

Openness/intellect: The weirdest trait in the Big Five world?

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Abstract

Openness/intellect often stands apart from the other Big Five/Six personality traits. Here, we interrogate its ‘weirdness.’ First, we discuss openness/intellect’s weird history, highlighting unresolved controversies critical to its interpretation. Second, we identify research questions where openness/intellect is weird among the Big Five: it is the least straightforward predictor of outcomes, often irrelevant to mental health, and the rarest target of volitional change. We distill these findings into three propositions that refine openness/intellect’s role in personality theory. Third, we synthesize etic (imported) and emic (local) evidence implicating openness/intellect as the WEIRDest Big Five trait, the least portable across cultural contexts. We hypothesize how cultural individualism and looseness modify the trait’s relevance and structure. We conclude by arguing for openness/intellect’s weirdness as a feature, not a bug: Some trait components may be universal, and those that aren’t illustrate through contrast how culture shapes personality expression.

Keywords: Personality Structure, Big Five, Openness to Experience, Culture

Public Abstract

Most researchers study personality using five or six broad traits called the Big Five/Six. One of these traits is called openness/intellect, which describes people who are imaginative, knowledgeable, unconventional, and curious. Here, we explore how openness/intellect is often weird compared to the other Big Five/Six. For example, most people want to change their personality, but they rarely pick openness/intellect as the trait to change. Additionally, although openness/intellect is important in North America and Europe, in other cultures it seems less relevant than the other Big Five/Six. In some cultures, its specific components don't go together: unconventional people aren't more imaginative. In some languages, words like "creative" don't exist. Even so, some indicators of openness/intellect, like experiencing goosebumps from music, are found among humans everywhere. Overall, studying the weirdness of openness/intellect helps us understand where and why this trait is important.

Researchers typically model personality structure in terms of broad, overarching traits, like the Big Five's extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (John et al., 2008), or the Big Six HEXACO's honesty/humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience (Ashton & Lee, 2020). In these models (henceforth collectively referred to as Big Five/Six), one trait stands out from the others as "weird":

Openness/intellect. Beyond describing people who are unconventional and quirky (and thus weird), empirical patterns that characterize the other traits often, weirdly, don't apply to openness/intellect, and it also appears to be the least applicable cross-culturally. But because researchers often dedicate equivalent theoretical consideration and manuscript space to each trait (e.g., Bleidorn et al., 2022; DeYoung, 2015a; Soto, 2019; Wrzus & Roberts, 2017), the reasons behind these unique qualities of openness/intellect and their implications for understanding of personality have yet to be assembled together and sufficiently explored.

In this paper, we give the weirdness of openness/intellect closer attention. In part one, we describe openness/intellect's 'weird' history, reviewing initial conceptualizations of openness and intellect and their imperfect synthesis, which requires continued consideration in modern personality research. In part two, we identify and review three focal topics in personality research where openness/intellect stands apart from the other Big Five/Six: it predicts outcomes less straightforwardly, seems less relevant to mental health, and is rarely a target of volitional change efforts. These points of discrepancy for openness/intellect emerge in study after study, yet the reasons have, to our knowledge, never been fully explored. Finally, in part three, we delve into ways that openness/intellect is 'WEIRD'¹

¹ Our triple entendre relies on this popular acronym and our title refers to the paper in which it was introduced. However, with much respect to that paper and the important points it makes, we avoid using the term "WEIRD" (Western, Educated, Industrialized, Rich, and Democratic) to describe people here. While the acronym brought attention to an important problem, it doesn't hold together coherently. For example, many Asian countries are both industrialized and rich, though they are not 'Western', and some poorer countries around the globe have higher rates of education and democracy than some rich ones. Furthermore, referring to people as "non-WEIRD" suggests that they are uneducated and undemocratic, which is both inaccurate and hurtful.

(Heinrich et al., 2010): research outside of Western cultural contexts typically fails to identify or replicate this trait. We consider why this might be and theorize about how particular elements of culture may shape the expression of openness/intellect, and we propose what may be the universally-relevant core of openness/intellect. Throughout, we provide specific hypotheses for how future research can clarify the weirdness of openness/intellect, allowing us to make the best use of the qualities that set this trait apart.

Our positionalities have certainly impacted how we think about openness/intellect. Both authors identify with openness/intellect as core to our own personalities and life choices. This personal connection to the trait has attuned us to its research, and to take great interest in its details and contradictions, which we believe strengthens the paper. This can also, however, bias us towards wanting to see openness/intellect as a coherent trait, contrary to some of the evidence we review, and to finding value in this trait, especially its humanistic elements (we discuss this further in Part II). There is also a substantial cross-cultural element to this paper, making our cultural identities as White Americans important to consider. Much of cross-cultural personality psychology has been a project of identifying traits and covariance patterns in the West and exporting them throughout the rest of the world, brushing over problems in portability (see Part III). As much as possible, we have sought to be reflexively cognizant of the pitfalls of using Western perspectives of personality as the default, and to seek out research from and about other world regions, citing openness/intellect research from teams throughout the world. This is assisted by the second author's extensive research and life experience outside the United States, and by our openness to new ideas! Our educations and formative life experiences in the United States, however, unavoidably shape our perspectives. In the spirit of openness/intellect, we welcome clarification, refutation, or expansion of cross-cultural claims we make throughout the paper.

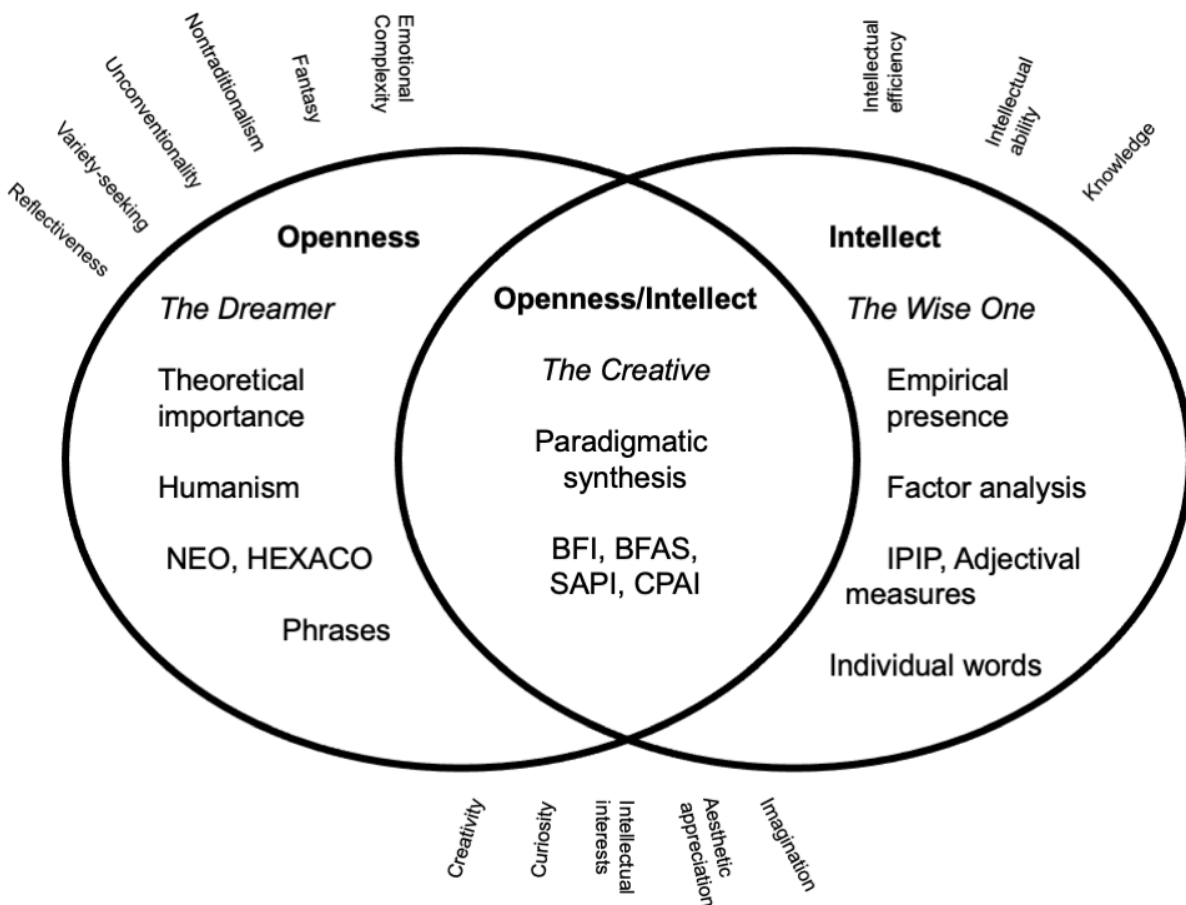
Part I: Openness/Intellect: A Weirdly Bifurcated History

When writing about openness/intellect, one complication immediately presents itself: what do we call it? Although this trait has been assessed in tens of thousands of studies, there is a surprising lack of consensus on a name that accurately encompasses its content. Commonly-used omnibus personality questionnaires have labeled this trait as openness to experience (Costa & McCrae, 1992; Lee & Ashton, 2004), intellect (Goldberg, 1992), openness/intellect (DeYoung et al., 2007), open-mindedness (Soto & John, 2017), and even originality/talent (Thalmayer et al., 2011). These differences in nomenclature are not superficial; they illustrate a serious lack of consensus on the core elements of this trait. For example, when developing the Big Five Inventory 2, Soto & John (2017) identified an “anchor” facet that describes the core of every other Big Five trait. For openness/intellect, however, they could not, citing *“considerable disagreement regarding [its] defining features and optimal label”* (p. 122). In comparison, the only other real variation in labeling across Big Five and Six questionnaires is for neuroticism, which is sometimes referred to by its positive pole, emotional stability (resiliency in the Big Six), or the less judgmental “negative emotionality,” differences that do not correspond to actual content variation.

In this paper we use the term “openness/intellect” as shorthand for what we have to come to think of as the “openness and intellect extended universe,” a transtheoretical umbrella label that integrates broad and narrow components across questionnaires and theoretical conceptions that purport to measure this personality trait. For our purposes, openness/intellect encompasses individual differences in breadth, depth, and permeability of consciousness (McCrae & Costa, 1997), in ability and motivation to explore cognitive concepts (DeYoung, 2015b), in originality and wisdom (Goldberg, 1990), and in flexibility and interconnectedness of mental associations (Christensen et al., 2018; Nettle, 2007). Defining openness/intellect in this maximally broad way allows us to write about theory and research across different approaches that target the same general theorized trait, appreciating both its common core as well as components that are only included in some of its measures or theories (Schwaba et al., 2020). Using the label openness/intellect in this paper is a deliberate balancing act aimed at being

maximally transtheoretical (DeYoung, 2015b) and cognizant of the trait's history we describe here (interested readers may also enjoy John et al., 2008, McCrae, 1993, and Saucier, 1992, for additional openness/intellect history). We depict the openness/intellect extended universe in Figure 1.

Figure 1. The Openness/Intellect Extended Universe



Note: Components labeled surrounding the Venn diagram are drawn from research synthesizing multiple openness/intellect questionnaires: Condon et al. (2017), Woo et al. (2014), Christensen et al., (2019), and Saucier et al. (2014). HEXACO = Honesty Emotionality eXtraversion Agreeableness Conscientiousness Openness. BFI = Big Five Inventory. BFAS = Big Five Aspects Scales. SAPI = South African Personality Inventory. CPAI = Chinese Personality Assessment Inventory. IPIP = International Personality Item Pool

The History of Openness

One conceptualization of openness/intellect emerged from the humanistic psychology movement in Europe and North America. This line of psychological thought, popular in the mid-20th century, emphasized curiosity and inquisitiveness, self-reflection, flexibility, and non-traditionalism as key components in the process of self-actualization. Rogers (1959) described openness to new experiences as an essential ingredient of mental health and responsiveness to therapy, Maslow (1964) discussed the tendency of some individuals to have awe-filled, transformative oceanic experiences, and Coan (1972) developed openness-to-experience scales that measured individual differences in traits like imagination and daydreaming. Related to these positive conceptions of openness were contemporaneous concerns about authoritarian and fascist tendencies among those closed to new and novel experiences, raised by those at the Frankfurt school (Adorno et al., 2019). In this humanistic conceptualization of openness/intellect, the prototypically open person might be best described as *the dreamer*: someone who loves to read and write, is moved by art, and reflects on the state of the world and what it could be (e.g., McCrae & Sutin, 2009).

These conceptions of openness were integrated into omnibus personality inventories courtesy of Costa and McCrae, developers of the NEO inventories (NEO-PI, NEO-PI-R, and NEO-PI-3; McCrae et al., 2005). In deciding on an exhaustive set of traits and phrases to incorporate into a structural model for human personality, Costa and McCrae were influenced by humanistic theorists, including in choosing their name for the factor. The openness to experience scale of their initial NEO inventory thus emphasized fantasy-proneness, non-traditionalism, and imagination, among other qualities (Costa & McCrae, 1976). Importantly, the initial NEO inventory, which measured three factors, was developed as its own omnibus model, meaning that this humanistic conception of openness was asserted as fundamentally important to personality structure *a priori*, before its synthesis into the now-paradigmatic Big Five. A similar humanistic conception of openness was shared by Ashton and Lee,

developers of the six-factor HEXACO inventories, of which the last letter stands for openness to experience.

What are the key tenets of the humanistic approach to openness/intellect? As Loevinger (1957) asserted, a psychological test is a theory that represents a researcher's best attempt to measure their conceptualization of a construct. Choices made in the content and wording of the NEO and HEXACO inventories reveal the underlying theory of this trait. A first tenet is that openness to experience includes content relevant to affect and behavior. Just as extraversion and neuroticism index positive and negative emotionality, respectively, openness was seen as incorporating more abstract, cognitive emotions like awe and interest (Fayn et al., 2015; 2019). Consider the evocative HEXACO item, *"Sometimes I just like to watch the wind blow through the trees."* Western research using humanistic openness inventories has shown that high scorers tend to experience a wider range of emotions and perceive finer distinctions in their valence and intensity (Terracciano et al., 2003). The humanistic tradition also emphasizes some of the emergent behavioral qualities of this trait, such as the tendency (for Westerners) to socially sort according to openness: spending time with, marrying, and procreating with people with similar levels of openness. In fact, this pattern of assortative mating is more prevalent for openness/intellect than any other Big Five trait (Hortwitz et al., 2023; McCrae, 1996).

Another important tenet of the top-down humanistic conceptualization of openness to experience is that its features aren't well captured in single-adjective trait terms (Saucier, 1992; Trapnell, 1994). Full phrases are required to measure many components of humanistic openness: there aren't common English words that describe interest in the beauty of the world (*"aesthetically sensitive"* comes close but is neither a single word nor a common phrase) or a tendency to experience complex emotions (*"emotionally differentiated"?*) As we discuss in detail later, this may be a major reason why lexical studies have not found a personality factor resembling openness to experience -- even English-

language dictionary-based studies do not extract many of the affective and behavioral qualities emphasized by the humanist tradition.

It is also notable that the humanistic tradition conceptualizes openness as orthogonal to intelligence, thus as an individual difference that is less associated with ability, and more with behavioral tendencies, to the extent that the two are separable (Soto et al., 2022). This has made for an uneasy fit with the lexically-based intellect-tradition scales described in the next section. The NEO-PI-R only includes a single scale, openness to ideas, that measures content relating to intellectual behavior and preferences, and the scale's items (as well as HEXACO items) focus on enjoying or participating in intellectual behaviors (*I like solving complex puzzles*) rather than skills or abilities (*I am good at them*).

The History of Intellect

An alternate conceptualization of the fifth factor, derived in the same historical timeframe but through different sources, follows a more atheoretical, empiricist tradition. Researchers beginning with Fiske (1949) and Tupes & Christal (1961) factor analyzed responses to various omnibus personality questionnaires and natural-language descriptors to identify a parsimonious higher-order structure for personality variation. Generally, these studies indicated five-factor solutions, with the fourth or fifth factor capturing elements of cultural refinement and intellectual curiosity. Later, researchers categorized trait terms found in dictionaries (Norman, 1968), based on the lexical hypothesis that the most salient concepts to differentiate personality variation will be encoded into single concepts in a language (Allport & Odbert, 1936). In American, German, and Dutch samples, the already named 'Big Five' model of these trait terms fit the data, though interpretations of the fifth factor still varied somewhat across studies (de Raad et al., 1992; Goldberg, 1990; Ostendorf & Angleitner, 1994). This lexically-derived fifth factor was termed intellect, a label later employed in personality measures based on these lexical results (Goldberg, 1992; Saucier, 1994). According to this line of research, a prototypical

person high on the trait may be described as *the wise one*: someone who is knowledgeable, smart, creative, and imaginative.

Here too, one can investigate questionnaires to understand their underlying theory. We focus on adjectival personality measures (e.g., Ashton et al., 2006; Goldberg, 1992; McCrae & Costa, 1985) as well as the International Personality Item Pool (IPIP) scales (Goldberg, 1999). In these, there are a few important discrepancies from the humanistic tradition. Drawing empirically on the entire lexicon of personality concepts, some but not all lexical researchers explicitly allowed ability descriptors in studies of personality terminology (e.g. Angleitner et al., 1990). Some of the adjectives that best define high intellect, like “*bright*,” “*smart*,” and “*quick-witted*,” turn out to also indicate high intellectual ability. This choice thus aligned intellect scales much more with intelligence measures than humanistic-tradition openness scales (r about .10 higher; Anglim et al., 2020). The focus on single adjectives also reduced the scope of intellect questionnaires. Specifically, IPIP intellect inventories do not contain any items measuring aesthetic sensitivity, nor do questionnaires in this tradition include emotional or interpersonal aspects of the trait, which are not well-captured with single adjectives or short phrases.

The bottom-up approach of this tradition means that it is less centered around Western theoretical conceptualizations of psychology and personality structure. The humanistic theory of openness/intellect begins with the premise that this trait derived from the insights of Western researchers studying mostly Western samples, is universally important. Lexically-derived openness/intellect is ideally more content agnostic. By proceeding from dictionaries rather than theory, lexical studies highlight whichever trait concepts are relevant in a given society, and together can make visible the most universal content through identifying empirical cross-language regularities. Across Western samples, one regularity appears to be intellect. As we describe in part two of this paper, lexically-based research into openness/intellect in lexicons outside Western cultural contexts has

revealed serious limitations in the trait's cross-cultural relevance, with some languages including few or no openness/intellect-related terms among frequently used person descriptors.

A Modern Synthesis?

So, how did these two competing conceptualizations get resolved? They didn't. As the Big Five model of personality grew exponentially in popularity (John et al., 2008), a fifth factor involving both openness AND intellect was enshrined as paradigmatic, though its content varied across studies and theories and there was no real resolution agreeing upon its optimal name, scope, or overlapping components (e.g. Saucier, 1994; De Raad & Mlacic, 2020; DeYoung, 2010). This ambiguity continues today, as openness-focused questionnaires, intellect-focused questionnaires, and questionnaires that synthesize the two are all in common use and typically treated as interchangeable.

This non-resolution was probably necessary to allow the field to move beyond debates about the structural units of personality and onto studying its antecedents and consequences (Roberts & Yoon, 2022). Among Western samples, the lexically-shaped IPIP-50 intellect scale and the more humanistic NEO-PI-R openness to experience scale correlate around $r = .60$, meaning that findings that apply to one likely apply reasonably well to the other. As McCrae and Costa wrote in 1985, *"Although our version of the five-factor model differs in some details from Norman's (1963), the similarities are far more remarkable than the differences."* (p. 720). A .60 correlation, however, also implies considerable non-shared variance, which can systematically influence results, especially if researchers aren't aware of this discrepancy. Knowing the history and differences between openness and intellect questionnaires can aid researchers to select the scale that most appropriately addresses the theory underlying their research question, and to be attentive to how they describe and compare results.

Four modern questionnaires synthesize openness and intellect. The Big Five Aspects Scales measure openness and intellect separately and explicitly acknowledge their differential content and correlations (DeYoung, 2015b). The developers of the Big Five Inventory (BFI; John et al., 1991) and its

successor, the BFI-2 (Soto & John, 2017), instead took a transtheoretical approach that balances bits and pieces from different traditions, explicitly seeking to measure their intersection (Benet-Martinez & John, 1998). And finally, the Chinese Personality Assessment Inventory (CPAI; Cheung et al., 2003) and South African Personality Inventory (SAPI; Fetvadjev et al., 2015) were both derived through synthetic approaches that blended bottom-up incorporation of local, more intellect-based person descriptors, and top-down incorporation of openness content from the Western Big Five model (as we describe more in Part 3). We do not assert that these inventories are superior or inferior to those developed primarily through the top-down (openness) or bottom-up (intellect) approaches, but they do afford research that bridges the divide between the two to explore their differences. For example, the lower-level openness and intellect aspect scales of the BFAS openness/intellect differentially predict scientific and artistic outcomes (Kaufman et al., 2016) and the unconventionality, intellect, and aesthetic components of the BFI differentially predict a variety of academic outcomes (Schwaba et al., 2019).

In summary, the history of openness/intellect helps explain why the construct is so difficult to pin into a single paradigmatic conceptualization and reminds us that its presence in the Big Five model is, contrary to a commonly-held assumption among personality psychologists, NOT predominantly based on robust convergent empirical evidence across diverse lexical studies. Theoretical reasons for the psychological importance of this trait motivated its inclusion in structural models prior to the completion of any lexical research. Reconsidering openness/intellect through this lens highlights imprints left by forgotten aspects of this trait. For example, the historic link between those closed to new experiences and fascism studied at the Frankfurt school is recapitulated in contemporary research reporting low levels of openness/intellect among people who espouse “Alt-Right” ethnocentric political beliefs (Moss & O’Connor, 2020) and right-wing authoritarians in general (Sibley & Duckett, 2010). And recalling Maslow (1964), transcendent “peak” experiences induced by psychedelic drug use may catalyze openness/intellect change (Kettner et al., 2019; MacLean et al., 2011), positioning humanistic

components of openness as important constructs to assess in contemporary research on therapeutic psychedelic usage (van Elk & Fried, 2023).

What might future conceptualizations of openness/intellect look like? If recent research into lower-level personality trait structure is any indication (Condon et al., 2021; Irwing et al., 2024; Schwaba et al., 2020), it will involve greater appreciation of the specific elements within the openness/intellect extended universe. Breaking the trait apart has the potential to reveal and obviate many of the problematic quirks of openness/intellect's bifurcated history. For example, instead of treating NEO-PI-R openness to experience and BFI-2 open-mindedness as the same construct, a researcher focused on facets can appreciate that both questionnaires measure components of aesthetic sensitivity but only the NEO measures values. This more granular approach could allow for better specification of openness/intellect's nomological network, quantifying how and why broad trait-level associations have heretofore failed to replicate, and instead clarifying them across aspects, facets, and items. Taking with us this historically-informed, multifaceted conceptualization of openness/intellect, we now turn to other ways in which openness/intellect stands apart from the other Big Five.

Part II: Openness/Intellect is the Weirdest Personality Trait

Across many key research questions in modern personality psychology, findings can be summarized in a similar manner: "for extraversion, agreeableness, conscientiousness, and neuroticism, results suggest one pattern... but for openness/intellect, results suggest something different." In the following section, we highlight predicting life outcomes, links between personality and mental health, and volitional personality change as areas where openness/intellect stands apart. These examples both illustrate the weirdness of this trait and allow us to hypothesize testable explanations for them. In Table 1, we summarize these discrepancies into falsifiable propositions.

Table 1. Five research questions where openness/intellect is unlike the other Big Five traits

Research Question	Openness/Intellect	Extraversion, Agreeableness, Conscientiousness, Emotional Stability
1) How do personality traits predict life outcomes?	<ul style="list-style-type: none"> Some interaction effects Some moderation effects Associations sometimes contingent on context 	<ul style="list-style-type: none"> Interaction effects rare Moderation effects rare Associations generally robust across contexts
Proposition 1: Of the Big Five, associations between openness/intellect and life outcomes are most frequently subject to moderation and interaction effects.		
2) How are personality traits relevant to mental health?	<ul style="list-style-type: none"> Null associations with psychiatric symptoms Null associations with psychiatric diagnoses Associations differ across facets, methodologies, and definitions of mental health 	<ul style="list-style-type: none"> Negative associations with psychiatric symptoms Negative associations with psychiatric diagnoses Associations generally consistent across facets, methodologies, and definitions of mental health.
Proposition 2: Robust associations between openness/intellect and mental health emerge only for specific facets (fantasy, unconventionality), methodologies (molecular genetic associations), and components of mental health (psychological richness).		
3) Do people want to change their personality traits?	<ul style="list-style-type: none"> In free responses and interventions, few desire change On questionnaires, many desire increases No perceived deficit reduction: Low and high scorers desire similar change 	<ul style="list-style-type: none"> In free responses and interventions, many desire increases On questionnaires, many desire increases Perceived deficit reduction: Lower scorers desire more increases than high scorers
Proposition 3: People value openness/intellect less highly than the other Big Five. People may not consider openness/intellect change as feasible as change in the other Big Five.		
4) How do personality scales derived in the West function elsewhere?	<ul style="list-style-type: none"> Mean-level comparisons between cultural contexts rarely valid Correlational comparisons sometimes valid Lower internal consistency Weaker correlations among facets 	<ul style="list-style-type: none"> Mean-level comparisons between cultural contexts rarely valid Correlational comparisons commonly valid High internal consistency Correlations among facets strong
Proposition 4: Openness/intellect scales are less portable across cultural contexts than scales measuring the other Big Five.		
5) What is the structure of personality traits outside the West?	<ul style="list-style-type: none"> Typically doesn't emerge as a coherent trait Few if any terms present in lexicons Low correlations between local scales and Big Five/Six marker scales 	<ul style="list-style-type: none"> Sometimes emerge as coherent traits Some terms present in lexicons Moderate correlations between local scales and Big Five/Six marker scales
Proposition 5: Personality scales developed outside the West are less likely to include openness/intellect-relevant content than content relevant to the other Big Five.		

1. Of the Big Five, Openness/Intellect Is the Least Straightforward Predictor of Life Outcomes

One of the most important contributions of personality science is demonstrating that personality traits predict consequential outcomes across life domains (Borghans et al., 2016; Roberts et al., 2007; Soto, 2019). These effects are generally robust and straightforward: extraverted people tend to have more friends regardless of the extraverted person's age, education, gender, or cultural context, i.e., there are few moderation effects (Soto, 2019; Wang et al., 2022), and this association is not modified by their standing on other traits, i.e., there are few trait-trait interaction effects (Vize et al., 2023).

In the cases where the association between a personality trait and an outcome *is* subject to moderation or an interaction effect, however, we believe that evidence implicates openness/intellect more often than the other Big Five. One example of this comes from Beck and Jackson (2022), who tested moderators of Big Five-outcome relationships across 10 samples of primarily Western participants. Across their many results, openness/intellect-outcome associations were moderated more frequently than those of other Big Five traits, most commonly by education and income level. This seems to apply longitudinally, too. Wright and Jackson (2023) investigated associations between Big Five change and outcomes in a subset of the above samples, and noted that associations involving openness/intellect were moderated more frequently than associations for change in other Big Five traits. Soto (2019), also in a large multi-trait multi-outcome study, found that six openness/intellect-outcome correlations differed by age, sex, or ethnicity (a tie with neuroticism for most-frequent moderation; for the other Big Five, a maximum of two associations showed evidence of moderation). Finally, Vize and colleagues (2023) examined whether Big Five traits interacted with each other to predict outcomes, in Soto (2019)'s data. Of 750 interactions, only 59 were robustly significant, indicating that trait-trait interactions are rare; of these 59, over half involved openness/intellect.

Some examples can help illustrate what it means for associations between openness/intellect and outcomes to be contingent on other variables. First, multiple studies have found that people in Western contexts who score higher on openness/intellect tend to use the internet more frequently – but this link is much stronger among older adults than younger adults (Correa et al., 2010; Schwaba & Bleidorn, 2021). This makes sense if you consider the extent to which internet use is driven by curiosity, intellectual engagement, and enjoyment of novelty, three components within the openness/intellect extended universe. Among current cohorts of younger adults, the internet is simply ubiquitous, whereas for older adults use may be influenced by attitudes towards a behavior that is perceived as novel and intellectually challenging (Vroman et al., 2015). Curious, intellectual older adults appear to be more likely to use the internet and use it more frequently, whereas the traditional and unintellectual tend to avoid it.

For another example, people higher on openness/intellect are less religious – but only in more traditional and religious societies (Entringer et al., 2021; Saroglu, 2010; Toscanelli et al., 2022). As with internet use, this may be driven by a context-dependent relationship of openness/intellect components with a set of behaviors. In normatively-religious contexts, like Sub-Saharan Africa, Malaysia, and the southern United States, people who are traditional and conventional abide by the social order and are typically religious, whereas the highly open are likelier to rebel against norms and explore alternate value systems, leading them away from organized religion (Gebauer et al., 2014; Entringer et al., 2021; more on this in the next section). However, in contexts that are less religious, like Japan, China, and the coastal United States, openness/intellect may play less of a role, because there is a less salient norm for traditional people to hew to and unconventional people to rebel against. In fact, in secular contexts, people high on openness/intellect report *higher* levels of spiritual feelings (Saroglu, 2010).

Finally, people who score higher on openness/intellect are less likely to die – but only in older adulthood, as found in a mega-analysis of 15 samples of Western participants (Graham et al., 2017). We

believe this might be explained by shifts in the common causes of mortality across the lifespan. In younger adults, accidents and suicide are the most common causes of death, whereas in older adults, death is more frequently caused by conditions like heart disease and dementia.

(https://www.cdc.gov/injury/wisqars/pdf/leading_causes_of_death_by_age_group_2018-508.pdf). If openness/intellect is related to the latter more than the former, this may account for the age moderation of the findings. Indeed, research with Western samples has found that people higher on openness/intellect are not substantially more or less at risk for accidental injury (Clarke and Robertson, 2005) but are less likely to suffer from a number of chronic diseases (Weston et al., 2015), including Alzheimer's (Terracciano et al., 2014). In our interpretation, this shows how openness/intellect is much more relevant to behaviors that cause mortality in old age than those that cause early mortality, inducing a moderation effect.

These findings on internet use, religiosity, and mortality illustrate three cases where openness-outcome associations are moderated by context: A behavior's relation to components of the openness/intellect extended universe may vary systematically, making it necessary to include appropriate context when making sense of results. These findings, in tandem with recent research testing moderation and interaction effects across traits and life outcomes, leads us to our first proposal: of the Big Five, associations between openness/intellect and outcomes are more frequently subject to moderation or interaction effects than associations involving other Big Five/Six traits. Though this seems to be qualitatively the case from our survey of the literature, we look forward to future research that can provide confirmatory, pre-registered tests of this proposal to substantiate this way in which openness/intellect stands apart from the Big Five.

2. Of the Big Five, Openness/Intellect is the Least Relevant to Mental Health

A second major research question in the study of personality traits is their role in mental health (Kotov et al., 2017). A vast literature has shown that people who score higher on neuroticism and lower

on extraversion, conscientiousness, and agreeableness are more likely to report lower levels of well-being, experience psychopathology symptoms, and receive psychiatric-disorder diagnoses. Just as consistently, this research (with Western samples) has found that variation in openness/intellect does not correspond with symptoms or diagnoses (Anglim et al., 2020; Kotov et al., 2017; Malouff et al., 2005). This discrepancy on the part of openness/intellect has hampered efforts to integrate the Big Five with psychopathology (Widiger & Crego, 2019).

A few more nuanced lines of evidence, however, suggest that openness/intellect is indeed relevant to mental health, but in complex ways that require standalone consideration. One of these lines of evidence returns us to the bifurcated history of openness/intellect. Widiger and Crego (2019) point out that thought disorders are specifically relevant to the unconventionality components of openness/intellect. Unconventionality, as discussed in section one, is often measured in openness scales, but rarely in intellect scales, despite the fact that this content was salient in early lexical studies (De Raad et al., 1992). Other research adds a theoretical component to this distinction. DeYoung and Kreuger (2018) conceptualize deficits in reality testing - discriminating patterns that are real and useful from false patterns that should be discarded - as a major component of schizophrenia. They argue that openness-relevant components like daydreaming, absorption, and fantasy-proneness, are nonclinical manifestations of false-pattern perception that are highly relevant to understanding thought disorders (See also DeYoung et al., 2012). However, these connections are masked by contrasting associations with the intellect-relevant components in the other “half” of the trait. People who are intellectual, quick-witted, and wise can reduce false pattern perception by relying on their knowledge and intelligence. The conclusion is that openness/intellect may indeed fit into an integrative model of personality and psychopathology, representing non-clinical variation in cognition and behavior relevant to thought disorders, but only if specific content, especially unconventionality, is measured (Blain et al., 2020).

A second line of evidence that indicates relevance to mental health comes from molecular genetic research, which has recently identified substantial positive overlap between aggregated genetic variants that confer risk for thought disorders like schizophrenia and bipolar disorder, and aggregated genetic variants predictive of openness/intellect (genetic $r \sim .35$; Lo et al., 2017; Grotzinger et al., 2022). This correlation is strikingly high compared to the nonsignificant or negative associations between openness/intellect and thought disorders observed in non-genetic studies (e.g., Camisa et al., 2005). For nearly all traits, patterns of phenotypic and genetic correlations across variables are similar in magnitude (Turkheimer et al., 2014), so this difference across methodologies is notable. Our proposed reason for this discrepancy has to do with the distribution of thought disorder symptoms versus genetic risk. Thought disorders are rare, so most genetic variation in liability differentiates between people who have no symptoms. Two people with no symptoms of thought disorders may vary in their degree of genetic risk, and it may be variation in this subthreshold risk that is especially relevant to openness/intellect. These emerging findings point to a quotidian version of the “mad genius” – everyday people who are more creative, curious, and intellectual and have inherited a few genetic variants linked to thought disorders (but who do not suffer any thought disorder symptoms).

A final line of evidence for openness/intellect’s relevance to mental health comes from research on the psychologically rich life (Oishi & Westgate, 2022; Ryff, 1989; McCrae & Costa, 1980). Most research on mental health focuses on positive or negative emotions and indeed openness/intellect is less relevant than the other Big Five to both. Echoing historical humanistic perspectives that inspired early conceptions of openness, however, recent research suggests that leading a psychologically rich, varied life is also important to mental health for many people, and openness/intellect is highly related to this component (Oishi & Westgate, 2022). A rich inner life, a varied cultural ‘diet’, and the ability to introspect and express one’s emotions are core components of openness/intellect, and if one considers them important to mental health (Rogers, 1959; but see Miller, 1991), then the trait is certainly relevant.

In fact, when asked to rate the personality traits of the prototypically psychologically-healthy person, personality psychologists, positive psychologists, and undergraduate students each rated openness to emotions as the most important of all 30 NEO-PI-R facets (Bleidorn et al., 2020).

In sum, openness/intellect may initially appear to be irrelevant to mental health, especially compared to other Big Five traits. But when considering specific fulcrums of investigation, associations emerge that suggest particular, more nuanced connections. This leads us to our second proposition: that associations between openness/intellect and mental health, particularly thought disorders, are indeed robust with regards to specific openness components (predominantly unconventionality), methods that index subthreshold levels of disorder risk, and/or an expanded definition of mental health. As the development of a synthetic nosology of personality and psychopathology continues (Kotov et al., 2017), future research can take advantage of these considerations to better situate openness/intellect in mental health.

3. People Value High Scores on the Other Big Five, but not Openness/Intellect

We close this section by illustrating one more way in which openness/intellect is weird among the Big Five: its valuation. Compared to the other Big Five/Six traits, people do not seem to value high scores in this trait. One straightforward way to understand whether people value a trait is to measure whether they would like to see themselves and/or those close to them to increase in it. About two-thirds of people in Western contexts hold volitional goals to change their traits, and when asked open-ended questions about the ways in which they wish to change, people frequently mention becoming more extraverted, conscientious, agreeable, and emotionally stable (Hudson et al., 2020; Miller, 2021). A perceived deficit-reduction relationship to this valuation is also observed: people who are especially low on conscientiousness or honesty/humility, for example, are more likely to desire higher conscientiousness or honesty/humility, whereas people who already score high aren't as interested in changing (Thielmann & De Vries, 2021).

These patterns are not found for openness/intellect. When asked which Big Five traits they would like to change in themselves, by far the least common response is openness/intellect (Miller, 2021; Miller et al., 2019), a finding replicated across student samples from 55 countries (Baranski et al., 2021). This is also seen when people take concrete steps to change their personalities. In a smartphone intervention study in which German subjects selected a Big Five trait to change, openness/intellect was the least frequently chosen and the only trait that did not respond to the intervention (Steiger et al., 2021). Furthermore, unlike other traits, there is no deficit-reduction effect for volitional openness/intellect change: in a meta-analysis, the correlation between current levels of openness/intellect and desire to change among over 13,000 participants was perfectly null, $r = .00$ (Thielmann & De Vries, 2021).

Does this mean that unlike the other Big Five/Six traits, that there is not a more desirable pole for openness/intellect? Other methods of measuring the perceived value of traits suggest this is not so straightforward. When asked about trait change goals in *questionnaire* format, people indicate they want to increase in openness/intellect to the same extent as the other Big Five (Hudson & Fraley, 2014; Hudson & Roberts, 2014). Additionally, when asked in questionnaire format about which traits they value in a significant other, people in Western contexts do emphasize openness/intellect-related traits (Bleidorn et al., 2020; Botwin et al., 1997, Liu & Ilmarinen, 2020). These indicators suggest that people value at least some aspects of higher openness/intellect in themselves and others.

Research on volitional change in personality is a hot topic in personality psychology, yet to our knowledge there has been little attention paid to differences in trait valuation across personality-relevant constructs (c.f. Sun & Goodwin, 2020; Thielmann & De Vries, 2021). The accumulating evidence is that people value being open/intellectual less than they value high scores on the other Big Five/Six traits (when thinking of the emotional stability pole rather than neuroticism). We see two potential explanations for these findings given the current data. First, it may be that higher levels of

openness/intellect are seen positive but are not strongly valued: Given the choice, people agree it could be nice if they and close others were be more curious, intellectual, and creative (as indicated by volitional change questionnaire responses and ratings of preferred others), but low levels of this trait are not perceived to be problematic, or do not chronically cause everyday problems, in the same way as low levels of conscientiousness or emotional stability. This could explain the lack of a deficit-reduction relationship and the low rate of participants who spontaneously mention desired openness change in free-responses or choose this trait as an intervention target. Alternatively, current findings are consistent with the possibility people see change in openness/intellect as more difficult than change in other traits. If people do not think anything can be done to change their curiosity and knowledge, they may devalue volitional change in openness/intellect. To adjudicate between these two possibilities is straightforward, requiring ratings on the extent to which people believe volitional change in different traits is feasible. If people do not perceive openness/intellect change to be more difficult than change in other traits, the lack of volitional change goals in this trait is consistent with the lack of a more positive pole for this trait, as persuasively argued by Nettle (2007). We note that nearly all of this volitional change research has been done on college students, a population that scores higher on openness/intellect than average (Noftle & Robins, 2007) who might thus find more value in this trait.

We conclude this section with a reflexive point about the value of openness/intellect. We believe this trait's central position in personality psychology may be partially attributable to high openness/intellect among psychology researchers themselves (and academics in general; Lounsbury et al., 2012). From the days of the psychoanalysts and humanists to modern investigation into the benefits of a psychologically rich life, we might have a tendency to emphasize the importance of a trait that captures our favorite things about ourselves, or "who we are" (Miller, 1991). But there are real costs to high openness/intellect, as seen in associations with having smaller social circles (Thalmayer et al., 2011), a greater likelihood of divorce (Solomon & Jackson, 2014), more career changes, and less

financial stability in later life (Helson & Mitchell, 2020). These findings apply to individualistic contexts – elsewhere, it may be even more problematic to deviate from the crowd (we address this in Part III). So although we, as highly open/intellectual academics, derive much meaning in life and connection with others in ways that stem from this trait, we should be careful when declaring the objective benefits of openness/intellect and receptive when samples indicate this trait may not be important to them.

Part III: Openness/Intellect is the WEIRDest personality trait

We now turn our focus to another major way in which openness/intellect is weird. It may be the least pan-culturally applicable of the Big Five, uniquely relevant to the WEIRD cultural contexts where the Big Five were developed. As noted above, we avoid referring to samples or people as WEIRD (or non-WEIRD) because the acronym does not accurately cleave Western contexts (i.e. Western Europe, North America, Australia and Canada) from the rest of the world, the 89% of humanity who live in Africa, Asia, Latin America, the Middle East, and Eastern Europe. This was also not its intention, which was to distinguish Westerners from those living in small-scale or hunter/gatherer societies (Henrich et al., 2010). In the particular case of openness/intellect, however, WEIRD captures the problem pretty well. As described above, the creation story of openness/intellect draws heavily on *Western* samples, from the US (e.g. Costa & McCrae, 1992; Goldberg, 1990), Canada (Lee & Ashton, 2004; DeYoung et al., 2007), and northern and Western Europe (Angleitner et al., 1990; De Raad et al., 1992). Even where lexical research has gone farther afield, the samples are highly *Educated* (Goldberg, 1990): Excluding a few recent studies in African languages, virtually all have been conducted in samples of college students (Thalmayer, Job, et al., 2021, Supplemental Table S1). Research in Western contexts is highly confounded with education due to this reliance on students; openness/intellect might have different utility and associations in less educated or more rural and traditional areas within Western contexts too. Western contexts are generally *Industrialized* and comparatively *Rich* which is also true of the East Asian

contexts that provide the most common source of cultural contrast in psychology. These are the contexts where distinguishing openness/intellect may be most relevant, due to a diversity of career paths, including variation in creative and intellectual opportunities (Smaldino et al., 2019). Finally, the contexts where research on openness/intellect has occurred are also largely *Democratic*, as one can ascertain from items that presuppose freedom of religion and thought that are not true in all societies. In the following section, we outline the ways in which openness/intellect sometimes emerges and sometimes doesn't across cultural contexts, and we compare these results to patterns found for the other Big Five domains. In effect, this entire section is one extended constraints on generality statement. The qualities that set openness/intellect apart are summarized in the bottom half of Table 1, above.

Etic research

One method of investigating the universality of personality structure, the etic approach, is to develop a questionnaire in one context and examine its validity when administered in others. Ideally, researchers do this by testing measurement invariance to formally examine patterns of similarity across groups, with successive levels of similarity required for successive levels of comparison (Vandenberg & Lance, 2000; Fischer & Karl, 2019).

The first-level test of similarity across groups is for configural invariance – whether items designed to measure a construct like openness/intellect are generally associated with it in each group. The second level, metric invariance, is established by showing that the patterns of intercorrelation among items in a scale are similar across groups. For example, do items measuring creativity, reflectiveness, and curiosity correlate among each other in similar ways across samples from two different cultural contexts? If so, one can meaningfully compare *correlations* of the aggregate scale scores between the groups – whether openness/intellect is more strongly correlated with an outcome in one group or the other. Finally, if metric invariance is satisfied, one can test for scalar invariance,

whether item scores relate to aggregate scale scores in the same way across groups. Do people who score high on openness/intellect tend to do so because they are both creative and reflective, in both groups? If this is satisfied, one can compare *mean scores* between the groups – whether one group tends to be more open/intellectual on average than the other.

Within Western contexts, openness/intellect and the other Big Five/Six traits seem to function comparably across different kinds of groups, typically satisfying all three tests of measurement invariance. For example, measurement invariance for openness/intellect scales has been established across age groups (Olaru et al., 2019; Oltmanns et al., 2020; Schwaba et al., 2018), and across income and education levels in the United States, after adjusting for a small number of invariant items (*“Prefers work that is routine”* and *“values artistic, aesthetic experiences,”* Hughes et al., 2021). This latter finding suggests that, within the United States, variation in Education and Rich-ness may not strongly affect the structure and relevance of openness/intellect. Little research has examined measurement invariance across racial and ethnic backgrounds within WEIRD contexts, however. One study established comparability of mean scores for an adjectival Big Five measure between Black and White job applicants, although two of the four with differential fit involved openness/intellect (Collins & Gleaves, 1998), and a study that compared European- and Asian-American college students found that mean levels of openness/intellect on the NEO-PI-3 were comparable after adjusting for non-invariance in openness-to-action (Liu et al., 2020). Future research is needed to better interrogate the comparability of the Big Five/Six generally and openness/intellect specifically across socio-demographic groups in Western contexts.

This initial evidence for the comparability of personality trait scores across demographic variables within Western contexts allows researchers to leverage the major strength of the etic approach: if a scale functions similarly across groups, it can be used for direct comparisons, such as

investigating differences in openness/intellect scores across the lifespan, or testing how correlations may be moderated by group membership (see Part 2 Section 1 above for examples).

In other world contexts, however, etic studies of openness/intellect have had more mixed measurement invariance test results. This is common across Big Five/Six inventories: cross-cultural personality research has rarely established measurement invariance at the level that allows for comparison of mean scores across groups (Church et al., 2011; Garcia et al., 2022; Laajaj et al., 2019; Steyn et al., 2022; Thalmayer & Saucier, 2014; Thielmann et al., 2020). For example, Church and colleagues (2011) compared translations of the NEO-PI-R among college students in the US, the Philippines, and Mexico. Despite holding age and education constant, a majority of items, for openness/intellect and the other Big Five, failed scalar measurement invariance tests that would permit cross-sample mean comparisons.

But openness/intellect's cross-cultural problems tend to be worse than those of the other traits, typically demonstrating the lowest item intercorrelations and least congruent factors across groups (McCrae et al., 2005). Sometimes, openness/intellect scales fail less-restrictive tests for metric invariance that would permit correlational comparisons: In Church and colleagues' (2011) study, items measuring the openness/intellect facet scales for values and actions (plus agreeableness: tender-mindedness) showed the greatest deviation in correlational patterns across groups. A similar pattern was found in a sample of Chinese college students (Cheung et al., 1996), where openness/intellect items were the least intercorrelated of the Big Five and the facets of actions, values, and ideas could not be coerced into the openness factor. Notably weak intercorrelations were also reported in studies of French-speaking Africans (Rossier et al., 2017) and Spanish university students (Benet-Martinez & John, 1998).

Further insight into this problem can be gleaned from a major comprehensive study of personality structure among people living in 23 low- and middle-income countries (Laajaj et al., 2019). In

this study, openness/intellect showed major configural deviations from the intended Big Five factor structure, though in this case not to a greater extent than agreeableness or conscientiousness.

Interestingly, these deviations were more pervasive in data collected through face-to-face interviews of representative samples; online survey methodology using convenience samples led to much smaller discrepancies in factor structure. As Henrich (2020) comments, participants in these online surveys were younger, more educated, literate, and more likely to speak English, typical of online cross-national studies. Methods that sample the ‘WEIRDest’ people across contexts seem to comport best with the Big Five structure.

Taken together, these findings illustrate the limitations of the etic strategy to export openness/intellect. They also reveal the cultural malleability of personality structure and present a strong argument that the Big Five as derived in Western, student samples is not a one-size-fits-all personality solution that can be exported worldwide (Thalmayer et al., 2022).

Thankfully, there are workarounds that allow for cross-cultural comparison even when scale scores aren’t directly commensurate. Statistically, if a researcher estimates openness/intellect as a latent variable (rather than a composite or sum score), and can identify “anchor” items that function similarly across groups, they can establish partial measurement invariance and compare the anchored latent scores across cultures (Byrne et al., 1989, Nye & Drasgow, 2011, Putnick & Bornstein, 2016). For example, Olaru and Danner (2021) found that although the full BFI-2 openness/intellect scale was not invariant across five Western nations, an invariant three-item subset could be extracted (including *“Values art and beauty,” “Has little interest in abstract ideas”* (reverse-scored), and *“Is original, comes up with new ideas”*). Thalmayer and Saucier (2014) used measurement invariance across 26 samples to define the five best-possible items for a cross-cultural Big Six inventory, further refined to four items by Hopwood and colleagues (under review) for use in Namibia (*“I have difficulty understanding abstract ideas* (reverse-scored)*”* *‘I have a rich vocabulary,” “I am considered to be a wise person,”* and *“I am an*

extraordinary person.") Finally, Kura and colleagues (under review) found a five-item metric-invariant scale of HEXACO marker terms for Openness across three African samples (*clever, creative, gifted, intellectual, and sharp*). Though these strategies permit comparisons across contexts, there is a cost. To the extent that they pare down scales to a smaller subset of items, they assess a narrower conceptualization of the openness/intellect extended universe that omits some of its components.

Recently, some researchers have claimed that measurement invariance tests are overly restrictive and that the validity of cross-cultural comparisons should instead be established using patterns of associations with external variables (Welzel et al., 2023; Funder & Gardiner, 2024). These researchers argue that even if openness/intellect items function differentially in different cultures, evidence that openness/intellect scores predict outcomes similarly across cultures provides sufficient evidence to justify scale score comparisons. For example, Laajaj and colleagues (2019) found that openness/intellect was positively associated with income across nations despite extremely inconsistent scale functioning. Our brief refutation of this argument is that measurement invariance tests are designed to identify whether constructs are the *same* across groups and can explicitly quantify the direction and amount of bias introduced by deviation from perfect congruence (Nye & Drasgow, 2011), whereas this alternate method only establishes whether they are *similar* using much softer logic. By analogy, if a researcher measures PTSD symptoms in one group and depression symptoms in another, they would find that both are associated with lower well-being, but these consistent correlational patterns do not indicate that these two disorders are the same. And though it is indeed valuable to use patterns of external correlations to identify similar constructs (Lawson & Robins, 2021), directly comparing mean scores on similar constructs that do not satisfy measurement invariance tests is as nonsensical as testing whether one group's depressiveness is higher than another group's PTSD.

Emic research

A second approach to understanding personality structure is to derive a local personality structure from the ground up. This provides the strongest test of the relevance of personality constructs in a population. Most commonly, this has been done through lexical personality-description research that identifies the most commonly used terms to distinguish between people in a given language and society and then tests patterns of covariation among these terms (e.g., Goldberg, 1981, 1990). While many initial lexical studies focused on identifying small sets of broad factors, in part because small sets of factors are most likely to replicate across cultures (Thalmayer et al., 2022), lexical studies have the potential to yield quite varied many-trait structures that can elucidate interesting local configurations of personality (e.g. Saucier & Iurino, 2020; Thalmayer, et al., 2021). These emic structures can be compared to proposed universal models of personality structure by adding key terms that allow for the creation of marker scales for the Big Five/Six and other models, providing empirical tests of replicability. Often, even in cultures in which the best-fitting factor structure looks quite different from the Big Five, correlations between emic factors and Big Five markers indicate that at least some factors across the two structural models are compatible – but if any are not, openness/intellect is among the incompatible factors (Benet-Martinez & John, 1998; Saucier et al., 2005; Thalmayer et al., 2020; 2021; Zeinoun et al., 2018).

Emic studies of personality structure have not identified a consistent openness/intellect trait, even in Western contexts. As early as 1994, regarding lexical studies in several European nations, De Raad wrote, *“None of the nominated fifth [openness/intellect] factors ... has both proceeded from the lexical method and received unquestionable cross-cultural affirmation.”* (De Raad, 1994, p. 229). The openness/intellect-like factors resulting from Indo-European-language emic studies have emphasized different sets of content: intellect (in the US and Germany; De Raad, 1994) versus unconventionality (in the Netherlands and Spain; Benet-Martinez & Waller, 1997) versus prowess/heroism (in Greece; Saucier et al., 2004).

These differences are minor, however, compared to results of emic studies in other cultural contexts, where terms related to openness/intellect are often completely absent. For example, no terms related to openness or intellect appeared among the most frequently used personality descriptors in emic, bottom-up lexical studies in three African languages representative of the main language groups of Africa (Thalmayer et al., 2020, 2021). Khoekhoe (the most widely-spoken of extant Khoi-san languages), for example, lacks a word for creativity, with the closest similar word being *uixia*, a person who tends to think things out or come up with ideas (Thalmayer et al., 2021). In South Africa (Fetvadjev et al., 2015; Nel et al., 2012) and in the Arab Levant (Zeinoun et al., 2018), researchers collected free personality descriptions and used them to identify relevant traits that could be measured with short phrases. In these studies, too, content coverage was weaker for openness/intellect than the other Big Five.

Comparisons across emic lexical studies have been used to identify cross-cultural structural models for personality. Two models that fit well across languages and cultures are a two-factor model, with agentic and pro-social traits (Saucier et al., 2014) and a three-factor model (affiliation, order, and dynamism, De Raad et al., 2014). However, the factors in these models are not closely associated with marker scales of openness/intellect, and the factors omit openness/intellect-related content almost completely.

Some emic research has been conducted with a more applied goal: to create a personality questionnaire for local use in a specific cultural context. Doing so requires balancing the goals of measuring a locally-coherent personality structure with creating an inventory that can be synthesized into paradigmatic Five- and Six-factor models prominent in the literature. In practice, achieving both of these goals for the trait of openness/intellect is difficult. For example, the South African Personality Inventory (Fetvadjev et al., 2015) includes measures of openness/intellect and extraversion, even though these traits had a much weaker empirical basis for inclusion than other traits. Similarly, the

Chinese Personality Assessment Inventory measures a trait called interpersonal openness, which was included after much effort to identify *any* valid openness/intellect-related scale (Cheung et al., 1996; 2001; 2003). Thus, inventories that measure openness/intellect in non-English languages may do so partly out of deference to openness/intellect theory rather than compelling empirical evidence.

Overall, the results of emic studies to date provide very little support for the cross-cultural relevance of openness/intellect. In the West, the core of an openness/intellect factor shifts across studies, and outside the West, openness/intellect is not typically identified as a coherent, important personality factor at all, despite efforts to find convergence with the dominant Western model. In the following section, we develop specific hypothesis for why this might be the case.

Cultural Differences May Affect the Relevance and Coherence of Openness/Intellect

Both etic and emic lines of research on openness/intellect indicate that the psychometric properties of the trait covary with WEIRDness. Why? In the following section, we theorize about how specific cultural differences may affect two important qualities of the trait: its relevance (as indexed by presence in natural language, and thus identification in emic research), and its structure (as indexed by correlations among different traits, and thus its portability in etic research). Throughout, we develop specific falsifiable hypotheses that can be tested in future research.

Openness/intellect may be especially relevant in individualistic cultures

Cultural differences have psychological consequences (Heine, 2020; Henrich, 2020; Kitayama & Salvador 2024), affecting for example religious and metaphysical beliefs, values regarding family relationships and gender roles (Muthukrishna et al., 2020; White et al., 2021; Saucier, et al, 2014), how a person's worth is determined (Leung & Cohen, 2011) and cognitive styles (Choi et al., 2007). Each of these may shape the ways in which people perceive and describe themselves and each other, influencing the local relevance of personality traits and their inclusion in lexicons. Specifically, according to the lexical hypothesis (Allport & Odbert, 1936; Goldberg, 1981), trait terms are present in a language

to the extent that they describe important vectors of individual difference. This implies that in contexts where a certain trait is especially relevant, there will be more terms to describe how people differ on it, whereas irrelevant traits will be described by fewer or no terms.

One of the most well-studied cultural differences is individualism versus collectivism, also known as independence versus interdependence, which indexes the extent to which a society's members prioritize individual identity coupled with impersonal pro-sociality, valuing principles of fairness to all, versus loyalty to, reliance on, and identification with collective ingroups (Hofstede, 1980; Triandis, 1989; see Henrich, 2020 for an in-depth discussion of these differences). Due to various historical reasons, Western cultures tend to be uniquely individualistic (Henrich, 2020). We believe that individualism may work in tandem with the lexical hypothesis to influence the relevance of openness/intellect, affecting whether terms related to openness/intellect are found in a group's lexicon. We specifically propose that individualism may make trait behavioral variability and niche-picking behavior especially important, leading over time to the inclusion of relevant single-word openness/intellect terms in the local lexicon (Table 2).

Table 2. Hypotheses for how cultural differences shape Openness/Intellect

Cultural difference	Relevance to openness/intellect	Hypothesis
1) Individualistic cultures increase the relevance of trait descriptors of behavioral variability .	Behavioral variability is a component of the openness/intellect extended universe, described in English with terms like <i>adventurous</i> , <i>curious</i> , and <i>exploratory</i> versus <i>simple</i> and <i>boring</i>	<i>Between languages</i> : Languages spoken in more individualistic cultures should contain more terms for behavioral variability. <i>Within languages/cultures/countries*</i> : terms for behavioral variability should be used more frequently in more individualistic contexts.
2) Individualistic cultures increase the relevance of niche-picking behavior – a person's selection of work, love, leisure, and values.	Niche-picking behavior is especially relevant to openness/intellect. English terms like <i>artistic</i> , <i>inquisitive</i> , <i>broadminded</i> , and <i>unsophisticated</i> are highly predictive of a person's niches.	<i>Between languages</i> : Languages spoken in more individualistic cultures should contain more terms for niche-picking behavior. Trait terms for niche-picking behavior should correlate with components of the openness/intellect extended universe. <i>Within languages/cultures/countries</i> : In more individualistic contexts, terms for niche-picking behavior should be used more frequently.
3) Tight cultures discourage and pathologize norm-violating behavior .	Norm violation is a component of openness/intellect, described in English with terms like <i>eccentric</i> , <i>odd</i> , and <i>weird</i> versus <i>conventional</i> and <i>rule-following</i> .	Among people living in tighter cultures, associations between traits relevant to norm violation and components of the openness/intellect extended universe should be weaker. Traits relevant to norm-violation should be more strongly associated with neuroticism in tighter contexts.
4) Collectivistic and tight cultures locate value systems more outside the individual.	Value systems are a component of the openness/intellect extended universe, described in English with terms like <i>broadminded</i> and <i>free-thinking</i> versus <i>traditional</i> and <i>conservative</i> .	Among people living in more collectivistic and tight cultures, inter-item associations within value-relevant trait scales should be weaker, associations between value-relevant trait scales should be weaker, and value-relevant trait scales should correlate less strongly with other components of the openness/intellect extended universe.

* Here we refer both to different regions with the same country, e.g., rural and urban, and also to situations in which the same language is used in multiple regions; for example English is the national or de facto national language in 63 countries, where it has diverged into local forms (World Englishes, e.g. Kirkpatrick, 2008).

For decades, scholars have theorized about how individualism may make personality traits more salient. People in more individualistic cultures, where there are fewer situational prescriptions for behavior, tend to attribute a person's behaviors to internal motives (a person helps someone because they are agreeable, kind, or affiliation motivated) whereas in collectivistic cultures where situational prescriptions are stronger and more frequently present, behavioral attribution is more often to the

situation (a person helps because an in-group member needs help; Church & Lonner, 1998; Henrich, 2020; Triandis, 2001). We expand on this by theorizing that people in more individualistic cultures may tend to attribute *variability* in behavior to internal motives rather than situational contingencies. Personality trait terms that describe differences in behavioral variability, like *adventurous*, *curious*, *exploratory*, *conventional*, and *boring*, tend to be located within the openness/intellect extended universe. These differences are assessed through BFI, HEXACO, and NEO items that ask whether a person enjoys learning about new things, tries new and unfamiliar foods, or prefers routine, and are borne out by research that has shown openness/intellect as the strongest personality predictor of everyday behavioral variability, both online and offline, among Western participants (Matz, 2021). In collectivistic cultures, we believe that engaging in different behaviors across situations is more likely to be attributed to situational differences. In this case, there is little need for trait terms to describe why some people are less ‘predictable’. In contrast, individualistic cultures may offer less clear guidance as to appropriate behavior in specific situations, and fewer situational attributions for variability, leading to the development and use of trait terms for this concept.

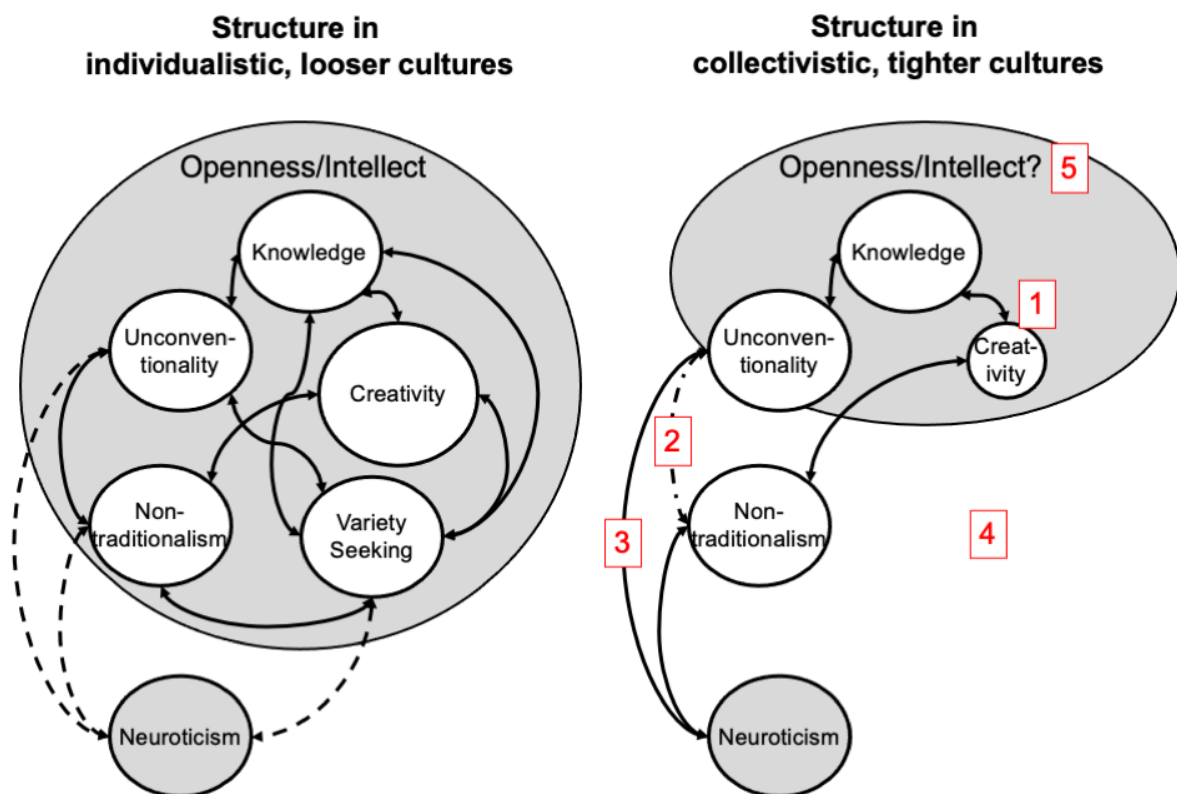
Beyond increasing the relevance of openness/intellect through emphasizing trait attributions for behavioral variability, individualism may increase its relevance by encouraging varied niche-picking behavior and personality attributions for this behavior. In the last decade, the niche-diversity hypothesis has been developed to explain differences in personality structure across societies (Durkee et al., 2020; Smaldino et al., 2019). According to this theory, societies with a greater number and variety of social roles promote differentiated and unique personality trait combinations, producing a more complex emergent system of personality traits. As with behavioral variability, we propose that this theory has unique consequences for openness/intellect. Of the Big Five/Six, openness/intellect is extremely relevant to niches. The BFI, BFAS, NEO, and HEXACO inventories all assess a person’s enjoyment of philosophical conversations, interest in the arts, and preference for the abstract over the concrete, and

English contains adjectives like *artistic*, *inquisitive*, *broadminded*, and *unsophisticated*. These qualities are among the strongest trait indicators of what a person values (Dollinger et al., 1996; Thalmayer et al., 2019) and how they spend their leisure time (Kraaykamp & Van Eijk, 2005; Schwaba et al., 2018), as well as being the Big Five trait most associated with romantic partner selection (Horwitz et al., 2023; Watson et al., 2004), political preferences (Gebauer et al., 2014; Kandler et al., 2011; Osborne et al., 2023), and, along with conscientiousness, education (Noftle & Robins, 2007; Schwaba et al., 2019). In other words, in individualistic contexts that feature many niches and attribute a person's niche selection to their personality, openness/intellect is especially relevant.

By contrast, in more collectivistic cultures, there may be fewer niches to select from, and fewer reasons to attribute niche selection to personality traits. For example, Senufo people are well-known for their masks and painting and value artistic skill, but have very few words to describe individual differences in openness/intellect, even regarding aesthetic preferences. In this setting, these traits are passed down through family lines (Diamitani, 1999) rather than chosen by an individual. Thus, individual differences in aesthetic preferences may be less relevant to discuss in Senufo society, leading to fewer related trait terms.

In sum, we hypothesize that individualistic cultural contexts 1) emphasize trait attributions for behavioral variability and 2) provide a diverse set of niches that people select into, both of which promote the creation and use of personality trait terms within the openness/intellect extended universe. If this is true, differences in individualism both across and within languages should covary with the presence and prevalence of terms related to behavioral variability and niche-picking (Table 2). This may explain why openness/intellect terms occupy a central place in North American and European lexicons and are often absent in other contexts. We visualize these effects in Figure 2 below, in particular boxes 1, 4, and 5.

Figure 2. Hypothesized cultural differences in the relevance and structure of openness/intellect, visualized



Note: Circles represent personality traits; larger circles are more relevant and indicated by a larger number of local terms. Double-headed arrows represent covariances. In cultural contexts that are collectivistic and tighter, five differences may emerge, depicted with red numbered squares: 1) Languages in these contexts typically have fewer words for openness/intellect (creativity has a smaller circle). 2) Associations between components are weaker (dashed line between unconventionality and non-traditionalism), especially associations between ideologically-relevant components. 3) Components may correlate with other Big Five/Six traits. In particular, nonconformity-related traits may be associated with neuroticism. 4) Some components may be completely absent from language (variety-seeking circle absent), especially words describing trait-like behavioral variation. 5) If an openness/intellect trait is identified in this language, it may differ substantially in scope and content (broad gray openness/intellect trait is smaller and encompasses a different set of narrower components).

Individualism and cultural looseness may explain why the structure of openness/intellect varies across cultures

Beyond modifying the relevance of openness/intellect, cultural differences may also shape its structure. Traits within the openness/intellect extended universe that covary strongly in a Western context may not covary as strongly elsewhere, or may covary more strongly with other Big Five/Big Six traits. This would explain the unique problems researchers face in establishing measurement invariance of openness/intellect across groups.

Here, in addition to individualism versus collectivism, the variable of cultural tightness versus looseness (Gelfand et al., 2011) may be relevant. While one aspect of individualism vs. collectivism is that it captures the presence of clear norms for behavior, tightness vs. looseness focuses on the strength of a culture's norms and the tolerance for deviant behavior – how important it is to stick to the script (Torreli & Rodas, 2017). Cultures that are less individualistic often tend to be tighter, though the correlation is not perfect ($r = -.47$; Gelfand et al., 2011). Places where the two diverge illustrate their distinctiveness: Israeli culture has many norms regarding Jewish religious practice, but deviation from these norms is commonplace, meaning the culture is moderately collectivistic but very loose (Gelfand et al., 2011). Parts of the mountain West in the US, in contrast, are very individualistic and do not have many norms for behavior (Vandello & Cohen, 1999), but deviation from these few key norms are highly punished, leading to tight culture; for example, these states are among the most homophobic in the US (Human Rights Campaign, 2022; <https://www.hrc.org/resources/state-equality-index>). We hypothesize that more collectivistic and tighter cultures promote two major changes to the structure of openness/intellect: they discourage and pathologize norm violation, and they locate ideology and value systems outside of the individual.

Cultures that are more collectivistic and tight have a greater number of societal norms and punish deviations from these norms more harshly. Descriptive terms like nonconformist, eccentric, or

unconventional – hallmarks of top-down, humanistic conceptions of openness/intellect measured in the HEXACO and NEO inventories - may be pathologized. Instead of covarying with other components of the openness/intellect extended universe like curiosity and creativity, or forming their own unconventionality factor, as in Dutch lexical research (De Raad et al., 1992), these terms may be more associated with traits indicating maladjustment, like neuroticism or moral evaluation.

Second, in more individualistic and loose cultural contexts, people are encouraged to choose their own constellation of ideological commitments and value systems, whereas in more collectivistic and tight contexts there may be a strong normative expectation to adopt the value set of one's ingroup. This may affect associations among traits involved in the formation and expression of ideology and values, especially reflection, intellectualism, and broadmindedness. In Western contexts, openness, more so than intellect, is the strongest personality predictor of political ideology (Osborne et al., 2023; Xu et al., 2021). Theoretically, someone who is reflective and intellectual may feel more comfortable with societal change and challenging their own beliefs, and thus favor a progressive set of values that embrace change and tolerance of diversity. The opposite may occur in a person whose dislike of abstract intellectual exercises and preference for familiar and the routine pushes them towards a traditional value system that emphasizes societal stability and the maintenance of convention.

In a collectivistic and tight society, however, this linking of openness to ideology may be disrupted: regardless of their tendencies on traits related to openness/intellect, a person may be more likely to align their ideology with that of their ingroup. This difference should theoretically lead to weaker associations between ideologically-relevant openness/intellect facets like broadmindedness and less ideologically-relevant ones like aesthetic sensitivity. It may also weaken the correlations among the items of ideologically-relevant openness/intellect facets. Support for this hypothesis comes from cross-cultural research using NEO inventories, whose openness/intellect scale contains a values facet that directly indexes liberalism and tolerance for secular viewpoint diversity. Etic research has found this

facet to be the least culturally-portable trait within the NEO Big Five (Church et al., 2011; Cheung et al., 1996).

In sum, we hypothesize that two important qualities of cultures, individualism and tightness, can help explain why the structure of openness/intellect varies between contexts. In more collectivistic and tighter contexts, openness/intellect facets relevant to unconventionality and nonconformity should be correlated less strongly with other openness/intellect components and more strongly with neuroticism, consistent with discouragement and pathologizing of these behavioral tendencies. Additionally, in such contexts, the structure of ideologically-relevant content should be less coherent, reflected in lower inter-item correlations within and between openness/intellect components. We visualize these effects in Figure 2 above, in boxes 2, 3, and 5.

Researchers have remarked on the difficulty of tying particular cultural differences to personality structure (Church, 2016). We thus offer these theoretically-grounded, specific and falsifiable predictions. If these differences are driven by the theoretical mechanisms we suggest, they should emerge not only when comparing Western to majority-world samples, but also across culturally-varying areas of the same country (e.g., rural versus urban areas), across the same contexts over time, and perhaps even within individuals across their lifespans.

The Bright Side: The Utility of Openness/Intellect in Cross-Cultural Research

Universal Elements of Openness/Intellect?

At this point, one may wonder if there is any point to studying openness/intellect! If it varies so much across cultures and is absent from the lexicons of many, does it merit study? We believe it does, for at least two reasons. First, despite these limitations, there may be universal elements of personality variation within the openness/intellect extended universe. Careful lexical investigation, biological commonalities, and evolutionary theory can guide the way here.

Even if some languages and language families lack terms for concepts like imagination or curiosity, some openness/intellect concepts seem more pan-linguistic. For example, the 30-item cross-culturally optimized QB6 originality factor includes items measuring wisdom, vocabulary, and difficulty with abstract thought (Thalmayer & Saucier, 2014). Further, Saucier and colleagues (2014) identified behavioral propensities related to competence that appear across 12 languages unlikely to have influenced each other. “*Wise*,” “*stupid*,” and “*quick*” are clearly relevant to intellect and invoke a combination of behavioral propensity and ability likely to overlap with cognitive ability. Perhaps these terms could serve as a cross-cultural anchor for an openness/intellect-like trait centered around knowledge (as depicted in Figure 2) with peripheral elements like aesthetic sensitivity and unconventionality incorporated on a culture-by-culture basis.

Furthermore, although the lexical hypothesis is useful for identifying which traits are most relevant to which societies, it is limited by its reliance on single-word trait terms, which are not necessary for people to be able to differentiate others on a trait. Even in English, the language in which openness/intellect was developed, many trait terms for the openness pole of the trait require multi-word person descriptive phrases, as noted above (Saucier, 1992). Thalmayer and colleagues (2021) asked Namibian Khoekhoe speakers in Khoekhoe “do you know anyone who tends to think things out, or tends to come up with ideas?” also adding the Afrikaans word for creative. Though Khoekhoe does not contain words related to openness/intellect, most interviewees easily identified a person who fit the trait, and in their responses described people who embody core concepts of openness/intellect, like being artistically or practically inventive. These findings suggest that, even where openness/intellect may not have been relevant over a long enough period to be encoded into single-word terms in the language, it is still an individual difference people can relate to when asked.

Vectors of biological variation common to all humans may provide another starting point for conceptualizing a universal core of openness/intellect. About half of all people experience aesthetic

chills, the wave of tingling excitement that can accompany meaningful artistic experiences (Goldstein, 1980). This tendency appears across cultures (Beier et al., 2020; McCrae, 2007), and people who often experience aesthetic chills tend to score higher on other elements of openness/intellect (McCrae, 2007). Furthermore, research on the rarer subset of people who can voluntarily control their goosebumps has found them to score extremely high on BFAS openness/intellect (Cohen's d of .90; Heathers et al., 2018). Other individual differences that merit investigation for a biology-first conception of openness/intellect are binocular-rivalry suppression, the extent to which a person is able to simultaneously perceive different images presented to different eyes at the same time, which has been associated with openness/intellect scores (Antinori et al., 2017), and synaesthesia, the perception of sense stimuli in an unintended sense, which, to our knowledge, has not yet been studied with respect to openness/intellect. Both are emblematic of (over)inclusive cognition that has been hypothesized as core to openness/intellect (Blain et al., 2020). These connections illustrate a provocative set of biologically-grounded individual differences relevant to Western conceptions of openness/intellect. To the extent that they reflect long-evolved individual differences conserved across the entire species, they may be less culturally bound.

Finally, we may be able to use cross-species research to identify openness/intellect-related individual differences that are less affected by cultural variation (Lilley et al., 2017). All living beings who perceive the world must integrate information varying in certainty in order to make decisions about behavior. The dogma of natural variation states that animals of the same species will differ in how they deal with this uncertainty (DeYoung, 2015a). For example, many species of birds, rats, and fish vary in their trait-like foraging strategies, where there is a tradeoff between prioritizing safe, less efficient foraging versus boldly pursuing food despite potential threats (Sommer-Trembo et al., 2024; Wilson et al., 1994). Elsewhere, research on dolphin “creativity” has found that they tend to vary their behavior to alleviate monotony, suggesting relevant openness/intellect components like variety-seeking (Kuczaj et

al., 2014). Perhaps a cross-cultural, cross-species core conceptualization of openness/intellect could be derived from these basics, with species- and culture-specific elaborations. A more circumscribed label like problem solving or curiosity is arguably more descriptive of this core than openness/intellect, as traits like enjoying poetry and contemplating philosophy are not qualities observed yet in nonhuman species.

Openness/Intellect's WEIRDness is a Feature, not a Bug

Despite some past predictions about the universality of personality trait structure (e.g., Costa & McCrae, 2005), and the strong appeal of a culturally-universal Big Five/Six model, it appears unequivocal that openness/intellect as currently conceptualized and measured in the Big Five/Six is not universally coherent and relevant. This is a disappointing conclusion for strong top-down theories about personality structure that require the existence of a small set of immutable, omnipresent latent variables, or for inflexible bottom-up theories about personality structure that require similar patterns of trait covariance across all humanity. It also means that we can't assume that research findings about the antecedents, structure, and consequences of openness/intellect found in WEIRD samples can be assumed to generalize to the rest of the world. But, even if openness/intellect is not a true ontological primitive, taking a more structurally-pluralistic perspective (Srivastava, 2020) can allow us to appreciate and explore the WEIRDness of openness/intellect as a feature, rather than as a bug.

For one, openness/intellect *is* a consequential individual difference in the cultures in which it emerges, making it deserving of study. In Western contexts, a person's openness/intellect predicts educational and career outcomes (Schwaba et al., 2019), romantic desires and decisions (Jokela et al., 2011; Solomon & Jackson, 2014), and the psychological richness and meaningfulness of their life (McCrae & Costa, 1980; Lilgendahl et al., 2013). There is no need to ignore important correlations and behavior prediction in some cultures because a trait isn't as relevant everywhere. We must simply couch results in awareness that this is a kind of ethnographic research that can only take us so far in

understanding human psychology (Klimstra & McLean, 2024; Laher, 2019). Just as papers on personality constructs less relevant to Western contexts are customarily titled in ways that ‘other’ the samples (e.g., “*Amae* – a key concept for understanding Japanese personality structure”; Doi, 1962; see also Castro Torres & Alburez-Gutierrez, 2022; Kahalon et al., 2022), some up-front decentering (Arshad & Chung, 2022) of openness/intellect may be refreshingly honest: “*Openness/Intellect* – A key concept for understanding educated members of the individualistic West.”

Additionally, variation in the relevance and coherence of openness/intellect across cultures presents an opportunity for empirical investigation. From a statistical perspective, it is beneficial that research has to date oversampled the Western cultures in which it is most important, as, after more representative data is collected, it maximizes statistical power for cross-cultural analyses. As we laid out in the previous section, certain societal qualities may be especially tied to openness/intellect, and testing these hypotheses will advance our understanding of how cultural variation shapes personality structure more generally.

Conclusion

Openness/intellect is ‘weird’ in all senses of the word: it is embodied in weird, unconventional people, it has weird, puzzling patterns of correlations that set it apart from the other Big Five/Six, and it is cohesive and relevant in Western cultures yet glaringly absent elsewhere in the world. By giving these qualities a focused interrogation and setting forth testable hypotheses about their origins, we hope to direct future research into this strange personality trait. It can be challenging to study openness/intellect because it is so distinct from the other Big Five/Six and it takes different forms in different cultures. In confronting these challenges, one can grow to adopt a broader, more nuanced perspective on the many ways in which people differ from one another and the power of societal context to shape these differences.

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