SPR Award, 2023

**For distinguished contributions to psychophysiology: Christopher J. Patrick**

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The Society for Psychophysiological Research (SPR) presented its highest award for Distinguished Contributions to Psychophysiology to Christopher J. Patrick at the Society’s annual meeting in New Orleans in 2023. It was my pleasure and honor to make that presentation and now to tell the story of his brilliant scientific contributions, as well as his extensive contributions to the field and to SPR itself.

It is rare for a scholar’s research career to yield such a coherent yet multi-faceted contribution to a single major topic, encompassing revolutionary contributions in multiple subareas over a sustained period of time. Notably, the dominant subject of Chris’s research—the construct of psychopathy as manifested in criminal and noncriminal forms—was not an obvious starting point for making major contributions to our understanding of psychopathology writ large. Yet his brilliant work has demonstrated how the study of psychopathy can both draw upon, and help to advance, what we know about mental health problems generally – through a focus on transdiagnostic trait constructs with clear connections to observable behavior, biology, and development.

Chris completed the majority of his primary and secondary education in the city of Saskatoon, the largest city in the Canadian province of Saskatchewan. When he was 17, Chris moved with his family to the province of Alberta, where he attended the University of Calgary as an undergraduate – completing a major in psychology and, of special relevance to his research career, a minor in criminology. He then pursued graduate studies in clinical psychology at the University of British Columbia, where it was his great good fortune to team up with Bill Iacono, who served as Chris’s PhD advisor and sparked his interest in psychophysiological research on psychopathy. Together, they conceived of a novel study to test the hypothesis that psychopathic individuals, owing to deficits in emotions such as remorse and fear, would be able to pass a polygraphic lie detector test even when guilty – a study that Chris undertook for his dissertation. Findings from this study (Patrick & Iacono, 1989) fueled a desire on Chris’s part to delve deeper into the nature of affective deficits in psychopathy.

To provide a bit of context, the modern conceptualization of psychopathy dates from the psychiatrist Hervey Cleckley’s 1941 book *The Mask of Sanity*, which described individuals whose persistent antisocial behavior was believed to reflect an underlying emotional deficit. In 1957 Chris’s “academic grandfather” David Lykken (Iacono’s mentor) published a seminal paper using palmar skin conductance responses (SCRs) to show that delinquent youth matching Cleckley’s description exhibited poor fear conditioning—suggesting their psychopathic behavior reflected a failure of fear of potential punishment to restrain reward-seeking behavior. Robert Hare later developed the Psychopathy Checklist-Revised (PCL-R) as a criterion-based measure for assessing Cleckley’s concept of this disorder in criminal offenders. Despite being developed to index psychopathy as a unitary syndrome, the 20-item PCL-R was found to contain two correlated factors (Hare et al., 1990; Harpur et al., 1989), one of them (Factor 1; F1) capturing the affective-interpersonal or “core features” of psychopathy (i.e., deficient emotional sensitivity and a predatory interpersonal style), and the other (Factor 2; F2) indexing the impulsive-antisocial features (i.e., early and persistent antisocial deviance marked by unrestrained, seemingly aimless behavior).

Chris found the opportunity to further investigate emotional deficits in psychopathy through a postdoctoral fellowship (1987-1990) with Peter Lang, Margaret Bradley, and Bruce Cuthbert at the University of Florida. The timing of this opportunity was fortuitous in two major respects. First, the then-recent discovery of two distinct factors underlying the PCL-R, which Chris had used to diagnose psychopathy in his dissertation, connected with variations he had observed in the clinical presentations and physiological response patterns of high-PCL-R offenders. Second, Lang’s work on affective modulation of the startle reflex suggested a means to distinguish between defensive and appetitive reactivity to emotional stimuli in psychopathy. Employing the affect-startle paradigm in prisoners assessed via the PCL-R, Chris published landmark papers in 1993 and 1994 (Patrick, 1994; Patrick, Bradley, & Lang, 1993) that provided dramatic support for Lykken’s low fear hypothesis. By examining effects in terms of the PCL-R’s two factors, Chris was able to demonstrate a deficit in aversive startle potentiation that was specific to the affective-interpersonal (F1) features of psychopathy and unrelated to its impulsive-antisocial (F2) features. These influential papers, published early in Chris’s career while on faculty at Florida State University (FSU), stimulated many studies that replicated the startle potentiation deficit for PCL-R F1 in diverse samples.

Contrary to idea that the symptoms of psychopathy arise from a single common cause, Chris posited that its F2 features might reflect an alternative etiological pathway. In another early paper (Patrick et al., 1994), he showed that F2 was associated with a deficit in the capacity for fear imagery, which he attributed to an impairment in top-down associative processing. In a 1999 chapter co-written with FSU colleague Alan Lang, Chris proposed that a deficit in prefrontal cortical control—analogous to that associated with acute alcohol intoxication—accounts for the reckless, impulsive behavior associated with Factor 2. This insightful and prescient hypothesis has been remarkably well supported by subsequent research findings.

In a decision that was to revolutionize research on psychopathy, Chris launched an extensive series of studies documenting the personality and clinical correlates of the unique variance in each PCL-R factor. This work, initiated at FSU and pursued further at the University of Minnesota (UMN) following Chris’s move there in 1999, served to advance a multidimensional view of psychopathy. Core findings were that F1 is negatively associated with the fear, distress, and stress reaction components of neuroticism as well as with anxious-depressive (internalizing) symptomatology, and related positively to social dominance, egocentricity, achievement orientation, and thrill-seeking behavior. By contrast, F2 relates positively to all facets of neuroticism (distress, fear, stress reaction, anger, aggression, and alienation), to impulsivity/disinhibition, and to psychiatric diagnoses of alcoholism, drug abuse, and antisocial personality disorder (American Psychiatric Association, 2000, 2013). These findings documented striking divergences in phenotypic expression that supported a dual deficit model of psychopathy, dramatically altering our understanding of this pathological condition.

A key question that occurred to Chris, having observed striking differences in the correlates of the two PCL-R factors, was how to conceive of individuals scoring high on both factors. Positing that high overall scorers might represent a mix of individuals with differing trait characteristics, Chris and his UMN PhD advisee Brian Hicks performed a cluster analysis of trait scores from an omnibus personality inventory completed by PCL-R diagnosed psychopathic offenders – and found two distinct subtypes, one exhibiting a personality profile mirroring the trait correlates of F1 (i.e., low anxiousness coupled with high agency [dominance and achievement]) and the other with a profile paralleling the trait correlates of F2 (i.e., high impulsiveness and nonconformity, along with elevated levels of alienation, aggression, and anxiousness; Hicks et al., 2004). Findings from this work provided further support for separate etiological pathways to psychopathy, one involving dispositional fearlessness and the other deficient inhibitory control.

The next important step in Chris’s work was to show that psychopathy and its distinctive facets are dimensional, extending continuously into noncriminal (normative) populations. He and his UMN collaborators (Benning, Patrick et al., 2003) performed a factor analysis of the self-report based Psychopathic Personality Inventory (PPI), developed by Lykken’s student Scott Lilienfeld (Lilienfeld & Andrews, 1996) to assess features of psychopathy in nonclinical populations, and reported evidence for two factors that strongly paralleled those of the PCL-R – correlating in diverging ways with various personality traits and clinical outcome measures (Benning, Patrick et al., 2005a) and relating in contrasting ways to affective-startle modulation (Benning, Patrick, & Iacono, 2005b). The finding of two factors underlying the PPI – exhibiting diverging personality, clinical, and physiological correlates – aligned with the idea of distinct etiological pathways to psychopathy, and provided evidence for subtypes reflecting these alternative etiologies among those diagnosed as psychopathic.

In a finding that was to transform our view of psychopathy by integrating it with mainstream psychopathology research, Chris established a fundamental link between psychopathy F2 and the externalizing psychopathology factor – one of two latent dimensions accounting for observed comorbidity among common mental disorders in children and adults (Achenbach & Edelbrock, 1978; Krueger, 1999). Researcher Robert Krueger, working with Chris and other UMN colleagues, presented evidence that this factor reflects a broad liability for impulse control problems by showing, in a twin sample, that it operates as a largely heritable common pathway to conditions including conduct disorder, antisocial personality, and alcohol/other drug dependence (Krueger et al., 2002). In a major challenge to the categorical disease model, they proposed that specific externalizing disorders of these and other types (e.g., attention deficit hyperactivity disorder) represent alternative phenotypic expressions of an underlying weakness in inhibitory control capacity. In subsequent work, Chris and his UMN colleagues (Hicks et al., 2007; Patrick et al., 2006) showed that reduced amplitude of the oddball-P300 response, previously found to be related to different externalizing disorders, operates as a neural indicator of this general liability factor.

Given the impulsivity/disinhibition seen in psychopathy F2, one would expect it to be strongly related to the latent externalizing factor. Confirming this expectation, Chris applied structural equation modeling to data from a male prisoner sample to demonstrate essentially complete overlap between latent externalizing (quantified using the same diagnostic variables as in Krueger et al., 2002) and PCL-R F2 (Patrick et al., 2005). In other work, he and his colleagues (Blonigen et al., 2005) used data from a community twin sample to demonstrate a selective association of the externalizing psychopathology factor with F2 of the PPI, attributable substantially to shared genetic influences. These results provided compelling support for a dispositional weakness in inhibitory control as a specific contributor to psychopathy F2. Corroborating this view, subsequent research demonstrated a selective association for reduced oddball-P300 response (previously shown to index externalizing liability) with this factor of psychopathy, whether indexed using the PPI (Carlson et al., 2007) or the PCL-R (Venables & Patrick, 2014).

During his time on faculty at UMN, Chris also worked to clarify psychopathy’s relationship with the other broad dimension underlying common mental disorders, the internalizing factor – encompassing fearful/anxious and depressive disorders (Krueger, 1999). Using PCL-R data for prisoners and PPI data for community samples along with clinical-diagnostic data for each, Chris and his colleagues demonstrated opposing relations for psychopathy factors F1 and F2 (negative versus positive) with internalizing symptomatology as a whole, and a selective negative association for F1 with phobic-fear symptoms in particular (Benning et al., 2005a; Blonigen et al., 2005). Thus, over his time at UMN, Chris took the somewhat arcane literature relating primarily to psychopathy in criminals and showed F2 to be isomorphic with one of the two major dimensions of psychopathology (externalizing) and F1 to be related to a distinct component of the other (fearful internalizing). In addition, he was able to show that physiological measures related selectively to externalizing (oddball-P300; Patrick et al., 2006) and fearful-internalizing (aversive startle potentiation; Vaidyanathan, Patrick, & Cuthbert, 2009) related in parallel ways to the two psychopathy factors.

These findings also provided the foundation for a new synthesis of psychopathy research with the developmental psychopathology literature. For many years the dominant view (associated with Moffitt and Lynam) was that the large group of children exhibiting ADHD comorbid with CD formed the risk group from which psychopathy emerges. However, the clinical picture of these children was incompatible with the Cleckley-Lykken focus in the adult literature on psychopaths as fearless, skilled predators. A partial resolution came when Paul Frick and colleagues (2003) identified a smaller subgroup of antisocial children characterized as callously unemotional, whose clinical characteristics appeared consistent with the low fear F1 psychopath. Chris’s findings regarding psychopathy F2 and externalizing were entirely consistent with the ADHD/CD clinical picture, providing the crucial theoretical continuity of the ADHD/CD pathway with psychopathy that previously did not exist. Given the high prevalence and clinical significance of childhood externalizing disorders, Chris’s work linking psychopathy research with the developmental psychopathology literature represents a major contribution in itself.

Operating from his reading of Frick’s work and other research on psychopathy in youth, together with his own work on psychopathy in older samples, Chris (in collaboration with myself and Robert Krueger) advanced his highly influential triarchic model of psychopathy (Patrick et al., 2009). The essence of this model is that the clinical condition (phenotype) we call psychopathy is undergirded by three distinctive trait-dispositional characteristics, termed boldness, meanness, and disinhibition. With these three dimensions, which can occur in various combinations (e.g., high bold and high disinhibited, high bold and moderately mean, etc.), the triarchic model is able to accommodate diverse expressions of psychopathy – including noncriminal (“successful”) as well as criminal variants.

Among the many highly innovative aspects of this conceptual model, three in particular stand out. One is the distinction it makes between the construct of meanness and those of boldness and disinhibition, which relate most closely to concepts of dispositional fearlessness and weak inhibitory control (externalizing proneness), respectively. Referents for meanness in the triarchic model include Frick’s work on callous-unemotionality in youth and clinical descriptions of some psychopaths as brutally callous-aggressive exploiters of others who were “loveless” and “guiltless” in the context of considerable dangerousness (e.g., McCord & McCord, 1964). Whereas Frick had postulated low fear as the etiological basis of callous-unemotionality, the triarchic model posited a separate attribute contributing specifically to this facet of psychopathy – namely, low affiliation – to account for its distinctiveness from boldness (with which it shares elements of fearlessness) and disinhibition (with which it shares elements of externalizing proneness). The idea of a distinct contribution of low affiliation to meanness, proposed initially by Patrick et al. (2009), has since become a major theme in research on callous-unemotionality in youth (e.g., Viding & McCrory, 2019; Waller & Wagner, 2019).

A second highly innovative aspect of the triarchic model is that it connects with quantitative measurement frameworks for two clinically relevant domains, established by Chris in collaboration with his UMN collaborators Robert Krueger and Mark Kramer. One of these, the externalizing spectrum model (Krueger et al., 2007; Patrick et al., 2013a), organizes externalizing behavior and related traits around three dimensions—a superordinate dimension of disinhibition, corresponding to the broad externalizing psychopathology factor, and subordinate dimensions of callous-aggressiveness and substance abuse proneness. The callous-aggressiveness dimension of this measurement framework served as a referent, along with Frick’s concept of callous-unemotionality, for the meanness construct of the triarchic model. The other measurement framework is one that delineates a bipolar dimension of dispositional fear versus fearlessness, encompassing various measures including subscales that define F1 of the PPI along with scales indexing specific fears, social timidity, harmavoidance, and thrill-adventure seeking (Kramer et al., 2012, 2020). This framework served as a referent for the boldness construct of the triarchic model, and a basis for developing a multi-scale inventory for assessing boldness (Patrick et al., 2019b). The existence of these models, and items for assessing constructs of disinhibition (as general externalizing proneness), meanness (as callous-aggressiveness), and boldness (as dispositional fear/fearlessness), served as the basis for initiating a now-extensive body of work on the nomological network of the triarchic model traits (for recent reviews, see Sellbom, 2018; Patrick, 2022).

The third highly notable aspect of the triarchic model is its focus on boldness, meanness, and disinhibition as *neurobehavioral* constructs, corresponding to (low) acute threat sensitivity, (low) inhibitory control, and (low) affiliation/attachment, respectively. In framing psychopathy-related traits this way, Chris envisioned an opportunity to integrate neurobiological and behavioral data more directly into conceptualizations of psychopathy – by extending report-based measurement models for the triarchic traits (Krueger et al., 2007; Patrick et al., 2019b; see also Kramer et al., 2012) to include variables from physiological and task-performance modalities. By incorporating other-modality indicators into the measurement of core dispositions underlying psychopathy and other clinical conditions (e.g., externalizing disorders more broadly, fear disorders), Chris suggested that conceptualizations of the conditions themselves could be reshaped along neurobehavioral lines. This idea was the centerpoint of Chris’s 2012 SPR Presidential address, titled “Psychoneurometrics: A Paradigm for Grounding Psychological Assessment in Neurophysiology.”

Chris has developed this idea through an influential series of empirical papers published since his return to FSU in 2009 (for recent reviews, see: Patrick, 2022; Patrick, Iacono, & Venables, 2019a). In an initial illustration of the psychoneurometric approach, Patrick et al. (2013b) demonstrated that self-report scale indicators of trait disinhibition could be combined with neurophysiological (ERP) indicators into a composite measure that related robustly to both externalizing disorder symptoms and criterion measures of brain response (e.g., oddball P300). The composite was viewed as indexing a psychoneurometric trait dimension, positioned between psychological and neurophysiological dimensions of externalizing proneness. Subsequently, Venables et al. (2018) extended this work by incorporating task-performance indicators of inhibitory control capacity previously shown to covary genetically with general externalizing proneness (Young et al., 2009), along with an expanded array of self-report and brain-ERP indicators, into a structural model of trait inhibition-disinhibition. The general factor of this model, reflecting variance shared among the three types of indicators, evidenced significant relations in expected directions with criterion measures from all three modalities (behavioral, self-report, neurophysiology). A noteworthy feature of the general factor of this inhibition-disinhibition model is that it was defined more strongly by indicators from the behavioral and neurophysiological modalities than the self-report modality (i.e., general-factor loadings for the former were 1.5 – 2 times higher than for the latter). This result is important because it illustrates how a psychologically-based conception of a target trait (disinhibition, in this case) can be revised to align better with neural and behavioral outcomes, by defining it in part using indicators from those modalities.

Yancey, Venables, and Patrick (2016) reported on a counterpart structural model for the construct of threat sensitivity that integrated measures from modalities of self-report and physiological response. They showed that the cross-modal, psychoneurometric factor of this model predicted fear disorder symptomatology and criterion measures of aversive physiological response at similar robust levels. Discriminant validity was also evidenced by negligible relations of this factor with externalizing-related clinical and physiological criterion measures (i.e., substance disorder symptomatology and oddball-P300 response). Drawing on this study along with the above-mentioned work of Patrick et al. (2013b), Venables et al. (2017) used data from an adult twin sample to evaluate the etiological basis of relations observed for psychoneurometrically defined threat sensitivity and disinhibition with fear, distress, and substance use symptomatology. Defined in this way, the two traits showed preferential, moderate-level associations with fear and substance use symptomatology, respectively, and in each case most of the observed association (~90%) was accounted for by shared genetic influences. Findings from this work are important because they support the view of neurobehavioral traits as liability factors for psychopathology and suggest that incorporating physiological measures into assessments of traits can enhance their “signal value” as indicators of genetic risk.

Chris’s triarchic model provided a comprehensive theory of psychopathy that has dominated the literatureon this topic over the past 15 years and stimulated a vast amount of new research. After providing purpose-built scales for indexing the triarchic trait constructs in new studies, Chris and his colleagues worked to develop alternative measures of these traits using items from various inventories of normal and maladaptive personality (for a recent review, see Patrick, 2022), allowing for innovative research to be undertaken using archival data from already completed studies – including multi-wave longitudinal studies. Drawing on the availability of triarchic scale measures in existing longitudinal datasets, research is increasingly being devoted to evaluating the ability of the triarchic traits, assessed early in life, to predict the later emergence of adverse behaviors associated with psychopathy (e.g., non-violent law-breaking, aggressive antisocial acts, substance problems; see, e.g.: Bertoldi et al., 2020; Perkins et al., 2022). Work of this kind is complementing twin study evidence for the triarchic traits as liability factors for psychopathy (Tuvblad et al., 2019) and other forms of psychopathology (Blonigen et al., 2005; Venables et al., 2017).

More broadly, Chris’s work provides a valuable framework for guiding efforts to interface major domains of psychopathology with neurobiological concepts and measures. In particular, his articulation of the psychoneurometric methodology and applications of this multi-modal assessment approach to traits of inhibitory control and threat sensitivity (Patrick et al., 2019a) represent a transformative contribution to this endeavor. Building upon his work with these traits, Chris has sought more recently to establish a multi-modal assessment model for the trait of affiliative capacity (Palumbo et al., 2020) as it relates to callous-unemotional symptoms in psychopathy and other antagonistic-aggressive disorders (e.g., antisocial and narcissistic personality). Extending beyond the triarchic model, Chris and his FSU colleagues (Bowyer et al., 2019) have also advanced a neurobehavioral conceptualization of reward sensitivity based around a neural index of responsiveness to gain versus loss outcomes that has shown promise as a biomarker for depressive disorders (Proudfit, 2015).

Given the scope of Chris’s contributions to the field, any brief attempt to summarize his work is doomed to fail to convey its scope, sophistication, and quality. This problem may be remedied in part by considering the extent and impact of his scholarly endeavors and his many awards and honors. His published works to date include 295 empirical papers along with 75 chapters and encyclopedia articles. His publications have been cited over 49,500 times as of this writing, resulting in an H-index of 114. The two editions of his *Handbook of Psychopathy* (2006, 2018) are widely viewed as the leading reference works in this area of study because of their comprehensive, integrative coverage. His research has been both facilitated and recognized by awards of numerous major grants from NIMH and the U.S. Army on which he has served as principal investigator.

Chris was the recipient of Distinguished Early Career Contribution awards from both SPR, in 1993, and the American Psychological Association, in 1995. He served as President of the Society for the Scientific Study of Psychopathy from 2007-2009 and was awarded that society’s Lifetime Achievement Award in 2013. He served as President of SPR from 2011-2012 and was awarded Fellow status in our society in 2021. Chris is also a fellow of APA and the Association for Psychological Science (APS). He held the appointment of Starke R. Hathaway Distinguished Professor at UMN and currently holds the position of Distinguished Research Professor and Director of Clinical Training at FSU. His scholarly expertise also has been recognized by invitations to serve as a member of or consultant to major committees pertaining to science and practice in psychopathology, including the DSM-5 Personality and Personality Disorders Work Group (2008-2013), the National Institute of Mental Health’s Research Domain Criteria (RDoC) Work Group on Negative Valence Systems (2011), the American Psychiatric Association’s DSM-5 Review Committee for Externalizing Disorders and Personality Disorders (2016-present), and the Hierarchical Taxonomy of Psychopathology Consortium (2016-present).

As important as Chris’s scientific contributions and recognition are, his devotion to his graduate students and the quality of mentoring he provides are equally important. Corroborating the many testimonials I have heard from his graduate advisees regarding the exceptionality of his mentorship, Chris was named recipient in 2020 of FSU’s Distinguished Graduate Faculty Mentor Award. He was nominated for this award in a letter signed by 20 of his past and current graduate students. In this letter, his advisees praised all aspects of his mentorship, noting that he challenged them with respect to rigor and precision, while providing ongoing support in terms of warmth, empathy, and individualized guidance and encouragement and facilitating professional development through detailed constructive feedback on manuscripts, fellowship and grant applications, and scholarly presentations along with continuing support post-PhD. These sentiments of his many contributing advisees were aptly summarized by the letter’s concluding statement: “Chris is my greatest supporter & fiercest advocate.”

I have always most admired great scientists who also are wonderful human beings. That is who Chris is.

References

Achenbach, T. M., & Edelbrock, C. S. (1978). The classification of child psychopathology: A review and analysis of empirical efforts. *Psychological Bulletin*, *85*, 1275-1301.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author. (4th ed., text rev., 2000).

Benning, S. D., Patrick, C. J., Blonigen, D. M., Hicks, B. M., & Iacono, W. G. (2005a). Estimating facets of psychopathy from normal personality traits: A step toward community-epidemiological investigations. *Assessment*, *12*, 3-18.

Benning, S. D., Patrick, C. J., Hicks, B. M., Blonigen, D. M., & Krueger, R. F. (2003). Factor structure of the Psychopathic Personality Inventory: Validity and implications for clinical assessment. *Psychological Assessment*, *15*, 340-350.

Benning, S. D., Patrick, C. J., & Iacono, W. G. (2005b). Psychopathy, startle blink modulation, and electrodermal reactivity in twin men. *Psychophysiology*, *42*, 753-762.

Bertoldi, B. M., Perkins, E. R., Tuvblad, C., Oskarsson, S., Kramer, M. D., Latzman, R. D., ... , & Patrick, C. J. (2022). Pursuing the developmental aims of the triarchic model of psychopathy: Creation and validation of triarchic trait scales for use in the USC-RFAB longitudinal twin project. *Development and Psychopathology*, *34*, 1088-1103.

Blonigen, D., Hicks, B., Patrick, C., Krueger, R., Iacono, W., & McGue, M. (2005). Psychopathic personality traits: Heritability and genetic overlap with internalizing and externalizing pathology. *Psychological Medicine, 35,* 637-648.

Bowyer, C. B., Joyner, K. J., Yancey, J. R., Venables, N. C., Hajcak, G., & Patrick, C. J. (2019). Toward a neurobehavioral trait conceptualization of depression proneness. *Psychophysiology*, *56*(7), e13367.

Carlson, S. R., Thái, S., & McLaron, M. E. (2009). Visual P3 amplitude and self-reported psychopathic personality traits: Frontal reduction is associated with self-centered impulsivity. *Psychophysiology*, *46*, 100–113.

Cleckley, H. (1941). *The mask of sanity*. St. Louis, MO: Mosby.

Frick, P. J., Cornell, A. H., Bodin, S. D., Dane, H. E., Barry, C. T., & Loney, B. R. (2013). Callous-unemotional traits and developmental pathways to severe conduct problems. *Developmental Psychology*, *39*, 246-260.

Hare, R.D., Harpur, T.J., Hakstian, A.R., Forth, A.E., Hart, S.D., & Newman, J.P. (1990). The Revised Psychopathy Checklist: Reliability and factor structure. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 2*, 338-341.

Harpur, T. J., Hare, R. D., & Hakstian, A. R. (1989). Two-factor conceptualization of psychopathy: Construct validity and assessment implications. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 1*, 6-17.

Hicks, B. M., Bernat, E. M., Malone, S. M., Iacono, W. G., Patrick, C. J., Krueger, R. F., & McGue, M. (2007). Genes mediate the association between P300 amplitude and externalizing psychopathology. *Psychophysiology*, *44*, 98-105.

Hicks, B. M., Markon, K. E., Patrick, C. J., Krueger, R. F., & Newman, J. P. (2004). Identifying Psychopathy Subtypes based on Personality Structure. *Psychological Assessment, 16,* 276-288.

Kramer, M. D., Patrick, C. J., Krueger, R. F., & Gasperi, M. (2012). Delineating physiological defensive reactivity in the domain of self-report: Phenotypic and etiologic structure of dispositional fear. *Psychological Medicine*, *42*, 1305-1320.

Kramer, M.D., Patrick, C.J., Hettema, J.M., Moore, A.A., Sawyers, C.K., Yancey, J.R., 2020. Quantifying dispositional fear as threat sensitivity: Development and initial validation of a model-based scale measure. *Assessment*. *27*, 533–546.

Krueger, R. F. (1999). The structure of common mental disorders. *Archives of General Psychiatry, 56,* 921–926.

Krueger, R. F., Hicks, B. M., Patrick, C. J., Carlson, S. R., Iacono, W. G., & McGue, M. (2002). Etiologic connections among substance dependence, antisocial behavior and personality: Modeling the externalizing spectrum. *Journal of Abnormal Psychology, 111*, 411-424. https://doi.org/10.1037//0021-843X.111.3.411.

Krueger, R. F., Markon, K. E., Patrick, C. J., Benning, S. D., & Kramer, M. (2007). Linking antisocial behavior, substance use, and personality: An integrative quantitative model of the adult externalizing spectrum. *Journal of Abnormal Psychology*, *116*, 645-666.

Lilienfeld, S. O., & Andrews, B. P. (1996). Development and preliminary validation of a self-report measure of psychopathic personality traits in noncriminal populations. *Journal of Personality Assessment, 66*, 488-524.

Lykken, D. T. (1957). A study of anxiety in the sociopathic personality. *Journal of Abnormal and Social Psychology*, *55*, 6-10.

McCord, W., & McCord, J. (1964). *The psychopath: An essay on the criminal mind*. Van Nostrand.

Palumbo, I. M., Perkins, E. R., Yancey, J. R., Brislin, S. J, Patrick, C. J., & Latzman, R. D. (2020). Toward a multimodal measurement model for the neurobehavioral trait of affiliative capacity. *Personality Neuroscience*, *3*, e11. doi: 10.1017/pen.2020.9

Patrick, C. J. (2010). *Triarchic Psychopathy Measure*. Publicly available questionnaire inventory, Florida State University, Tallahassee, FL. Access online at: [www.phenxtoolkit.org/protocols/view/121601](http://www.phenxtoolkit.org/protocols/view/121601)

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Patrick, C. J. (2018). *Handbook of Psychopathy (2nd ed.*). New York: Guilford. (1st ed., 2006).

Patrick, C. J. (2022). Psychopathy: Current knowledge and future directions. *Annual Review of Clinical Psychology*, *18*, 387-415. <https://doi.org/10.1146/annurev-clinpsy-072720-012851>.

Patrick, C. J., Bernat, E., Malone, S. M., Iacono, W. G., Krueger, R. F., & McGue, M. K. (2006). P300 amplitude as an indicator of externalizing in adolescent males. *Psychophysiology*, *43*, 84-92.

Patrick, C. J., Bradley, M. M., & Lang, P. J. (1993). Emotion in the criminal psychopath: Startle reflex modulation. *Journal of Abnormal Psychology, 102*, 82-92.

Patrick, C. J., Cuthbert, B. N., & Lang, P. J. (1994). Emotion in the criminal psychopath: Fear image processing. *Journal of Abnormal Psychology*, *103*, 523-534.

Patrick, C. J., Fowles, D. C., & Krueger, R. F. (2009). Triarchic conceptualization of psychopathy: Developmental origins of disinhibition, boldness, and meanness. *Development and Psychopathology*, *21*, 913-938. https://doi.org/10.1017/S0954579409000492.

Patrick, C. J., Hicks, B. M., Krueger, R. F., & Lang, A. R. (2005). Relations between psychopathy facets and externalizing in a criminal offender sample. *Journal of Personality Disorders*, *19*, 339-356.

Patrick, C. J., & Iacono, W. G. (1989). Psychopathy, threat, and polygraph test accuracy. *Journal of Applied Psychology*, *74*, 347-355.

Patrick, C. J., Iacono, W. G., & Venables, N. C. (2019). Incorporating neurophysiological measures into clinical assessments: Fundamental challenges and a strategy for addressing them. *Psychological Assessment*, *31*, 1512-1529.

Patrick, C. J., Kramer, M. D., Krueger, R. F., & Markon, K. E. (2013a). Optimizing efficiency of psychopathology assessment through quantitative modeling: Development of a brief form of the Externalizing Spectrum Inventory. *Psychological Assessment, 25,* 1332-1348.

Patrick, C. J., Kramer, M. D., Vaidyanathan, U., Benning, S. D., Hicks, B. M., & Lilienfeld, S. O. (2019b). Formulation of a measurement model for the boldness construct of psychopathy. *Psychological Assessment*, *31*, 643-659.

Patrick, C. J., & Lang, A. R. (1999). Psychopathic traits and intoxicated states: Affective concomitants and conceptual links. In M. E. Dawson, A. M. Schell, & A. H. Boehmelt (Eds.), *Startle modification: Implications for clinical science, cognitive science, and neuroscience* (pp. 209-230). New York: Cambridge University Press.

Patrick, C. J., Venables, N. C., Yancey, J. R., Hicks, B. M., Nelson, L. D., & Kramer, M. D. (2013b). A construct-network approach to bridging diagnostic and physiological domains: Application to assessment of externalizing psychopathology. *Journal of Abnormal Psychology*, *122*, 902-916.

Perkins, E. R., Joyner, K. J., Foell, J., Drislane, L. E., Brislin, S. J., Yancey, J. R., …, & Patrick, C. J. (2022). Assessing general versus specific liability for externalizing problems in adolescence: Concurrent and prospective prediction of conduct disorder, ADHD, and substance use. *Journal of Psychopathology and Clinical Science*, *131*, 793-807.

Proudfit, H. G. (2015). The reward positivity: From basic research on reward to a biomarker for depression. *Psychophysiology*, *52*, 449-459.

Sellbom, M. (2018). The triarchic psychopathy model: Theory and measurement. In M. DeLisi (Ed.), *Routledge international handbook of psychopathy and crime* (pp. 241–264). New York: Routledge.

Tuvblad, C., Wang, P., Berntsen, L., Raine, A., Patrick, C. J., & Baker, L. A. (2019). Genetic and environmental influences on disinhibition, boldness, and meanness as assessed by the Triarchic Psychopathy Measure in 19 – 20 year old twins. *Psychological Medicine*, *49*, 1500-1509.

Vaidyanathan, U., Patrick, C. J., & Cuthbert, B. N. (2009). Linking dimensional models of internalizing psychopathology to neurobiological systems: Affect-modulated startle as an indicator of fear and distress disorders and affiliated traits. *Psychological Bulletin*, *135*, 909-942.

Venables, N. C., Foell, J., Yancey, J. R., Kane, M. J., Engle, R. W., & Patrick, C. J. (2018). Quantifying inhibitory control as externalizing proneness: A cross-domain model. *Clinical Psychological Science*, *6*, 561-580. <https://doi.org/10.1177/2167702618757690>.

Venables, N. C., Yancey, J. R., Kramer, M. D., Hicks, B. M., Nelson, L. D., Strickland, C. M., Krueger, R. F., Iacono, W. G., & Patrick, C. J. (2017). Evidence of a prominent genetic basis for associations between psychoneurometric traits and common mental disorders. *International Journal of Psychophysiology, 115,* 4-12*.*

Venables, N. C., & Patrick, C. J. (2014) Reconciling discrepant findings for P3 brain response in criminal psychopathy through reference to the concept of externalizing proneness. *Psychophysiology*, *51*, 427-436.

Viding, E., & McCrory, E. (2019). Towards understanding atypical social affiliation in psychopathy. *Lancet Psychiatry*, *6*, 437-444.

Waller, R., & Wagner, N. (2019). The Sensitivity to Threat and Affiliative Reward (STAR) model and the development of callous-unemotional traits. *Neuroscience and Biobehavioral* *Reviews*, *107*, 656–671.

Yancey, J. R., Venables, N. C., & Patrick, C. J. (2016). Psychoneurometric operationalization of threat sensitivity: Relations with clinical symptom and physiological response criteria. *Psychophysiology*, *53*, 393-405.

Young, S. E., Friedman, N. P., Miyake, A., Willcutt, E. G., Corley, R. P., Haberstick, B. C., & Hewitt, J. K. (2009). Behavioral disinhibition: liability for externalizing spectrum disorders and its genetic and environmental relation to response inhibition across adolescence. *Journal of Abnormal Psychology*, *118*, 117-130.