Dispositional Influences on Human Aggression

Jennifer L. Tackett
University of Toronto

Robert F. Krueger
Washington University in St. Louis
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The Trait Approach in Personality Psychology

The most common approach to examining stable, enduring dispositional human qualities falls under the domain of personality trait theory. Traits are typically conceptualized as pervasive and enduring characteristics that offer important information in the prediction of human behavior. The trait approach is one of the most prominent perspectives in modern personality psychology and has had a large influence on shaping research in this domain. The most widely-accepted trait model is the Five Factor Model (FFM; see Goldberg, 1993). The FFM is a taxonomy of higher-order, broadly-defined personality traits which includes neuroticism, extraversion, conscientiousness, agreeableness, and openness to experience. Neuroticism is defined by the experience of negative affect and emotions, including experiences of dysphoric mood or anxiety. Extraversion is a trait that encompasses positive emotions as well as behaviors such as sociability and assertiveness. Conscientiousness reflects characteristics related to inhibition versus disinhibition. Agreeableness is defined by affiliation and altruism versus antagonism. Openness to Experience encompasses intellectual curiosity as well as imagination and fantasy.

The FFM has shown strong replicability across languages and cultures, strengthening the evidence for reliance on the FFM as an overarching taxonomy to classify and organize individual differences (John, Naumann, & Soto, 2008). In addition, recent work has demonstrated empirical connections between higher-order personality trait models allowing a better understanding of interrelationships among them (Markon, Krueger, & Watson, 2006). There is much less agreement regarding a comprehensive
structure of lower-order personality traits, although lower-order traits may be particularly useful for discriminating among behavioral outcomes (e.g., Reynolds & Clark, 2001).

Researchers have more recently addressed questions regarding potential continuity of the FFM across the lifespan, particularly at earlier ages. Recent investigations examining personality structure in childhood has resulted in higher-order structures resembling the FFM (e.g., Halverson et al., 2003; Mervielde & De Fruyt, 2002). For example, structural work in children has supported empirical relationships between higher-order trait models that parallels those found in adults (Tackett, Krueger, Iacono & McGue, 2008) allowing better comparison across studies using different trait models.

**The Externalizing Spectrum: Integrating Personality and Aggression**

In parallel with the development of normal personality trait models such as the FFM, investigators have worked to model the empirical structure of mental disorders as described in standard psychiatric classification systems. Although mental disorders have been traditionally conceptualized as discrete and categorical, extensive evidence suggests that many disorders are better conceived of as continuous and dimensional in nature (Helzer, Kraemer & Krueger, 2006). In addition, putatively separate categorical disorders tend to blend into each other, a phenomenon traditionally conceived of as “co-morbidity” (the co-occurrence of putatively separate disorders), but probably better understood in terms of dimensionally-organized “spectrums of psychopathology” (Krueger & Markon, 2006). That is, distinguishable mental disorders are probably better understood as variants within broader psychopathological domains (spectrums), as opposed to being understood as entirely distinct categories.
Psychopathology spectrums bear clear conceptual similarities to the higher-order domains of personality trait models, as both constructs serve to organize diverse human individual differences in terms of a multidimensional space. This resemblance is not only conceptual, but also empirical. Forms of psychopathology that involve aggression are elements within a broad spectrum that has generally been labeled “externalizing”, and aggressive personality tendencies also fall within this same spectrum (Krueger et al., 2007). In FFM terms, the externalizing spectrum is closely aligned with the conjunction of disagreeableness and unconscientiousness, domains that are correlated and form a higher-order domain of disinhibition (Markon et al., 2005). Stated somewhat differently, disinhibition appears to be the personality core of externalizing behavioral tendencies.

The Relevance of a Hierarchical Conceptualization to Understanding Aggressive and Externalizing Tendencies

Adults. We recently sought to develop a novel empirical model of individual differences in externalizing tendencies, including diverse forms of aggression (Krueger et al., 2007). Specifically, we created 23 novel facet-level measures of various externalizing tendencies using modern psychometric (item response theory) techniques. The 23 facets cover a variety of specific individual difference variables, ranging from those more traditionally characterized as “personality” (e.g., problematic impulsivity) to those more traditionally characterized as “psychopathology” or “behavior problems” (e.g., drug problems). Three narrow facets of aggression emerged in the course of this scale development project: relational, physical, and destructive aggression.

Interestingly, the 23 scales were best modeled using a “bifactor” or “hierarchical” model. In this type of model, all indicators (in this case, the 23 scales) load on one
general factor, and also can load on other more narrow factors. In addition, these factors are uncorrelated. As a result, this model suggests the presence of multiple, uncorrelated pathways (modeled as the factors loadings on the scales) to a given specific outcome (i.e., a score on a specific scale). Three factors emerged: the general factor (i.e., overall externalizing tendencies, indicated most strongly by irresponsible and impulsive tendencies), and two narrower factors, one indicated by callous-aggressive tendencies and the other indicated by problems with substance use.

In the context of this model the three aggression scales were quite interesting. Relational aggression was a stronger indicator of the callous-aggressive factor than the general externalizing factor, physical aggression was more closely linked to overall externalizing than to callous-aggression, and destructive aggression showed similar loadings on overall externalizing and callous-aggression (albeit higher on overall externalizing). The general conclusion is that there are multiple pathways to aggressive outcomes. Specific aggressive outcomes can emerge because a person’s impulses are unconstrained in general (i.e., via the general externalizing factor) or because a person is unusually callous and aggressive (i.e., via the callous-aggressive factor, which is uncorrelated with general externalizing).

Putting this work into the context of structural models of personality, in research investigating connections between personality traits and externalizing behaviors in adults, high levels of Negative Emotionality (NEM)/Neuroticism and low levels of Conscientiousness/Constraint have shown robust connections with violence and aggression (Blonigen & Krueger, 2007). One facet of NEM that has been specifically linked to violent behavior is Alienation. This has been interpreted as potentially
reflecting a tendency toward distrust or being hypersensitive to threatening stimuli, resulting in a greater likelihood of committing violent behaviors.

Children/Adolescents.

Research examining personality-psychopathology relationships in childhood and adolescents has been largely consistent with findings for adults, although less often studied. Specifically, the trait of Conscientiousness/Constraint, related to the higher-order Effortful Control trait in temperament models, has been most consistently linked to externalizing behaviors (see Nigg, 2006; Tackett, 2006) with additional evidence for connections with Neuroticism/Negative Emotionality and Agreeableness/Affiliation (Lahey & Waldman, 2003; Tackett, 2006). Much of this work to date has been correlational in nature, precluding a deeper understanding of the development of these connections (Tackett, 2006). Longitudinal work on personality connections to externalizing behaviors has largely operated under a vulnerability, or risk, framework, postulating that personality/temperament may serve as a distinct risk factor for the development of later disorders. An alternative framework is the spectrum or common cause model, which conceptualizes personality and externalizing psychopathology as dimensionally related and as sharing core etiologic factors. One potential issue in this literature is that longitudinal studies that do not measure such third variables as shared causal factors cannot disentangle evidence for a vulnerability model from a spectrum model (Tackett, 2006).

Externalizing disorders in younger age groups fall under different disorder classes according to DSM-IV (APA, 2000). Specifically, this category typically refers to Oppositional Defiant Disorder, Conduct Disorder, and Attention Deficit/Hyperactivity
Disorder. Other potential externalizing behaviors in early adolescence include precocious sexual behavior and early substance use. Some behaviors, such as relational aggression (the utilization of social power and social exclusion to aggress against one’s victims) are still relatively new in the area of childhood aggression and not yet incorporated into work on broad externalizing problems (e.g., Tackett, Waldman, & Lahey, 2009).

One important future direction in this research area is identification of both common and unique personality correlates that will aid in a more comprehensive picture of the hierarchical nature of such behavioral problems (Tackett, 2009). For example, relational aggression appears to show similar personality correlates to other externalizing behaviors reflected in lower conscientiousness and agreeableness (Schell & Tackett, 2009). Such evidence supports connecting relational aggression to a broader externalizing dimension, akin to the work described above in adults (Krueger et al., 2007). This work is currently limited by the lack of strong empirical correspondence between widely-used models of personality and temperament, however, such that researchers focusing on younger age groups tend to rely on either a personality or a temperament framework without existing data on how best to integrate these approaches.

As noted previously, lower-order personality traits may hold particularly powerful information in the predictions of externalizing behaviors (e.g., Reynolds & Clark, 2001; Paunonen & Ashton, 2001). If limitations exist in our current understanding of higher-order personality trait structure and development in childhood and adolescence, our understanding at the lower-order level is much further away from a comprehensive integrated taxonomy (Shiner, 1998; Tackett et al., 2008). Recent proposed models of
childhood personality offer possible lower-order facets for further investigation (Halverson et al., 2003; Mervielde & De Fruyt, 2002) as do common temperament measures (Rothbart et al., 2001). Theoretical reviews have worked toward comparing and integrating proposed lower-order trait structures between models (Halverson et al., 2003; Shiner & Caspi, 2003) which provides an important starting point for future work.

An additional place to look for potentially relevant lower-order traits is research that has focused on more narrowly-defined personality characteristics. A good example of this work is the extensive program of research conducted by Frick and colleagues on the potential influence of callous-unemotional traits on conduct problems (e.g., Frick et al., 2003). Frick and colleagues have extended empirical efforts toward integrating callous-unemotional traits in broader personality and temperament models, which have identified consistent connections with the broader externalizing work by highlighting the importance of negative emotionality and effortful control (Frick & Sheffield-Morris, 2004) as well as agreeableness and conscientiousness (Essau, Sasagawa, & Frick, 2006). One potential approach would involve taking the 23 facet model developed by Krueger et al (2007) for adults and extending it downwards, to see if it also applies to children and adolescence. Some parallels here seem clear, e.g., callousness figures prominently as a narrow band factor in the Krueger et al (2007) model, as it does in the thinking of Frick and his colleagues.

**Integrating Environmental and Situational Factors**

*Personality is Just One Aspect of the Person*

A diathesis-stress perspective can be easily applied to a conceptualization of personality’s influences on the development of externalizing problems. In fact,
examination of person by situation interactions is a flourishing area of personality research (see Funder, 2008 for a recent review) and is an important area of inquiry for understanding externalizing outcomes. Personality traits are substantially influenced by genetic factors and this general finding appears to be largely consistent across the lifespan. Personality shows substantial stability across the lifespan as well, emphasizing the importance of understanding the role such individual differences play in predicting later externalizing behavior.

In addition to stability, of course, there is evidence for personality change. It is important to adapt a dynamic perspective on the influences of personality on behavioral outcomes that incorporates both stability and change as well as environmental factors across development. For example, while previous work has demonstrated a connection between impulsive personality traits, high levels of negative affect, and increased risk for suicidal behaviors (Caspi, Moffitt, Newman, & Silva, 1996), recent research suggests that this is particularly important at earlier ages with the association showing a decline across the lifespan (McGirr et al., 2008). Similarly, researchers have argued that early onset conduct problems are more likely to be influenced by dispositional factors than those with a later onset (Lahey & Waldman, 2003; Moffitt, 2003).

Personality is an important potential moderator in individual responses to a given situation, and in this way, its relevance for aggressive and externalizing outcomes is clear. For example, individuals low in Conscientiousness were more likely to engage in aggressive behavior in the face of anger-provoking stimuli than individuals high in Conscientiousness (Jensen-Campbell, Knack, Waldrip, & Campbell, 2007). These findings were interpreted in the context of personality/temperament traits indexing self-
regulation such as Effortful Control, Conscientiousness, and Agreeableness. This is consistent with temperament models differentiating approach/positive emotionality and avoidance/negative emotionality from self-regulatory traits that are considered superordinate in these models (e.g., Ahadi & Rothbart, 1994; Carver, Johnson & Joorman, 2008; Clark, 2005).

Psychobiological Aspects of the Person

Psychobiological factors such as hormones, genes, and cortical activity have also played an important role in explicating connections between personality and externalizing behaviors. For example, low serotonergic functioning has been connected to personality traits such as hostility and impulsivity as well as aggressive behaviors (Carver et al., 2008). This connection has been roughly paralleled in molecular genetic investigations examining links to the short allele of the serotonin 5-HTTLPR polymorphism (Carver et al., 2008). Reduced amplitude of the P300 event-related potential during a visual oddball task has been linked to both externalizing behaviors and impulsive personality traits (Iacono, Malone, & McGue, 2003). This research has identified a psychobiological link between these constructs that may serve as an endophenotype, or a marker for genetic risk for the externalizing domain. Indeed, a recent study found substantial heritability for this psychophysiological index (Hicks et al., 2007).

It is also possible that psychobiological risk factors increase responsivity to external stimuli leading to differential expressions of aggressive and antisocial behaviors (Hay, 2007). Such relationships can only be investigated with research designs including measures of both person and situation variables. For example, adolescents with early-onset Conduct Disorder showed increased left-sided amygdala activation when presented
with negative pictures compared to controls and adolescents with ADHD (Herpertz et al., 2008). In related work, individuals with high levels of trait anger showed increased left frontal activation in response to anger-provoking pictures compared to individuals lower in trait anger (Harmon-Jones, 2007). These findings suggest psychobiological predispositions that influence the potential reactivity to negative or threatening situations.

**Genetic Research on Externalizing Phenomena**

In recent years, genetic research on externalizing syndromes and behaviors has focused on exploring the coherence of these syndromes as elements within a broader spectrum, following from the phenotypic work described above. The majority of the genetic effect on externalizing syndromes is in common; nevertheless, there are also residual genetic effects on substance dependence syndromes in particular (Young et al. 2000; Krueger et al. 2002; Kendler et al. 2003). This makes a great deal of physiological sense; in this type of account, dependence on substances is traceable both to genetic effects unique to substances (presumably reflecting substance metabolism) and to more general effects, presumably reflecting disinhibited personality. Note also the similarity to the model that emerged in Krueger et al. (2007), described above, where drug problems were affected by a coherent factor, beyond the effect of the general externalizing factor. The heritability of general externalizing has been quite substantial in these studies, around 80%, suggesting that this general factor may be an appealing target for gene hunting enterprises.

Along these lines, Dick et al. (2008) recently focused their molecular work on Alcohol Dependence, Antisocial Personality Disorder, Conduct Disorder, Drug Dependence, Novelty Seeing, Sensation Seeking, and a general externalizing component,
representing variation linking these syndromes. The strength of genetic linkage was stronger for the externalizing component than for the individual syndromes. In particular, a region on Chromosome 7 appeared to contribute to general risk, transcending specific externalizing syndromes (cf. Stallings et al., 2005).

Going beyond linkage, Dick and her colleagues also reported on Single Nucleotide Polymorphisms (SNPs) in the \textit{CHRM2} gene. \textit{CHRM2} was associated with alcohol dependence in early work, and was next found to be associated with risk for alcohol combined with drug dependence, making it an appealing potential candidate gene to study with reference to general externalizing. In Dick et al (2008), general externalizing showed the most associations with SNPs in \textit{CHRM2}, when compared with the other syndromes.

\textit{Placing Genetic Research on Externalizing Phenomena in an Environmental Context}

With regard to gene x environment interactions, both twin and molecular approaches suggest that environmental effects are critical in shaping the expression of genetic risk for externalizing. Statistics such as the heritability (the overall magnitude of genetic influence on a phenotype) are typically estimated such that they are applicable to an entire population. For example, the aforementioned roughly 80% heritability for externalizing is an estimate that summarizes an entire population, without regard to various subgroups within that population. Refining these general estimates with subgroup information can be considered the pursuit of gene x environment interaction effects. Essentially, genetic effects may be moderated by other exogenous (and often, putatively environmental) variables.
Consider first a recent study from Legrand and her colleagues (2008). A sample of 17-year-old twins assessed on diverse externalizing syndromes were divided into those living in rural and those living in urban areas. In urban areas, genetic influences predominated, but in rural areas, shared environmental effects (environmental effects making people similar within families) predominated. This suggests that the previously described 80% heritability is collapsing across diverse circumstances, which act to modulate genetic and environmental contributions.

In the molecular realm, Caspi et al. (2002) examined how childhood maltreatment interacted with a gene coding for MAOA (MAOA metabolizes major neurotransmitters) in predicting antisocial behavior in a birth cohort of males. Genotype and environment interacted: the effect of childhood maltreatment on antisocial behavior was moderated by MAOA genotype. The genetic polymorphism that predicts high MAOA activity had a protective effect, such that men with this genotype were protected from the deleterious impact of childhood maltreatment. Although there are exceptions, this finding has proven generally replicable (Kim-Cohen et al., 2006).

**Summary and Conclusions**

The hierarchical trait model provides a compelling way to conceptualize stable dispositional characteristics that differentiate individuals. Such hierarchical models have been integrated with structural dimensions of psychopathology, including externalizing behaviors such as aggression and violence (Krueger et al., 2007). Work at the higher-order trait level has implicated high Negative Emotionality and low Constraint in connection with aggression from early childhood through adulthood (Blonigen & Krueger, 2007; Tackett, 2006). Lower-order personality traits may offer increased
predictive validity over higher-order traits, particularly for specific behavioral outcomes such as physical aggression and violence. Research linking lower-order traits to externalizing behaviors is much sparser, but has implicated alienation in adults (Blonigen & Krueger, 2007) and callous-unemotional traits in children (Frick et al., 2003), for example.

Much of our recent work has been conducted within the framework of the externalizing spectrum model (Krueger et al., 2007; Tackett, 2009), which posits dimensional relations among correlated personality traits and externalizing behaviors. This approach has thus far been fruitful in identifying factors common to the broader externalizing domain as well as specific factors differentiating types of externalizing behaviors (Krueger et al., 2002; Krueger et al., 2007; Tackett, Krueger, Sawyer, & Graetz, 2003; Tackett, Krueger, Iacono, & McGue, 2005; Tackett, Waldman, & Lahey, 2009). Indeed, as work on molecular genetic linkage studies and gene x environment interactions progresses, it is possible that the spectrum approach will be helpful in the search for specific genes and environmental stressors (Dick et al., 2008).

Nevertheless, limitations to a full understanding of personality connections to externalizing behaviors remain. There is not yet a clear picture of the lifespan trajectory of the externalizing spectrum (Tackett, 2009). For example, some disorders typically conceptualized as externalizing syndromes in childhood do not have officially recognized analogs in adult disorder constructs (e.g., Attention Deficit/Hyperactivity Disorder and Oppositional Defiant Disorder). Other behaviors, such as relational aggression, that are often viewed as externalizing (e.g., Baker, Jacobson, Raine, Lozano, & Bezdjian, 2007; Krueger et al., 2007) are not yet clearly identified as pathological behaviors in younger
age groups (Tackett, Waldman, & Lahey 2009). In addition, pathways from early temperamental traits to adult personality traits have not been fully articulated, limiting our ability to provide a complete lifespan perspective.

As psychopathology research continues moving toward person x environment perspectives, it brings with it the opportunity for an important integration with developmental approaches, which have often placed large emphasis on the contribution of environmental factors to the development of specific behavioral outcomes (Jenkins, 2008). Epigenetic approaches, which focus on the role of genetic expression, are also becoming increasingly salient to mainstream psychopathology researchers. Methodological advances in epigenetics offer new opportunities for integration with complex personality and psychopathological phenotypes (Kaminsky et al., 2008; Mill & Petronis, 2007) and further emphasize a need to focus on critical developmental periods and improve measurement of potential environmental influences.
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