened easily.	.62	.62
Rarely feel depressed. (R)	−.56	−.51
Worry about things.	.60	.58
Am easily discouraged.	.58	.65
Am not embarrassed easily. (R)	−.44	−.42
Become overwhelmed by events.	.57	.57
Am afraid of many things.	.54	.63
Agreeableness		
Compassion		
Am not interested in other people's problems. (R)	−.62	−.50
Feel others' emotions.	.66	.60
Inquire about others' well-being.	.62	.64
Can't be bothered with other's needs. (R)	−.58	−.65
Sympathize with others' feelings.	.62	.72
Am indifferent to the feelings of others. (R)	−.57	−.51
Take no time for others. (R)	−.48	−.59
Take an interest in other people's lives.	.61	.70
Don't have a soft side. (R)	−.42	−.47
Like to do things for others.	.57	.60
Politeness		
Respect authority.	.43	.33
Insult people. (R)	−.55	−.58
Hate to seem pushy.	.42	.30
Believe that I am better than others. (R)	−.49	−.51
Avoid imposing my will on others.[a]	−.49	.42
Rarely put people under pressure.[a]	−.48	.48
Take advantage of others. (R)	−.48	−.69
Seek conflict. (R)	−.48	−.52
Love a good fight. (R)	−.48	−.54
Am out for my own personal gain. (R)	−.46	−.50
Conscientiousness		
Industriousness		
Carry out my plans.	.59	.54
Waste my time. (R)	−.60	−.62
Find it difficult to get down to work. (R)	−.56	−.64
Mess things up. (R)	−.55	−.54
Finish what I start.	.52	.54
Don't put my mind on the task at hand. (R)	−.54	−.45
Get things done quickly.	.49	.46
Always know what I am doing.	.49	.49
Postpone decisions. (R)	−.53	−.51
Am easily distracted. (R)	−.52	−.53

(*table continues*)

Table 4 (*continued*)

Scale	*r* with factor score (ESCS)	Factor loading (University)
Orderliness		
Leave my belongings around. (R)	−.63	−.47
Like order.	.63	.56
Keep things tidy.	.61	.60
Follow a schedule.	.54	.54
Am not bothered by messy people. (R)	−.51	−.26
Want everything to be "just right."	.53	.56
Am not bothered by disorder. (R)	−.48	−.31
Dislike routine. (R)	−.48	−.41
See that rules are observed.	.47	.45
Want every detail taken care of.	.47	.52
Extraversion		
Enthusiasm		
Make friends easily.	.70	.60
Am hard to get to know. (R)	−.68	−.61
Keep others at a distance. (R)	−.63	−.61
Reveal little about myself. (R)	−.56	−.46
Warm up quickly to others.	.65	.66
Rarely get caught up in the excitement. (R)	−.45	−.44
Am not a very enthusiastic person.[b] (R)		−.56
Show my feelings when I'm happy.	.54	.46
Have a lot of fun.	.48	.63
Laugh a lot.	.43	.62
Assertiveness		
Take charge.	.67	.71
Have a strong personality.	.65	.69
Lack the talent for influencing people. (R)	−.57	−.57
Know how to captivate people.	.58	.53
Wait for others to lead the way. (R)	−.56	−.62
See myself as a good leader.	.57	.69
Can talk others into doing things.	.56	.47
Hold back my opinions. (R)	−.48	−.52
Am the first to act.	.53	.63
Do not have an assertive personality.[a] (R)	.69	−.61
Openness/Intellect		
Intellect		
Am quick to understand things.	.65	.65
Have difficulty understanding abstract ideas. (R)	−.68	−.55
Can handle a lot of information.	.64	.65
Like to solve complex problems.	.61	.51
Avoid philosophical discussions. (R)	−.61	−.45
Avoid difficult reading material. (R)	−.58	−.39
Have a rich vocabulary.	.61	.48
Think quickly.	.57	.65
Learn things slowly. (R)	−.48	−.55
Formulate ideas clearly.	.56	.60
Openness		
Enjoy the beauty of nature.	.43	.47
Believe in the importance of art.	.66	.64
Love to reflect on things.	.42	.48
Get deeply immersed in music.	.60	.44
Do not like poetry. (R)	−.60	−.51
See beauty in things that others might not notice.	.52	.47
Need a creative outlet.	.48	.40
Seldom get lost in thought. (R)	−.40	−.40
Seldom daydream. (R)	−.38	−.35
Seldom notice the emotional aspects of paintings and pictures. (R)	−.60	−.47

Note. Items from all 10 scales should be interspersed for administration, and 5-point Likert scales should be used for responses. (R) indicates items to be reverse scored; ESCS = Eugene-Springfield community sample.
[a] These items were keyed in the opposite direction for the ESCS.
[b] This item is new; it was not included in the International Personality Item Pool or administered to the ESCS.

Table 5
Descriptive Statistics for the BFAS in Two Samples

	ESCS				University				
Factor	*M*	*SD*	α	*r*[a]	*M*	*SD*	α_1	α_2	*r*[b]
Neuroticism	2.46	0.63	.89		2.82	0.70	.89	.89	.85
Volatility	2.48	0.70	.85	.90	2.72	0.82	.87	.89	.85
Withdrawal	2.45	0.71	.84	.91	2.92	0.75	.81	.80	.81
Agreeableness	4.11	0.45	.84		3.70	0.56	.85	.89	.79
Compassion	4.11	0.54	.84	.90	3.87	0.65	.84	.91	.79
Politeness	4.10	0.53	.75	.85	3.52	0.67	.76	.76	.74
Conscientiousness	3.76	0.51	.84		3.06	0.56	.81	.82	.86
Industriousness	3.80	0.61	.81	.87	2.84	0.70	.79	.82	.82
Orderliness	3.73	0.62	.80	.89	3.28	0.64	.72	.74	.79
Extraversion	3.48	0.60	.85		3.37	0.63	.88	.86	.83
Enthusiasm	3.59	0.72	.81	.88	3.52	0.73	.81	.80	.73
Assertiveness	3.36	0.70	.85	.88	3.21	0.71	.84	.88	.86
Openness/Intellect	3.72	0.53	.85		3.47	0.52	.80	.82	.82
Intellect	3.70	0.68	.84	.93	3.39	0.67	.79	.81	.86
Openness	3.74	0.61	.78	.88	3.52	0.64	.72	.77	.79

Note. BFAS = Big Five Aspect Scales; ESCS = Eugene-Springfield Community Sample; α_1 = internal reliability in original sample ($N = 480$); α_2 = internal reliability in retest sample ($N = 90$).
[a] Correlation with factor scores from Study 1, Table 3.
[b] Test–retest correlation.

(in bold) are similar, offering further support for similarity of measurement across instruments.

In the ESCS, we were additionally able to validate the BFAS against NEO-PI-R domain scores and Saucier's (1994) Mini-Markers, a well-validated adjective marker set for the lexical Big Five, which participants completed at the same time as the BFI (see Table 7). High correlations between the same Big Five domains across scales (in bold) provide an additional demonstration that the BFAS is measuring the standard Big Five. When corrected for attenuation, these correlations ranged from .80 to .92 ($M = 0.88$, $SD = 0.05$) for the NEO-PI-R and from .80 to .85 ($M = 0.82$, $SD = 0.02$) for the Mini-Markers.

Discriminant validity and an example of suppression. Given the fairly strong correlations between the two aspect factors in each domain, one important question is: To what degree do the two aspects of each domain possess discriminant validity? If the two aspects within each Big Five domain are indeed distinct traits, then they should not show overly similar patterns of correlation with other variables. Table 6 confirms that they do not, for all five aspect pairs. The differential associations of the aspect pairs of Extraversion and Agreeableness provide one clear example: Whereas Assertiveness is negatively correlated with Politeness, Enthusiasm is positively correlated with Politeness.

Because each pair of aspects is positively correlated, assessing discriminant validity can be more complicated than simply looking for divergent patterns of zero-order correlations. Being positively correlated and presumably sharing some of the same sources, the two aspects in each domain should predict many variables similarly. Furthermore, whenever they do not predict some variable similarly, they may act as suppressors on each other. When two positively correlated variables are related to a third variable in opposite directions, one or both of their associations with the third variable may be suppressed (Paulhus, Robins, Trzesniewski, & Tracy, 2004). Multiple regression or partial correlation may then be necessary to control for the positive association between the first two variables in order to examine the unique associations of their nonshared variance with the third variable. (Although the correlations between aspects are fairly strong, none of them reach the threshold [$r > .9$] at which multicollinearity typically becomes a problem for such analyses; Tabachnick & Fidell, 2001).

As one example of suppression, consider the associations of the aspects of Conscientiousness with BFI Neuroticism (see Table 6). In previous research, the negative correlation between Conscientiousness and Neuroticism has proved to be one of the most robust cross-domain correlations among the Big Five (Mount, Barrick, Scullen, & Rounds, 2005). Using the BFAS, however, one can see that this correlation holds only for Industriousness. Orderliness is almost uncorrelated with Neuroticism. Not only that, but when one controls for Industriousness, Orderliness is significantly positively correlated with Neuroticism, in both the university sample and the ESCS (University: partial $r = .24$, $p < .01$; ESCS: partial $r = .20$, $p < .01$). Thus, the negative association between Industriousness and Neuroticism was suppressing a positive association between Orderliness and Neuroticism.

Correlations among the aspects. Patterns of correlation among the aspect-level traits (bottom right corner of Table 6) are more varied than correlations among domains, and stronger cross-domain correlations appear at the aspect level than at the Big Five level. In several cases, correlations between two aspects across two domains are at least as strong as correlations between the two aspects within each of those two domains. This is true of the correlations between Intellect and Industriousness and between Intellect and Assertiveness. (In fact, Intellect, Industriousness, and Assertiveness form a cluster of related scales from three different domains.) Could this finding be a product of our final item selection procedure, which intentionally reduced correlations between aspects within the same domain, by choosing items that discriminated well between the two aspects? This explanation seems

Table 6
Correlations Between the BFI and the BFAS in Two Samples

	BFI					BFAS					10 aspects									
Domain	N	A	C	E	O	N	A	C	E	O	N_V	N_W	A_C	A_P	C_I	C_O	E_E	E_A	O_I	O_O
N (BFI)	—	**−.38**	**−.27**	**−.18**	**−.11**	***.75***	−.13	−.14	−.26	−.04	.67	.67	−.06	−.17	−.30	.06	−.27	−.16	−.15	.10
A (BFI)	**−.24**	—	**.25**	**.10**	**.03**	−.38	***.59***	.13	.21	.00	−.44	−.24	.45	.55	.17	.06	.38	−.04	−.02	.02
C (BFI)	**−.24**	**.38**	—	**.25**	**.15**	−.29	.18	***.71***	.33	.13	−.19	−.32	.15	.16	.65	.54	.20	.34	.27	−.07
E (BFI)	**−.33**	**.15**	**.18**	—	**.29**	−.14	.07	.21	***.76***	.17	.05	−.30	.22	−.11	.24	.12	.60	.67	.22	.06
O (BFI)	**−.13**	**.11**	**.11**	**.26**	—	−.14	.10	−.01	.35	***.77***	−.06	−.20	.25	−.09	.10	−.11	.16	.42	.64	.64
N (BFAS)	***.80***	−.34	−.33	−.26	−.15	—	**−.20**	**−.22**	**−.32**	**−.12**	.89	.89	−.09	−.25	−.41	.04	−.28	−.27	−.26	.07
A (BFAS)	−.01	***.68***	.36	.06	.09	**−.14**	—	**.18**	**.13**	**.12**	−.25	−.10	.85	.84	.18	.12	.33	−.11	−.01	.23
C (BFAS)	−.15	.24	***.77***	.08	−.04	**−.25**	**.22**	—	**.25**	**−.01**	−.13	−.26	.11	.20	.83	.84	.14	.29	.12	−.14
E (BFAS)	−.36	.31	.33	***.78***	.34	**−.33**	**.23**	**.24**	—	**.34**	−.10	−.47	.32	−.10	.35	.07	.85	.84	.40	.15
O (BFAS)	−.21	.17	.31	.22	***.67***	**−.20**	**.28**	**.19**	**.37**	—	−.04	−.18	.27	−.07	.14	−.15	.19	.38	.85	.81
Volatility (N_V)	.67	−.40	−.25	−.10	−.08	.90	−.24	−.17	−.16	−.15	—	.59	−.09	−.34	−.28	.06	−.12	−.06	−.14	.07
Withdrawal (N_W)	.76	−.20	−.34	−.38	−.19	.88	.00	−.29	−.44	−.21	.59	—	−.08	−.10	−.46	.01	−.38	−.43	−.32	.05
Compassion (A_C)	.02	.54	.32	.22	.19	−.03	.84	.18	.40	.40	−.07	.02	—	.43	.13	.05	.44	.10	.11	.35
Politeness (A_P)	−.04	.62	.28	−.12	−.04	−.20	.86	.20	.00	.08	−.32	−.02	.45	—	.18	.17	.12	−.29	−.14	.03
Industriousness (C_I)	−.32	.25	.72	.17	.04	−.42	.17	.84	.31	.23	−.28	−.49	.12	.16	—	.39	.21	.39	.31	−.09
Orderliness (C_O)	.09	.14	.55	−.05	−.11	.02	.20	.81	.07	.07	.01	.03	.17	.17	.38	—	.03	.09	−.10	−.15
Enthusiasm (E_E)	−.27	.42	.24	.69	.20	−.25	.36	.16	.88	.22	−.15	−.31	.46	.15	.20	.06	—	.43	.18	.13
Assertiveness (E_A)	−.36	.11	.34	.68	.39	−.33	.04	.25	.87	.44	−.13	−.46	.22	−.15	.34	.06	.52	—	.49	.13
Intellect (O_I)	−.37	.10	.39	.25	.46	−.37	.15	.31	.42	.82	−.25	−.41	.24	.01	.40	.10	.21	.52	—	.37
Openness (O_O)	.03	.17	.09	.09	.62	.06	.33	−.02	.18	.80	.02	.08	.42	.14	−.04	.01	.14	.17	.33	—

Note. The university sample is below the diagonal; the Eugene-Springfield community sample is above. Validity coefficients across instruments are in bold italics. Correlations among the Big Five within instrument are in bold; BFI = Big Five Inventory; BFAS = Big Five Aspect Scales; N = Neuroticism; A = Agreeableness; C = Conscientiousness; E = Extraversion; O = Openness/Intellect; subscript letters represent the first letter of the aspect.

Table 7
Correlation of the BFAS With NEO-PI-R and Mini-Markers Big Five Domain Scores

	NEO-PI-R					Mini-Markers				
Domain	N	A	C	E	O	N	A	C	E	O
N (BFAS)	**.84**	−.30	−.36	−.25	−.07	**.69**	−.22	−.20	−.17	−.09
A (BFAS)	−.13	**.69**	.13	.12	.17	−.32	**.66**	.14	.04	.00
C (BFAS)	−.25	.11	**.77**	.21	−.16	−.09	.08	**.72**	.18	.02
E (BFAS)	−.36	.03	.23	**.78**	.33	−.17	.27	.25	**.69**	.28
O (BFAS)	−.11	−.04	.06	.28	**.78**	−.07	.17	.12	.15	**.71**
Volatility	.68	−.37	−.27	−.07	−.01	.68	−.26	−.12	.03	−.03
Withdrawal	.81	−.16	−.37	−.38	−.12	.56	−.14	−.24	−.33	−.13
Compassion	−.04	.50	.06	.31	.34	−.19	.63	.11	.19	.17
Politeness	−.18	.67	.15	−.11	−.05	−.35	.48	.13	−.13	−.17
Industriousness	−.45	.11	.72	.29	−.01	−.24	.11	.59	.22	.13
Orderliness	.03	.07	.56	.06	−.25	.09	.02	.61	.07	−.08
Enthusiasm	−.29	.25	.10	.68	.24	−.24	.43	.15	.56	.08
Assertiveness	−.32	−.21	.30	.64	.32	−.05	.02	.28	.59	.39
Intellect	−.25	−.14	.22	.30	.56	−.15	.07	.23	.20	.64
Openness	.09	.08	−.15	.15	.73	.05	.22	−.05	.03	.52

Note. Validity coefficients are in bold. BFAS = Big Five Aspect Scales; NEO-PI-R = Revised NEO Personality Inventory; N = Neuroticism; A = Agreeableness; C = Conscientiousness; E = Extraversion; O = Openness/Intellect.

unlikely because correlations among the factor scores for the aspects from Study 1 (see Table 8) demonstrate that this pattern is not merely an artifact of our scale construction technique. Even in the factor scores, Intellect is correlated almost equally with Openness and Assertiveness, and Industriousness shows sizable correlations with both Intellect and Assertiveness. Compassion and Enthusiasm are another cross-domain pair that show strong correlations in Tables 6 and 8.

Despite these patterns of cross-domain correlation, the Big Five are readily recoverable from the aspects by factor analysis. Tables 9 and 10 show eigenvalues and five-factor solutions for factor scores and scale scores in the ESCS and for scale scores in the university sample.

Discussion

The items selected for the BFAS (see Table 4), which were among the best markers for each of the 10 factors, offer additional support for the interpretations of these factors that we offered in Study 1. Compassion, for example, is clearly marked by the tendency to affiliate with others emotionally and to take interest in others' emotions, whereas Politeness contrasts the tendency to respect others with the tendency to pursue one's own desires at the expense of others, even to the point of belligerence. Consistent with the apparent similarity between Politeness and Ashton and Lee's (2005; Ashton et al., 2004) Honesty-Humility factor, hints of narcissism and Machiavellianism can be detected in Politeness items like "Believe that I am better than others" and "Take advantage of others" (Lee & Ashton, 2005). As hypothesized, the new item, "Am not a very enthusiastic person," was a good marker of the factor we labeled *Enthusiasm.*

The BFAS appears to provide excellent representations of the two factors underlying the shared variance of the facets in each domain. Additionally, averaging the two aspects in each domain provides good representations of the Big Five. The strong demographic differences between the two samples used to construct the BFAS suggest that this instrument is likely to be valid in a wide variety of English-speaking populations. (One sample was a largely middle-aged, American, community sample, almost entirely White; the other was an ethnically diverse sample of young adults enrolled in two Canadian universities.) Although the BFAS might be improved upon psychometrically by using item response theory or by developing additional new items specifically targeting

Table 8
Correlations Among the Factor Scores for the 10 Aspects From Study 1

Factor	1	2	3	4	5	6	7	8	9	10
1. Volatility	—									
2. Withdrawal	.71	—								
3. Compassion	−.13	−.13	—							
4. Politeness	−.48	−.17	.61	—						
5. Industriousness	−.43	−.50	.15	.25	—					
6. Orderliness	−.10	−.06	.03	.19	.71	—				
7. Enthusiasm	−.12	−.40	.59	.17	.18	.00	—			
8. Assertiveness	.03	−.46	.13	−.37	.34	.05	.59	—		
9. Intellect	−.11	−.36	.12	−.20	.32	−.03	.19	.56	—	
10. Openness	.11	−.05	.41	−.01	−.08	−.25	.29	.28	.55	—

Table 9
Eigenvalues for Factor Analyses of the 10 Aspects

Factor	ESCS scale score	ESCS factor score	University scale score
1	2.79	3.15	3.03
2	1.71	2.17	1.70
3	1.57	1.72	1.39
4	1.26	1.19	1.16
5	0.90	0.92	0.93
6	0.48	0.28	0.49
7	0.37	0.19	0.41
8	0.36	0.14	0.34
9	0.30	0.13	0.30
10	0.27	0.12	0.25

Note. ESCS = Eugene-Springfield community sample.

the 10 aspect factors, use of the IPIP allowed us to create a public domain instrument with excellent psychometric properties.

The BFAS should be useful for exploring the discriminant validity of the different aspects within each domain, especially in cases of suppression, the phenomenon in which a positive association between two variables may obscure the association of one or both with a third variable. Our results highlighted one example of suppression: Orderliness showed almost no zero-order correlation with Neuroticism, but it was significantly positively correlated with Neuroticism when controlling for Industriousness. It is important to understand what such a result means in commonsense terms: Given two people (or groups) with equal levels of Industriousness, the one higher in Orderliness is likely to show higher levels of Neuroticism. This finding may be substantively important. One of the facet scales that marked the Orderliness factor was Perfectionism (see Table 3), and two Orderliness items ("Want everything to be 'just right'" and "Want every detail taken care of") appear conceptually related to perfectionism. Perfectionism has been described as a "pervasive neurotic style" (Hewitt & Flett, 1991, p. 456) and is associated with anxiety, depression, and other psychopathologies (Dunkley, Sanislow, Grilo, & McGlashan, 2006; Sherry, Hewitt, Flett, Lee-Baggely, & Hall, 2007). Despite the fact that Conscientiousness is typically negatively associated with Neuroticism, the BFAS reveals that its Orderliness aspect may be positively associated with Neuroticism. This finding might lead to an advance in researchers' understanding of how some forms of Conscientiousness can be maladaptive.

In addition to demonstrating the reliability and validity of the BFAS, Study 2 demonstrated that the aspect-level traits show more striking patterns of cross-domain correlations than do the Big Five. We see this as a potential advantage rather than a disadvantage, as correlations among the aspects may reveal meaningful cross-domain connections that are given short shrift in much of the literature on the Big Five. For example, Enthusiasm and Compassion are strongly correlated, perhaps because both encompass the tendency toward social affiliation. However, item content suggests that Enthusiasm is linked to the rewarding nature of social affiliation, whereas Compassion appears to reflect affiliation driven by concern or empathy. It is of interest that their complementary aspects, Assertiveness and Politeness, are negatively correlated. Separating the aspects of Extraversion and Agreeableness, therefore, may further researchers' understanding of how these two domains are both similar and different in their description of interpersonal behavior.

As another example, Assertiveness, Intellect, and Industriousness were strongly intercorrelated. All three of these traits seem likely to be related to industrial performance, which might make them particularly useful in research on leadership or personnel selection. Although the 10 aspects displayed the standard Big Five factor structure, if the correlations among Assertiveness, Intellect, and Industriousness were a bit stronger, then one could imagine them forming a factor of their own. Such a factor, labeled *Prowess/Heroism*, appears to have emerged in a Greek lexical study (Saucier, Georgiades, Tsaousis, & Goldberg, 2005). This Greek factor was most similar to Extraversion in the standard Big Five, but it excluded descriptors related to "sociability" and included descriptors related to "giftedness/brilliance" and "competence," which, in the Big Five, would fall within Openness/Intellect and Conscientiousness, respectively (Saucier et al., 2005), and which correspond to Intellect and Industriousness, at the aspect level. This finding suggests, as Saucier et al. (2005) noted, that different languages may yield different factor structures, not because the underlying structure of personality in different cultures is very different, but because different languages emphasize different con-

Table 10
Five-Factor Solutions for the 10 Aspects

	ESCS scale score					ESCS factor score					University scale score				
Aspect	N	A	C	E	O	N	A	C	E	O	N	A	C	E	O
Volatility	.78	−.22	.01	.02	.00	.89	−.20	−.12	.08	.03	.75	−.28	.01	−.01	−.01
Withdrawal	.79	.08	−.13	−.34	−.10	.83	.00	−.13	−.38	−.14	.84	.14	−.13	−.27	−.02
Compassion	.06	.63	.03	.44	.26	.02	.87	.02	.31	.21	.11	.56	.12	.42	.42
Politeness	−.22	.78	.15	−.04	−.10	−.31	.81	.15	−.20	−.16	−.14	.77	.14	−.01	.04
Industriousness	−.37	.02	.73	.14	.17	−.37	.07	.89	.15	.15	−.40	−.01	.75	.14	.07
Orderliness	.10	.10	.61	.03	−.15	.02	.06	.83	−.01	−.14	.08	.14	.54	.03	.01
Enthusiasm	−.14	.14	.05	.75	.09	−.12	.39	−.01	.77	.10	−.13	.17	.05	.82	.08
Assertiveness	−.18	−.39	.28	.55	.38	−.09	−.24	.16	.82	.38	−.27	−.29	.18	.61	.34
Intellect	−.24	−.18	.10	.13	.75	−.18	−.13	.12	.18	.87	−.37	−.14	.25	.16	.65
Openness	.15	.21	−.19	.11	.60	.10	.25	−.21	.17	.69	.11	.19	−.07	.09	.62

Note. Principal-axis factoring with varimax rotation. ESCS = Eugene-Springfield Community Sample; N = Neuroticism; A = Agreeableness; C = Conscientiousness; E = Extraversion; O = Openness/Intellect.

nections in a web of relations among lower level traits that exist in all cultures. Whether the 10 aspects of the Big Five might constitute such lower level traits is a question of interest for future research.

Study 3

Having found two factors within the facets of each of the Big Five and characterized them through empirical scale construction, we turn to the question of how well these phenotypic factors correspond to the genetic factors identified by Jang et al. (2002). Before examining this question empirically, one must consider the strengths and limitations of Jang et al.'s behavior genetic findings. In two large samples, they tested models with one, two, or three genetic factors in each domain, and, in every case, models with two factors fit best. This provides strong evidence that a single factor cannot completely explain the pattern of genetic covariance among the facets in each domain.

However, Jang and colleagues (2002) did not allow the two factors within each domain to correlate, which might have prevented their estimated factor loadings from providing the best representation of the true factors (though it does not invalidate their finding that more than one factor is necessary). Another behavior genetic study of the same samples (Yamagata et al., 2006), which factor-analyzed all 30 facets of the NEO-PI-R together, found a five-factor genetic solution that was highly congruent across cultures and in which all of the facets in each domain loaded strongly on a single factor. This study did not factor the facets within each domain separately, nor did it compare factor solutions with different numbers of factors within each domain, so it is not incompatible with Jang et al.'s (2002) findings, but it does suggest that the two genetic factors within each domain should be correlated. That correlation would indicate the existence of genes that influence both factors, whereas the two factors themselves indicate genes that specifically influence one subfactor of the domain but not the other.

Another limitation of Jang et al.'s (2002) study was that it used only the NEO-PI-R. To the degree that the NEO-PI-R underrepresents any content at the facet level, their factors may be distorted. Despite these limitations, Jang et al.'s work provides the best estimates presently available of two genetic factors underlying each of the Big Five domains. We therefore used their estimated factor loadings and the NEO-PI-R to calculate genetic factor scores in the ESCS, allowing us to quantify the similarities between the phenotypic factors found by us and the genetic factors found by Jang et al.

Our general hypothesis was that, within each domain, each phenotypic factor would be most strongly correlated with a different genetic factor. These correlations may not be extremely strong because phenotypic factors include environmental as well as genetic influences and because Jang et al.'s (2002) results may be less accurate than they would have been had they allowed correlated factors or used a wider range of facets in each domain. Nonetheless, the correlations should show a pattern of correspondence between phenotypic and genetic factors, moderated by three additional hypotheses: The results of Study 1 suggested the hypothesis that the phenotypic factors of Compassion and Intellect would correspond less closely to Jang et al.'s genetic factors because the NEO-PI-R does not include any facets that specifically marked the Compassion factor without also marking the Politeness factor and includes only one facet (Ideas) that strongly marked the Intellect factor. A second moderating hypothesis was developed on the basis of the fact that Jang et al. did not rotate their factors. In an unrotated factor solution, many variables tend to load on a large first factor, and additional factors model relations that were not captured in that first factor. Thus, in the present case, the first genetic factor is more likely than the second to be correlated with both phenotypic factors. Finally, because Jang et al.'s factor loadings showed some divergence between Canadian and German samples for Conscientiousness and Extraversion, we expected that there might be less agreement across the two sets of estimates in those two domains.

Method

Participants were the 481 ESCS participants from Study 1. Genetic factor scores were calculated using the NEO-PI-R and the method of Thomson (1951). Let X be a matrix of standardized facet scores, with number of rows equal to sample size and six columns representing the facets in one domain. The genetic factor scores Y are then the expected values of the two factors in that domain conditional on X, which are given by:

$$Y = X\Sigma^{-1}\,\Lambda,$$

where Σ is the correlation matrix of the six facets, and Λ is a matrix of the estimated genetic factor loadings for those facets reported by Jang et al. (2002).[7] These genetic factor scores were computed twice for each Big Five domain, using values of Λ derived for Jang et al.'s Canadian and German samples separately.

These two estimates of the genetic factor scores were then correlated with the aspect factor scores from Study 1 (very similar correlations were found if scores from the BFAS were used instead of factor scores). Partial correlations were used to control for the shared variance of the two phenotypic factors in each domain, allowing us to investigate only the unique association between each aspect and the estimated genetic factor scores. We report the zero-order correlations as well, but these are less interpretable because of the lack of specificity introduced by the nonrotation of the genetic factors in conjunction with the fairly strong correlations between the phenotypic factors.

Results and Discussion

Table 11 presents the associations between genetic and phenotypic factor scores. As predicted, when considering the partial correlations, in most cases, each genetic factor was more strongly associated with one phenotypic factor than the other. Of the 10 phenotypic factors, 8 were correlated at $r > .5$ with one, and only one, of the two genetic factors. The only two phenotypic factors that were not correlated at $r > .5$ with one of the genetic factors were Compassion and Intellect, and this was predicted because of the underrepresentation of Compassion- and Intellect-related facets in the NEO-PI-R. Some of the aspects, like Openness and

[7] NEO-PI-R facet correlation matrices from the ESCS were used for these calculations. Results were very similar using the normative matrices from the NEO manual (Costa & McCrae, 1992b).

Table 11
Partial Correlations Between Genetic Factor Estimates (From Jang et al., 2002) and Aspect Factor Scores, Controlling for Complementary Aspects

	Canadian estimate		German estimate	
Aspect	F1	F2	F1	F2
		Neuroticism		
Volatility	**.68** (.85)	−.68 (.18)	**.59** (.80)	−.76 (.19)
Withdrawal	.44 (.77)	**.85** (.72)	.38 (.73)	**.90** (.75)
		Agreeableness		
Compassion	.27 (.49)	−.19 (.30)	.40 (.65)	.08 (.29)
Politeness	.30 (.50)	**.65** (.68)	.48 (.68)	**.52** (.57)
		Conscientiousness		
Industriousness	.42 (.66)	**.58** (.70)	.38 (.72)	**.56** (.61)
Orderliness	**.24** (.60)	−.04 (.48)	**.52** (.76)	.18 (.33)
		Extraversion		
Enthusiasm	**.71** (.79)	.34 (.56)	**.77** (.83)	−.01 (.45)
Assertiveness	.03 (.48)	**.37** (.58)	−.05 (.46)	**.69** (.76)
		Openness/Intellect		
Intellect	.24 (.59)	.29 (.31)	−.13 (.35)	.31 (.46)
Openness	**.93** (.95)	−.05 (.13)	**.73** (.76)	.20 (.40)

Note. $N = 481$. Predicted strongest partial correlations are in bold. Zero-order correlations are in parentheses. Correlations >.10 are significant at $p < .05$. F1 = Genetic Factor 1; F2 = Genetic Factor 2.

Withdrawal, showed correlations as high as .90 with one genetic factor, suggesting high degrees of similarity.

Also as predicted, the first genetic factor was positively correlated with both phenotypic factors in most domains. This lack of complete specificity is likely to be due to the fact that Jang et al.'s (2002) factors were unrotated, rendering the first factor less specific than it could have been had their factors been rotated toward simple structure. Finally, for Extraversion and Conscientiousness, the two domains in which Jang et al.'s (2002) Canadian and German samples showed the most divergence, the phenotypic factors more closely resembled the German than the Canadian genetic factors.

Comparison of the genetic factors reported by Jang et al. (2002) and the phenotypic factors found in Study 1 thus suggests a reasonably high degree of correspondence between the two sets of factors, given the limitations discussed. The correspondence is strong enough to suggest that the aspect-level phenotypic factors may have separable genetic substrates similar to those associated with Jang et al.'s genetic factors. Future research could provide a stronger test of this hypothesis by including the AB5C-IPIP with the NEO-PI-R in a behavior genetic study.

General Discussion

The studies reported here demonstrate a level of organization in personality between the narrow facets and the broad domains. Factor analysis indicated that each Big Five domain is divisible into two correlated aspects, subsuming multiple facets. A process of empirical scale construction using the IPIP allowed us to provide a detailed characterization of the aspect factors at the item level, while simultaneously creating the BFAS, a reliable and valid public domain instrument to assess the 10 aspects of the Big Five.

The larger significance of the existence of the aspects, like the two genetic factors found within each Big Five domain by Jang et al. (2002), is that they reveal a novel level of personality structure that demands further investigation. The degree of correspondence between our phenotypic factors and Jang et al.'s genetic factors suggests the possibility that both sets of findings may be tapping the same underlying structure and that this structure may be partly genetically based. The optimal facet-level structure of personality in the five-factor model is still unknown, but at this intermediate level of the hierarchy between facets and domains, each of the Big Five appears divisible into two aspects, each subsuming many facets. By analyzing a broader range of facets than just those of the NEO-PI-R, the present studies may have provided a more accurate characterization of the two aspects of each domain.

Like the Big Five themselves, the aspects are phenotypic factors that presumably have both genetic and environmental causes. The sources of the aspects may be easier to identify than the specific genetic and environmental causes of individual facets. The aspect-level traits are broader, more parsimonious, and less arbitrary than the facets. They allow differentiation of two trait dimensions within each of the Big Five that are likely to have partially distinct biological substrates, environmental influences, and effects.

Consider Openness and Intellect, for example. The distinction between these two aspects of Openness/Intellect may explain why the NEO-PI-R facets of Fantasy, Aesthetics, and Feelings (markers of Openness) sometimes show different patterns of association from Ideas (a marker of Intellect). Fantasy, Aesthetics, and Feelings are all correlated with crystallized intelligence but not fluid intelligence or working memory, whereas Ideas is correlated with fluid intelligence and working memory (DeYoung et al., 2005). Given what is known about the biological substrates of fluid intelligence and working memory (DeYoung et al., 2005; J. R. Gray & Thompson, 2004), this finding suggests that those substrates might be among the sources of Intellect but not Openness.

As another example, we hypothesize that the two aspects of Neuroticism, Volatility and Withdrawal, may represent the primary manifestations in personality of two brain systems governing sensitivity to threat and punishment, which J. A. Gray and McNaughton (2000) have called the fight-flight-freeze system (FFFS) and the behavioral inhibition system (BIS). J. A. Gray and McNaughton (2000) described Neuroticism as a predisposition for general sensitivity to threat and punishment, involving both the FFFS and the BIS. Whereas Neuroticism as a whole may reflect the joint sensitivity of these systems, we suggest that the two aspects of Neuroticism may reflect the sensitivities of the two systems individually. This hypothesis is plausible because Gray and McNaughton describe the BIS as responsible for anxiety and also relate it to depression, whereas they describe the FFFS as responsible for panic and anger. Withdrawal clearly encompasses traits related to anxiety and depression, whereas Volatility clearly encompasses traits related to anger, as well as items like "Get upset easily" and "Rarely lose my composure," which may be related to panic. Various psychologists have proposed the relation of Neuroticism to the BIS (e.g., Elliot & Thrash, 2002), but our findings may indicate what aspect of Neuroticism is associated with the BIS and what is associated with the FFFS.

Untangling the sources of the two aspects of each Big Five domain is one major challenge posed by our findings. We hope that the BFAS may prove useful in research aimed at this goal. At the very least, the BFAS provides a demonstration of the unique possibilities for research and empirical scale construction provided by the IPIP (Goldberg, 1999), allowing characterization of factors with much more confidence than would have been possible on the basis of variable labels and factor loadings. (It would be interesting to test how similar the BFAS is to the Big Five Questionnaire [Caprara, Barbaranelli, Borgogni, & Perugini, 1993], an instrument derived theoretically rather than empirically, which divides each Big Five domain into two subscales.) It is hoped that our factor analyses will be replicated in other samples, despite the difficulty of administering both the NEO-PI-R and the AB5C-IPIP. Nonetheless, the size of the ESCS and the use of scale scores rather than item scores as variables in our factor analyses in Study 1 provide some confidence that the factors assessed by the BFAS are likely to be replicable.

The aspect-level factors are lower order factors specific to the Big Five. In other personality models, other traits of similar magnitude might appear. However, the Big Five remains a promising and widely used model. New knowledge about its substructure could have important ramifications for personality psychology in its efforts to identify the sources of personality and to understand associations between the Big Five and a wide variety of other phenomena.

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