Baskin-Sommers, A.R. & Newman, J.P. (2013). Differentiating the Cognition-Emotion Interactions that Characterize Psychopathy versus Externalizing Disorders.
In M Robinson, E. Harmon-Jones, and E. Watkins. Cognition and Emotion. (pp. 501-520).
Guilford Press: New York.

CHAPTER 27

Differentiating the Cognition–Emotion Interactions That Characterize Psychopathy versus Externalizing

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Disinhibitory psychopathology encompasses a broad range of traits and behaviors that is epitomized by psychopathy and externalizing (Gorenstein & Newman, 1980; Krueger, Markon, Patrick, & Iacono, 2005; Patrick & Zempolich, 1998; Patrick, Zempolich, & Levenston, 1997; Poythress & Hall, 2011; Zuckerman, 1978). Psychopathic individuals are characterized by difficulty establishing genuine relationships, minimal and superficial affective experience, an impulsive behavioral style, and a chronic antisocial lifestyle that entails great costs to society as well as for affected individuals (e.g., incarceration). Alternatively, externalizing individuals often display excessive reward seeking, intense hostility and reactive aggression, and poor impulse control (Buckholtz et al., 2010; Gorenstein & Newman, 1980; Krueger et al., 2005; Pridmore, Chambers, & McArthur, 2005; Newman & Lorenz, 2003). Although both psychopathy and externalizing are characterized by antisociality, impulsivity, irresponsibility, and aggression, these syndromes are commonly measured and expressed in distinct manners.

Psychopathy is a severe psychopathological disorder affecting approximately 1% of the general population and 25% of incarcerated male offenders (Hare, 2006; Neumann & Hare, 2008). The gold standard measure of psychopathy, particularly with incarcerated samples, is Hare's Psychopathy Checklist—Revised (PCL-R; 2003). The PCL-R, an interview-based measure, identifies individuals displaying a combination of disinhibited traits (i.e., impulsivity, irresponsibility), a chronic antisocial lifestyle, and a variety of interpersonal and affective symptoms (i.e., callousness, glibness, superficial charm, shallow emotions). Because the impulsivity and antisocial lifestyle symptoms apply to most disinhibitory psychopathology, it is the callous--unemotional traits that distinguish psychopathy from externalizing disorders (i.e., antisocial personality disorder, substance abuse/dependence) and externalizing personality traits (e.g., low constraint).

In contrast to psychopathy, the externalizing spectrum encompasses a heterogeneous mixture of disorders, including conduct disorder, substance use disorders, and antisocial personality disorder. In prison populations, externalizing disorders are much more prominent than psychopathy (e.g., the prevalence of antisocial personality disorder [50–80%] is more than double the preva-

lence of psychopathy in male prisoners). By definition, the externalizing construct is not intended to identify a specific disorder or set of symptoms. Rather, it is intended to identify a heritable predisposition (i.e., latent variable) to diverse forms of disinhibitory psychopathology (Gorenstein & Newman, 1980; Iacono, Malone, & McGue, 2008). In some cases, this latent variable is identified by extracting the common variance associated with conduct disorder, adult antisocial behavior, and symptoms of a substance use disorder (Iacono et al., 2008). In other cases, externalizing is identified using measures of personality/temperament that include low constraint, impulsivity, negative emotionality, high extraversion, and high neuroticism. When defined in this way, investigators identify externalizing using broad-spectrum measures of personality, such as the Multidimensional Personality Questionnaire (MPQ; Patrick, Curtin, Tellegen, 2002) or, more recently, questionnaires designed to assess the array of predisposing traits more directly (e.g., Externalizing Spectrum Inventory; Krueger, Markon, Patrick, Benning, & Kramer, 2007).

The distinction between psychopathy and externalizing is complicated by virtue of their overlapping behavior problems. Nearly all incarcerated individuals with psychopathy qualify for conduct disorder and antisocial personality disorder, and most also qualify for one or more substance use disorders (Smith & Newman, 1990). Thus, if using these behavioral symptoms alone, it would be extremely difficult to distinguish between psychopathy and externalizing. However, as already noted, the callous–unemotional traits serve to differentiate psychopathy from the more emotionally reactive style (e.g., high reward seeking and negative emotionality) associated with externalizing. Moreover, although laboratory-based characterizations of psychopathy and externalizing commonly emphasize etiologically relevant attentional, executive system, and emotion-related dysfunction (Gorenstein & Newman, 1980; Newman, 1997; Patrick, 2007), close inspection of the specific pattern of process-level results associated with psychopathy and externalizing reveal that they are remarkably different. As a result of the differences in assessment and process-level functioning, we believe that progress in understanding the serious behavior problems associated with psychopathy and externalizing depends on disentangling the divergent etiological pathways associated with their disinhibitory psychopathology.

The primary goal of this chapter is to distinguish between the cognitive–affective processes contributing to psychopathy and externalizing. Toward this end, we (1) review key findings in psychopathy and externalizing for the purpose of identifying their respective attentional, executive functioning, and affective abnormalities; (2) introduce an integrative model of cognitive–affective interactions as a framework for specifying and distinguishing the dysfunctional interactions operating in psychopathy and externalizing; and (3) based on the proposed model, discuss treatment implications for these syndromes. Before continuing, it is important to note that the scope of the studies reviewed in this chapter is not all-inclusive. We specifically examine reports that help us characterize and distinguish the dysfunctional cognition–emotion interactions operating in psychopathy and externalizing. In our view, failure to distinguish the dysfunctional cognitive–affective interactions associated with psychopathy and externalizing is a primary factor impeding etiological understanding as well as the development of more successful treatment strategies in both domains.

Attention

To understand the proposed roles for attention in the etiology of psychopathy and externalizing, it is important to first clarify the processes that may be operating in them. Models of selective attention suggest that there is a continuum of early and late influences. Early selective attention may act as a "fixed bottleneck" that, once established, blocks the processing of secondary information that is not goal relevant (Driver, 2001). Such selection is presumed to involve the serial processing of incoming information. Alternatively, selective attention may operate at a later stage (e.g., Luck & Hillyard, 1999). In traditional models of late selection, information is initially encoded in parallel, and then selection occurs after stimulus identification or semantic encod-

ing (Corbetta, Miezin, Dobmeyer, Shulman, & Petersen, 1991; Duncan, 1980) as a function of memory and response selection processes that bias attention in a manner consistent with an individual's top-down, goal-directed focus (Driver, 2001). Of particular relevance, the distinction between these stages highlights the extent to which selective attention reflects a relatively automatic gating (early) out of distracting stimuli, as opposed to the influence of higher-order regulatory processes (late) that sustain a goal-relevant focus of attention. The following review suggests that individuals with psychopathy are uniquely associated with an early attention bottleneck, whereas externalizing individuals are primarily associated with dysfunction at a later stage of attention.

According to Newman and colleagues (e.g., Newman & Baskin-Sommers, 2011), an early attention bottleneck plays a crucial role in moderating the behavior and decision-making deficits associated with psychopathy. Psychopaths are oblivious to potentially meaningful peripheral information because they fail to reallocate attention while engaged in goal-directed behavior (MacCoon, Wallace, & Newman, 2004; Newman, 1998; Patterson & Newman, 1993). This difficulty balancing simultaneous demands to process goal-directed and peripheral information creates a bias whereby psychopaths are unresponsive to information unless it is a central aspect of their goal-directed focus of attention (Jutai & Hare, 1983; Kiehl, Hare, McDonald, & Brink, 1999).

An important implication of the attention bottleneck is that the emotion deficits commonly associated with psychopathy may vary as a function of attentional focus. A recent experiment by Newman and colleagues (2010) involving fear-potentiated startle (FPS) provides striking support for this hypothesis. Of note, existing evidence suggests that FPS is generated via the amygdala (Grillon, Ameli, Goddard, Woods, & Davis, 1994). The task used in this study required participants to view and categorize letter stimuli that could also be used to predict the administration of electric shocks. Instructions engaged either a goal-directed focus on threat-relevant information (i.e., the color that predicted electric shocks) or an alternative, threat-irrelevant dimension of the letter stimuli (i.e., in a low-load condition, participants responded to indicate letter case; in a high-load condition, participants responded to indicate whether or not a letter stimulus matched one that occurred two back). The results provided no evidence of a psychopathy-related deficit in FPS under conditions that focused attention on the threat-relevant dimension. However, PCL-R psychopathy scores were significantly and inversely related to FPS under conditions that required participants to focus on an alternative, threat-irrelevant dimension of stimuli (i.e., when threat cues were peripheral) (Figure 27.1A).

Although the results from Newman and colleagues (2010) provided some of the strongest evidence to date that the fear deficit of individuals high on psychopathy is moderated by attention, the study did not specify the attentional mechanism underlying this effect. Baskin-Sommers, Curtin, and Newman (2011) specified this attentionally mediated abnormality in a new sample of offenders by measuring FPS in four conditions that crossed attentional focus (threat vs. alternative focus) with early versus late presentation of goal-relevant cues. First, the authors replicated the key findings reported by Newman and colleagues (2010): The deficit in FPS in individuals high on psychopathy was virtually nonexistent under conditions that focused attention on the threat-relevant dimension of the experimental stimuli (i.e., threat-focus conditions), but was pronounced when threat-relevant cues were peripheral to their primary focus of attention (i.e., alternative-focus conditions). More specifically, the psychopathic deficit in FPS was apparent only in the early alternative-focus condition, in which threat cues were presented after the alternative goal-directed focus was already established (Figure 27.1B). This finding implicates an early attention bottleneck as a proximal mechanism for deficient response modulation in psychopathy (see Newman & Baskin-Sommers, 2011). Additionally, Larson and colleagues (2012) have recently completed an imaging study using this paradigm with an independent sample of inmates. Preliminary results suggest that individuals with psychopathy as compared to those without it display significantly lower activation in the right-dorsal amygdala in the early alternative-focus con-

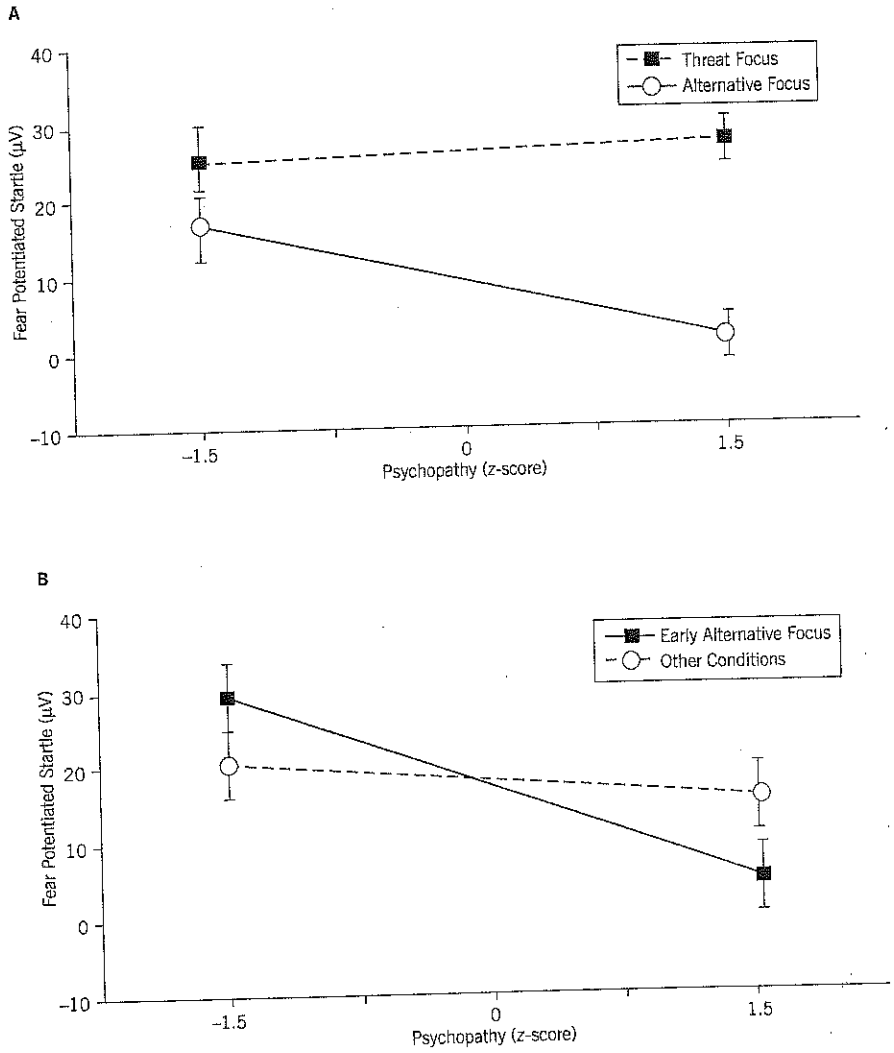

FIGURE 27.1. Fear-potentiated startle (FPS) as a function of PCL-R psychopathy (± 1.5 *SD* from the mean) and condition. (A) As reported by Newman et al. (2010), prisoners high on psychopathy displayed significantly lower FPS than prisoners low on psychopathy in the alternative-focus conditions. High- and low-psychopathic prisoners displayed comparable FPS in the threat-focus condition. (B) As reported by Baskin-Sommers et al. (2011a), prisoners high on psychopathy, compared to those low on psychopathy, displayed significantly lower FPS in the early alternative-focus condition, but comparable FPS in the other three conditions.

dition, but there was no difference in amygdala activation between the two groups (psychopathic vs. nonpsychopathic) in the early threat-focus condition. These results corroborate the idea that attention moderates the fearlessness of individuals with psychopathy, as evidenced by the appearance and disappearance of deficits in FPS and amygdala activation as a function of focus of attention.

There is equally clear evidence that the core inhibitory deficit in psychopathy is moderated by attention. Using a go/no-go learning task, Newman and Kosson (1986) examined passive avoidance (i.e., inhibition of punished responses) learning under reward-and-punishment versus punishment-only conditions. When participants were focused on avoiding punishment (punishment-only),

there were no group differences in passive avoidance. However, when punishment was peripheral to the primary focus of earning rewards (reward-and-punishment), those with psychopathy committed significantly more passive avoidance errors than controls. Thus, the deficit in passive avoidance learning of individuals with psychopathy, like their FPS deficits, is moderated by their focus of attention (see also Arnett, Smith & Newman, 1997; Newman, Patterson, Howland, & Nichols, 1990). Individuals with psychopathy also display deficits in reversal learning (Budhani, Richell, & Blair, 2006; Hornak et al., 2004) and in gambling tasks (Bechara, Damasio, Tranel, & Damasio, 1997; Mitchell, Colledge, Leonard, & Blair, 2002; Newman, Patterson, & Kosson, 1987; cf. Lösel & Schmucker, 2004; Schmitt, Brinkley, & Newman, 1999), which also require participants to reallocate goal-directed attention.

Despite strong evidence for the role of an attention bottleneck in moderating affective reactivity in psychopathy, the evidence reviewed to this point does not preclude the possibility that a fundamental deficit in emotion processing undermines the motivation or capacity of these individuals to redirect attention (Blair & Mitchell, 2009; Lykken, 1995). However, there is now substantial evidence demonstrating that individuals with psychopathy display similar attentional abnormalities on laboratory tasks involving motivationally neutral peripheral information.

In standard versions of the color–word and number Stroop tasks, participants first perceive the conflicting elements and must then reprioritize attention to the appropriate element of the display (i.e., late selective attention; MacLeod, 1998). Thus, the quality of response depends on the participant's ability to resolve the conflict prior to making a response using executive functions, such as cognitive control (Botvinick, Braver, Barch, Carter, & Cohen, 2001). Under such conditions, individuals with psychopathy and those without it show comparable levels of interference (Blair et al., 2006; Hiatt, Schmitt, & Newman, 2004; Smith, Arnett, & Newman, 1992). Conversely, on Stroop-like tasks that facilitate early selection of goal-relevant information by spatially or temporally separating the incongruent elements of the display, individuals with psychopathy display significantly less interference than nonpsychopathic individuals, who still show significant interference under these conditions (Hiatt et al., 2004; Mitchell, Richell, Leonard, & Blair, 2006; Newman, Schmitt, & Voss, 1997; Vitale, Brinkley, Hiatt, & Newman, 2007). Such findings suggest that for individuals with psychopathy, an early attention bottleneck effectively blocks the processing of conflicting information, reducing the salience of the conflict and obviating the need to use executive functions to inhibit the distracting/conflicting information. Therefore, in certain contexts, individuals with psychopathy are effectively oblivious to distraction and remain focused on their goal, whereas nonpsychopathic individuals answer the automatic call for processing and are influenced by the conflict regardless of experimental context (Patterson & Newman, 1993).

Corroborating this attention-bottleneck-based interpretation of the Stroop data, Zeier, Maxwell, and Newman (2009) used a modified Erikson flanker task with an attentional cueing manipulation to examine whether an early attention bottleneck is a crucial factor differentiating sensitivity to response conflict in individuals with psychopathy. On some trials, pretrial cueing was used so that participants could orient attention to the location of the task-relevant target before the target and distracting flanker stimuli were presented (i.e., early selection). On other trials, the pretrial cues directed attention to both the target and distracter locations (i.e., late selection). Whereas participants with psychopathy displayed significantly less interference than controls in the former condition, they displayed nonsignificantly more interference in the latter condition.

Similarly, Wolf and colleagues (2011) evaluated the early attention bottleneck hypothesis using a more traditional assessment of attention, the attentional blink (AB) task. In the AB paradigm, participants identify targets in a rapid serial visual presentation (RSVP). Because distracters are presented almost immediately after targets, they elicit a response conflict between attending to the target and attending to the distracters. The magnitude of the AB appears to reflect the consequences of prioritizing attention to the

first target (T1) over competing demands to reallocate attention in order to process all stimuli in the RSVP; the greater the conflict and resulting prioritizing of T1, the greater the AB. As predicted by the attention bottleneck hypothesis, offenders high on psychopathy displayed a significantly smaller AB (i.e., less conflict and fewer missed targets) than offenders low on psychopathy and this difference was apparent from the earliest possible postconflict lag time (i.e., lag 2, the second stimulus presented after T1). Such evidence is consistent with the idea that once they focus attention on goal-relevant information, individuals with psychopathy are essentially oblivious to goal-irrelevant information that elicits conflict in others.

Combined, these studies show that participants with psychopathy are significantly less sensitive to information if it is peripheral to a preestablished focus of goal-directed behavior. Moreover, the fact that this abnormality applies to affectively neutral as well as to affectively significant peripheral information implicates an early attention bottleneck that undermines the processing of goal-incongruent cues regardless of affective significance (Hiatt et al., 2004; Jutai & Hare, 1983; Mitchell et al., 2006; Vitale et al., 2007).

The attentional abnormality in externalizing individuals tends to be quite different. Not only do they perform differently than individuals with psychopathy on the Baskin-Sommers, Curtin, and Newman (2011) fear-conditioning paradigm and other tasks, such as AB, but they appear to display a different set of attention-related problems. Research on externalizing-specific performance implicates strong attentional orienting to salient and/or motivationally significant cues (Derryberry & Reed, 1994; Tiffany & Conklin, 2000) and a tendency to overallocate attentional resources to events of motivational significance (Ávila & Parcet, 2001; Baskin-Sommers, Wallace, MacCoon, Curtin, & Newman, 2010; Wallace & Newman, 1997). Thus, once a stimulus is identified as intrinsically important, engagement of higher-order cognitive processes is required to regulate a response. This later stage of attentional selection, which links up with executive functions to sustain a goal-relevant focus, appears dysfunctional in externalizing individuals.

Using the Baskin-Sommers, Curtin, and Newman (2011) instructed fear paradigm, a pattern distinct from the psychopathy effect emerged among externalizing individuals. When threat information was the primary focus of attention and presented first, trait externalizing (i.e., high-negative affect and low constraint) was significantly associated with greater FPS. Conversely, under conditions that instructed participants to focus on threat-relevant information but presented an irrelevant letter prior to the threat-relevant cues, externalizing was associated with nonsignificantly smaller FPS (Baskin-Sommers et al., 2012). One interpretation of these findings is that externalizing individuals have an intrinsic bias that primes them to orient attention toward motivationally significant information more strongly than other individuals. This recruitment of attention that prioritizes the goal-relevant processing of threat information, in turn, impairs other executive control processes and results in emotional hyperreactivity. Conversely, when a stimulus occurs that is at odds with this goal, such as an irrelevant distracting letter, it is necessary to alter the focus of attention and employ executive functions to facilitate goal-directed behavior. In externalizing this reallocation of attention and effort appears to disrupt fluent processing, resulting in an attenuated threat response. Such findings suggest that attentional processes, and their interaction with executive control processes, are at the root of the externalizing-related dysfunction. Moreover, in light of the fact that the externalizing effect was specific to the early threat-focus condition, whereas the psychopathy effect was specific to the early alternative-focus condition, the results indicate that the abnormal attentional responses associated with psychopathy and externalizing are clearly distinct.

Similarly, externalizing-related performance on the AB paradigm is easily differentiated from psychopathy-related performance and consistent with the purported externalizing-based attentional bias. Individuals with high externalizing (as measured by MPQ-based Impulsive Antisociality; Benning, Patrick, Blonigen, Hicks, & Iacono, 2005, or antisocial personality disorder) displayed a significantly greater AB (i.e., less accurate T2 identification) than individuals with low externalizing scores. Thus, exter-

nalizing individuals appear to overallocate attention to salient information (i.e., T1), and this attentional response temporarily (AB lasts for approximately 300–400 milliseconds [ms]) impairs information processing, resulting in an inability to update expectations concerning the present situation. This study further clarifies the attentional dysfunction operating in externalizing and, moreover, distinguishes it from the abnormalities associated with psychopathy.

Adaptive self-regulation requires a balance of attention to goal-relevant and peripheral information (MacCoon et al., 2004). On the one hand, adaptive behavior requires "that we respond to objects that are outside the current focus of attention, i.e., those that do not match current settings for selecting stimuli and responses" (Corbetta, Patel & Shulman, 2008, p. 306). On the other hand, effective goal-directed behavior requires not becoming overly distracted by stimuli outside the current goal-directed focus or overallocating attentional resources to particularly salient information. The former appears especially relevant for psychopathy. The early attention bottleneck facilitates the selection of goal-relevant information at the expense of overlooking information that might otherwise modulate the goal-directed behavior of individuals with psychopathy. Externalizing individuals do not show this type of deficit. Rather, they are characterized by a tendency to overcommit attentional resources to salient environmental events at the expense of processing other goal-relevant information (i.e., the latter requirement for adaptive self-regulation). In other words, both psychopathy and externalizing are associated with disordered attentional processing, but the characteristic attentional dysfunction in psychopathy involves an early attention bottleneck that interferes with information intake, whereas externalizing is associated with a later selective attention dysfunction that interferes with executive control.

Executive Function

Morgan and Lilienfeld (2000) define executive functioning as an "umbrella term that refers to the cognitive processes that allow for future, goal-oriented behavior" (p. 114). More specifically, executive functions are a constellation of higher-order cognitive processes that facilitate the planning, initiation, and regulation of behavior (Giancola & Tarter, 1999).

When studying externalizing, it is hard to ignore the substantial behavioral, imaging, and event-related potential (ERP) evidence that such individuals have impaired executive functioning (Iacono et al., 2008). First, using behavioral tasks, executive functions such as working memory (e.g., measured by go/no-go discrimination tasks) and cognitive control (e.g., measured by Stroop interference) have been shown to be particularly deficient in externalizing individuals (Dolan, Bechara, & Nathan, 2008; Endres et al., 2011; Morgan & Lilienfeld, 2000). Second, neuroimaging studies involving externalizing individuals (e.g., antisocial personality disorder; Raine, Lencz, Bihrle, LaCasse, & Colletti, 2000) detect both structural and functional abnormalities in regions of the frontal cortex that have been associated with executive functions (e.g., anterior cingulate cortex [ACC]; Davidson, Pizzagalli, Nitschke, & Kalin, 2003; Raine et al., 2000; orbitofrontal cortex [OFC]; Seguin, 2004). Lastly, ERP studies consistently report inverse relationships between increased levels of externalizing and the amplitude and latency of the P300 and error-related negativity (ERN).

Externalizing is regularly associated with deficits in P300 during oddball paradigms (i.e., participants respond to target stimuli that occur infrequently and unpredictably within a series of target-frequent stimuli) and task-relevant stimuli in non-oddball tasks (Bernat, Nelson, Steele, Gehring & Patrick, 2011; Costa et al., 2000; Patrick et al., 2006; Polich, Pollock, & Bloom, 1994). A deficiency in this component suggests disruptions in the updating of working memory and integrating information into existing networks (Bernat et al., 2011). Correspondingly, even though posterior brain regions typically generate the P300, the externalizing-related P300 amplitude reduction is often largest at frontocentral sites, suggesting that this P300 indexes the executive functioning deficit typically associated with anterior brain regions (e.g., ACC; Nelson, Patrick, & Bernat, 2011). Additionally, reports of significant externalizing-related

reductions in ERN suggest inefficient executive function processing related to conflict monitoring and error detection (Hall, Bernat, & Patrick, 2007). Neurally, the ERN is primarily linked to the ACC (Dehaene, Posner, & Tucker, 1994) and supplementary motor area, with other structures, including the PFC, playing a supporting role (Gehring & Knight, 2000). Thus, a deficit in ERN is thought to reflect a deficit in the ACC's executive processes.

Overall, individuals with executive functioning deficits are less able to override maladaptive response inclinations in order to maintain more appropriate and personally beneficial behavior. Consequently, they are at higher risk for persistent rule breaking and committing acts of violence. Thus, deficits in executive functioning may underlie the emotional dysregulation, lack of conscience, and decision-making deficits that have been found to characterize antisocial, externalizing behavior.

Despite the general association between antisocial syndromes/externalizing and executive function deficits (Morgan & Lilienfeld, 2000; see also Blair, 2001), individuals with psychopathy generally do not display deficits on the executive functioning tasks (Blair et al., 2006; Brinkley, Schmitt, & Newman, 2005; Dvorak-Bertsch, Sadeh, Glass, Thornton, & Newman, 2007; Hart, Forth, & Hare, 1990; Hiatt et al., 2004; Munro et al., 2007; Smith et al., 1992; Sutker, Moan, & Allain, 1983). Thus, despite the high level of antisocial behavior displayed by individuals with psychopathy, they do not appear to manifest primary deficits in executive functioning, and in some cases display superior performance on tasks that measure executive functioning (see Stroop discussion above; Hiatt et al., 2004).

Further evidence that executive functioning deficits may be less strongly associated with psychopathy than with externalizing relates to differences in the ERP findings. In the handful of ERP studies on psychopathy that focus on P300 (Jutai, Hare, & Connolly, 1987; Kiehl, Hare, McDonald, & Brink, 1999; Kiehl, Smith, Hare, & Liddle, 2000; Raine & Venables, 1988), the results are more equivocal than those for externalizing. Jutai and colleagues (1987) found no significant difference between individuals with psychopathy and those without it in the amplitude or latency of the P300. Raine and Venables (1988) reported increased amplitude of parietal P300 in individuals high versus low on psychopathy to visual target stimuli elicited during a continuous performance task (see also Raine, Venable, & Williams, 1990, for faster P300 latency effects in predicting psychopathic behavior). And still other studies show significantly smaller P300 responses in individuals high versus low on psychopathy during visual and auditory oddball tasks (Kiehl et al., 1999). The evidence linking psychopathy and ERN activity is equally mixed. Some evidence suggests that individuals with psychopathy show comparable ERN activity to individuals without it in nonaffective tasks (Brazil et al., 2009; Munro et al., 2007), whereas other evidence reveals attenuated ERN activity, particularly in tasks that have an affective component (Munro et al., 2007). Unfortunately, the results of these studies allow few firm conclusions owing, in large part, to the heterogeneity of the participants and the variety of tasks employed (e.g., oddball, S1–S2 motor response, and aversive differential conditioning tasks).

Conventional wisdom highlights the importance of a person's ability to focus on goal-directed behavior and to screen out salient distracters (i.e., executive functioning) in order to regulate the expression of violent behavior, inappropriate drug use, harmful antisocial behavior, and shortsighted reward seeking (Banfield, Wyland, Macrae, Munte, & Heatherton, 2004; MacCoon et al., 2004; Rueda, Posner, & Rothbart, 2005). In light of the existing evidence with externalizing individuals, there is reason to believe that this mechanism contributes to their behavior problems. However, another group with marked disinhibition, psychopathic individuals do not appear to be deficient in this regard. To the contrary, once their attention is engaged in goal-directed behavior, individuals with psychopathy are abnormally resistant to the influence by peripheral information that routinely modulates the goal-directed behavior of others. As described above, psychopathy appears to reflect abnormalities at an earlier stage of selective attention that moderate executive functioning. Early selection of goal-relevant

stimuli diminishes the need for executive functioning to screen out distracting stimuli. Additionally, the psychopathic individual's obliviousness to peripheral information may interfere with recognizing the importance of engaging executive functions to regulate maladaptive responses. Thus, despite what appears to be a normal capacity for executive functioning, psychopathy may often appear to display both superior executive functioning (when early selection obviates the need for utilizing executive functions) and executive functioning deficits (when the need to employ executive functions has not been registered). Paralleling our review of attentional abnormalities, the literature on executive functioning highlights important distinctions between psychopathy and externalizing.

Emotion

Emotion is central to the variety of human experiences. It exerts a powerful influence on behavior, decision making, and reasoning. Here too, however, there is reason to believe that the contributions of emotion to the disinhibited behavior of psychopathic and externalizing individuals are different.

The disinhibited behavior of individuals with psychopathy has most often been understood in the context of the low-fear model (Lykken, 1957). In line with this view, individuals with psychopathy display poor fear conditioning (Lykken, 1957), minimal autonomic arousal (i.e., electrodermal response) in anticipation of aversive events (e.g., loud noises, electric shocks; Hare, 1978), and problems learning to inhibit punished responses (Newman & Kosson, 1986). Additionally, and arguably the most cited evidence of psychopathy-related affective deficits, is the fact that individuals with psychopathy display emotion-modulated startle deficits in picture-viewing paradigms (Patrick, Bradley, & Lang, 1993). In contrast to controls, who display greater startle responses to noise probes while viewing unpleasant versus neutral pictures, this startle potentiation appears to be lacking in participants with psychopathy (see Patrick, 1994). However, this deficit appears to be time-limited. Specifically, those with psychopathy display startle potentiation deficits when probes are presented shortly after picture onset (e.g., 1.5 seconds), but they display normal emotion-modulated startle when probes are presented later in the picture-viewing interval (e.g., 4 seconds; Levenston, Patrick, Bradley, & Lang, 2000). The restricted nature of the emotion-modulated startle deficit may suggest that a fundamental deficit in the defensive response is not completely accurate and that the processes governing picture viewing in individuals with psychopathy are more complex (see Newman & Baskin-Sommers, 2011, for an attention-related explanation of this finding).

Consistent with the emotion-modulated startle deficit, there is also preliminary evidence that those with psychopathy display less amygdala activation than controls in several domains: aversive conditioning, moral decision making, social cooperation, and memory for emotionally salient words (Birbaumer et al., 2005; Glenn, Raine, & Schug, 2009; Kiehl et al., 2001; Rilling et al., 2007). However, other studies indicate that the amygdala is hyperreactive when individuals with psychopathy view certain emotionally salient information (Muller et al., 2003).

In contrast to the typically hyporeactive affective style in psychopathy, externalizing is more often associated with hyperreactivity to affective cues. In approach/motivation contexts, such as reward or drug seeking, externalizing individuals are characterized by reward hypersensitivity (Buckholtz et al., 2010; Endres, Rickert, Bogg, Lucas & Finn, 2011; Martin & Potts, 2004; Volkow & Li, 2004). For example, impulsive individuals choose immediate rewards over larger delayed rewards (Martin & Potts, 2004). Substance-dependent individuals perform poorly on the Iowa Gambling Task, preferring larger immediate payoffs despite their association with periodic costly punishments that ultimately result in a net loss (Bechara, 2001). Consistent with the assumption that drug cues are rewarding to substance-dependent individuals, they also show increased heart rate and sweat-gland activity in response to drug-related cues in cue reactivity paradigms (Carter & Tiffany, 1999).

In the presence of reward incentives, neurotic extraverts (traits associated with exter-

nalizing) commit more passive avoidance errors than introverts do (Newman, Widom, & Nathan, 1985) and fail to pause following punished errors (Nichols & Newman, 1986). On the surface this seems similar to the findings reported above for offenders with psychopathy; however, research suggests that the passive avoidance deficit in neurotic extraverts is mediated by reward sensitivity, whereas the psychopathy effect is not (Newman et al., 1990; Patterson et al., 1987). These findings suggest that externalizing traits may be associated with a fundamental hypersensitivity to rewards.

Importantly, externalizing-related hyperreactivity is not limited to reward contexts. Evidence also shows increased skin conductance and heart rate in response to stressful events (Taylor, Carlson, Iacono, Lykken, & McGue, 1999; Verona, Patrick, & Lang, 2002). These findings suggest that the emotional hyperactivity displayed by externalizing individuals may not be specific to reward, but rather a more general hypersensitivity to motivationally significant information.

A very clear difference in affective response styles between psychopathic and externalizing individuals becomes apparent. Simply put, psychopathic individuals are hyporeactive to emotion information, whereas externalizing individuals are hyperreactive. However, this simple statement can be criticized for being both too specific and not specific enough. For example, as noted above, evidence suggests that the psychopathy-related affective deficit is moderated by attention. In externalizing, there is evidence that both attentional and executive function processes influence affective responding. Thus, focusing on a single deficit (i.e., just emotion, just attention, just executive function) cannot fully capture the process-level dysfunctions that result in behavioral disinhibition.

Integrative Model: The Importance of Cognition–Emotion Interactions

The above review highlights many important research findings related to psychopathy and externalizing. In both syndromes there is evidence that dysfunction at the level of attention, executive function, and/or affect contribute to disinhibition. Moreover, it appears that psychopathy and externalizing are related to divergent patterns of dysfunction. However, within the research on both syndromes, there is a tendency to focus on one specific process. Of course, though, these processes do not operate in a vacuum. There is a wealth of existing research suggesting that attention, executive function, and affect are interrelated processes. Dysfunction associated with any one component may disrupt processing associated with any other component. Understanding how these processes affect each other is too important to ignore, and ultimately it is the relationships (i.e., interactions) among these processes that determine the specific behavior problems related to these distinct syndromes. To the extent that we can distinguish the predisposing cognition–emotion interactions associated with these syndromes and conceptualize their impact on behavior, we are poised to unravel the problem of disinhibitory psychopathology.

Toward this end, we outline an integrative model (Figure 27.2) to illustrate how attention, executive functioning, and affect are interrelated and how the consequences of dysfunction at one process level may affect function at another process level. We believe that this model has a number of advantages. First, it moves away from the typical unitary focus and emphasizes the need for considering multiple processes when attempting to understand disinhibition. Second, it provides a framework for identifying a controlling variable that may initiate the cascade of process-level dysfunction that ultimately results in behavioral disinhibition. The notion of a controlling variable may seem ironic as we propose a movement away from the unitary process approach. However, identifying a controlling variable does not mean that it is the only process needed to understand a person's disinhibitory psychopathology. Rather, this approach provides an opportunity to clarify the impact of interrelated processes on disinhibition. For each syndrome, the model helps us elucidate the multiple interacting influences and specify the divergent pathways that culminate in disinhibited behavior.

As described above, psychopathy is associated with emotional hyporeactivity, an early attention bottleneck, and nonspecific anomalies in executive functions. We pro-

pose that the attention bottleneck is the distinctive controlling variable in psychopathy-related disinhibition (Figure 27.2). This is not to deny that psychopathy is often associated with executive function and emotion processing anomalies. However, these anomalies may be usefully understood as a consequence of an early attention bottleneck. Once the bottleneck is established, it blocks the processing of secondary information that is not goal-relevant. Thus, individuals with psychopathy are oblivious to a variety of potentially important stimuli unless they are a central aspect of their prepotent focus of attention. To the extent that the bottleneck filters information at an early stage of attention, executive functioning is essentially circumvented, as there are fewer perceived conflicts and thus fewer demands for executive control. Of note, we have found that the psychopathy-related deficits in passive avoidance learning, conflict monitoring, electrodermal activity, FPS, and amygdala activation may all be made to appear and disappear in laboratory contexts as a function of experimental manipulations that control the focus of attention. The central role of attention in influencing psychopathic responses across experimental contexts highlights its role as a controlling variable in psychopathy. This understanding of the cognition–emotion interactions

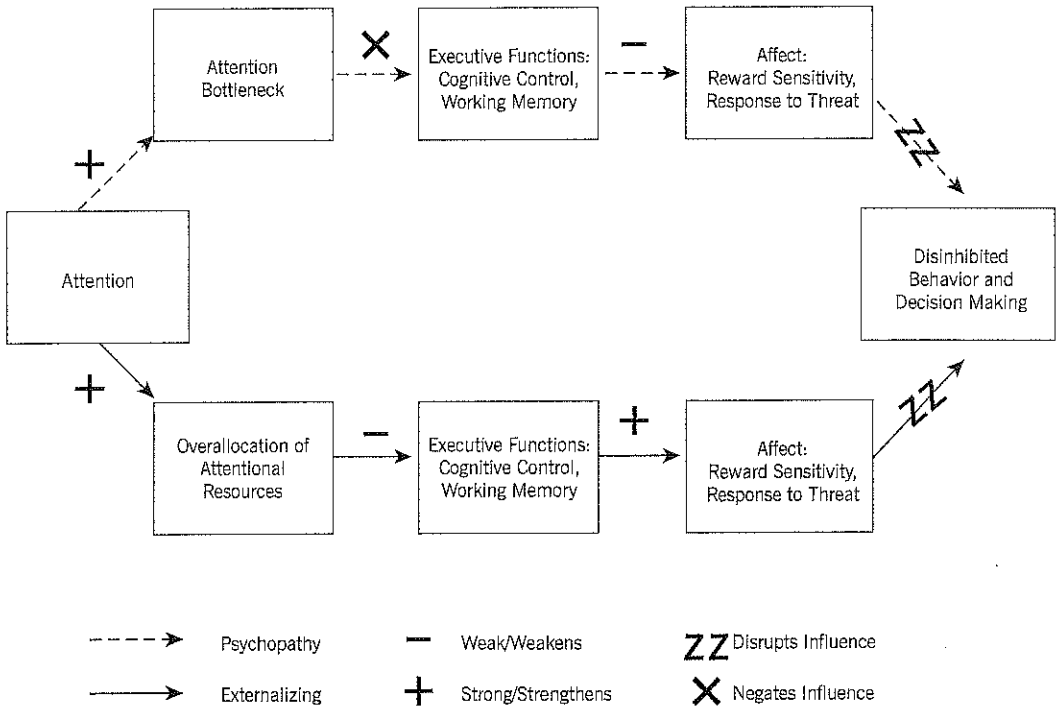

FIGURE 27.2. Integrative model of cognition–emotion interactions in psychopathy and externalizing. First, externalizing (solid line) involves an overallocation of attentional resources, which in turn impairs executive functions that normally moderate responding, including inhibition, shifting, and control, and results in dysregulated affective responses and behavioral disinhibition. Second, psychopathy (dashed line) is best characterized by an early attention bottleneck that disrupts the processing of information, particularly when it is peripheral to the primary goal. To the extent that the bottleneck filters information at an early stage of attention, executive functioning is essentially circumvented, as there are fewer conflicts or cognitive demands. Nevertheless, strong executive functioning reinforces the early attention bottleneck (Baskin-Sommers, Curtin, & Newman, 2011). Moreover, to the extent that affective information is not the main focus of attention, it receives little or no attention and has minimal impact on behavior. This disrupted influence on behavior and decision making ultimately results in the disinhibited expression of prepotent or dominant responses.

characterizing psychopathy not only provides an integrative context for understanding laboratory-based findings, but may also provide a better context for conceptualizing the often cold-hearted behavior of individuals with psychopathy.

The behavior of psychopathic individuals is highly paradoxical. Their behavior is often deliberate, yet, at times they can be quite impulsive and have little perspective on how their behavior affects themselves and others. This is evident in the strong association between psychopathy and instrumental aggression (i.e., aggression that is deliberate and goal-directed; Blair, 2001) and premeditated murder (i.e. Woodworth & Porter, 2002). Although an attention bottleneck may allow individuals with psychopathy to be more effective at filtering out distraction and focusing narrowly on personal goals (i.e., deliberateness of behavior), it may also leave them vulnerable to overallocating attention to goal-relevant cues at the expense of processing other context-relevant information (i.e., impulsivity of behavior). This inflexible focus on personal goals may also underlie the self-centered, callous traits associated with psychopathy. More generally, a deficit in the ability to process multiple aspects of a situation may leave individuals with psychopathy oblivious to the potentially devastating consequences (i.e., the distress response of others) of their behavior. Given this attentional perspective, it is interesting to speculate that the harmful behavior of individuals with psychopathy (e.g., instrumental aggression, fraud) may not reflect innate callousness. Rather, they are callously oblivious to information that is not directly and immediately related to their goal. That is, psychopathic individuals' abnormal cognition–emotion interaction, guided by an abnormal attention bottleneck, may effectively preclude response inhibition, conflict monitoring, affective processing, and self-regulation.

In contrast to psychopathy, the process-level dysfunctions in externalizing appear best characterized by an overallocation of attentional resources (i.e., late selective attention), deficits in executive functions, and hyperemotionality. At this time, determining which of these processes is the controlling variable in externalizing-related disinhibition is less clear-cut than it is for psychopathy. Relatively few studies have systematically attempted to disambiguate whether it is emotional hyperreactivity, attention, or executive function that is the controlling variable in externalizing disinhibition. However, one scenario that seems to be associated with many of the externalizing findings may be that the overallocation of limited capacity processing resources to salient stimuli exacerbates emotional reactions and consequently decreases cognitive resources available for processing subsequent stimuli (Figure 27.2). That is, when expecting motivationally significant/salient information, externalizing individuals overallocate attentional resources, which in turn may also impair executive functions that normally moderate responding, including inhibition, shifting, and control. Ultimately, the impact of information on behavior will depend on the application of resources associated with executive function, but the proposed model suggests that these downstream executive function effects in the dysfunctional cascade begin with an overallocation of resources at the attentional stage. Although novel and speculative at this time, this proposal is consistent with the strong attentional orienting to salient cues, dysfunction in identifying T2 stimuli in the attentional blink task, difficulty classifying rare or unexpected stimuli in the oddball task, and problems shifting focus to inhibit drug craving and violent responses of externalizing individuals. Moreover, much like in psychopathy, this unique understanding of the interactions between cognition and emotion in externalizing may provide a more nuanced understanding for why individuals with this behavioral disinhibition behave the way they do.

Externalizing individuals are reactive in their behavior and tend to let emotions get the best of them. As such, these individuals are prone to excessive reward (e.g., monetary) seeking, reactive aggression (i.e., aggression often in response to frustration or threat), and other strong urges (e.g., drug cravings) that overwhelm their inhibitory controls (i.e., executive functions). Describing individuals with such problems, Skeem and colleagues (2004) note that they are "anxious, emotionally volatile, hostile, and impulsive, and they are heavy substance abusers" (p. 399). Thus, unlike psychopathic

individuals, externalizing individuals, do not engage in disinhibited behavior (i.e., gambling, substance use reactive aggression) because of intentional premeditated goals or obliviousness to the drawbacks associated with these behaviors. Rather, they may be disinhibited because of an inability to engage in cognitive control under affectively charged circumstances, stemming from an overcommitment of attentional resources to motivationally salient information (e.g., a drug, a threat), resulting in affective hyperreactivity (e.g., substance use, aggression). Although more research needs to be done to support this point of view, ultimately, the behavior of externalizing individuals is clearly a function of abnormal cognition–emotion interactions, rather than a deficit in a single process that hampers effective self-regulation.

The purpose of outlining an integrative model for characterizing crucial cognition–emotion interactions in psychopathy and externalizing is to specify the dysfunctional processes that contribute to each syndrome and understand how these processes form a network that culminates in distinct patterns of disinhibition. In addition to confirming that they are different syndromes, the unique empirical and behavioral correlates of psychopathy and externalizing highlight their distinct and complex cognitive–affective deficits. Moreover, the specification of these distinct interactions may aid in the development of targeted intervention and treatment programs to address the dysfunctional processes.

Treatment

To date, many of the canonical behavioral and cognitive treatments for disinhibitory psychopathology have proven ineffective, particularly in cases of psychopathy. Individuals with externalizing disorders are usually perceived as resistant to treatment, especially psychotherapy. Moreover, individuals with alcohol dependence and antisocial features have significantly worse outcomes in treatment than those without these features (Compton, Cottler, Jacobs, Ben-Abdallah, & Spitznagel, 2003). For those with psychopathy, it has been proposed that "popular prison treatment and socialization programs may actually make psychopaths worse than they were before. . . . Group therapy and insight-oriented programs help psychopaths develop better ways of manipulating, deceiving and using people but do little to help them understand themselves" (Hare, 2006, p. 717). Supporting this notion, not only are individuals with psychopathy more likely to reoffend, but after treatment they reoffend at a higher rate and more violently than nontreated individuals with psychopathy (Hughes, Hughes, Hollin, & Champion, 1997; Ogloff, Wong, & Greenwood, 1990; O'Neil, Lidz, & Heilbrun, 2003; Rice, Harris, & Cormier, 1992). Nonetheless, with advancing knowledge regarding cognition–emotion interactions that undermine the ability of psychopathic and externalizing individuals to self-regulate, new treatment options are on the horizon (Hare & Neumann; 2009; Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003; Wallace & Newman, 2004; Wallace, Schmitt, Vitale, & Newman, 2000; Wallace, Vitale, & Newman, 1999).

Among those treatment possibilities being explored currently is that of cognitive remediation. *Cognitive remediation* refers to an approach that trains the individual in particular cognitive skills, such as paying attention to contextual cues, applying working memory, and sustaining attention (Klingberg, 2010; Wykes & Van der Gaag, 2001). In healthy adults, Klingberg and colleagues have shown that working memory training not only improves overall working memory capacity, but also changes the functioning of dopamine neurotransmission and brain plasticity (McNab et al., 2009). Research on disorders with known cognitive abnormalities, such as attention-deficit/hyperactivity disorder and schizophrenia, has begun to assess the efficacy of cognitive remediation as a treatment strategy (Stevenson, Whitmont, Bornholt, Livesey, & Stevenson, 2002; Wykes et al., 2003). For example, the application of working memory training has demonstrated durable improvement in memory (Wykes et al., 2007).

Given the dysfunctional cognition–emotion interactions associated with externalizing and psychopathy, it may be possible to develop cognitive remediation treatments that target the specific deficits of these individuals. Thus, as seen in McNab and col-

leagues (2009), with explicit practice and skill building in attentional selection, executive functioning, and reactivity to affective information, improvement in these functions may be reflected in brain-related measures and ultimately behavior.

Externalizing individuals are overreactive to affective and motivationally salient information and have poor executive function capabilities. For example, a training task that focuses on exposure to distressing cues and requires executive functions to regulate responses and emotional reactivity might be quite effective. Along this line, distress tolerance tasks, such as the paced auditory serial addition test (PASAT), provide a means to measure performance and, over time, improvement on difficult or frustrating cognitive tasks (Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). Preliminary evidence suggests that the latency of task engagement on the PASAT predicts the ability to maintain substance use abstinence (Daughters et al., 2005).

Individuals with psychopathy are oblivious to affective, inhibitory, and punishment cues (Newman & Kosson, 1986) that contraindicate ongoing goal-directed behavior (i.e., mismatch information; Baskin-Sommers et al., 2010; Hiatt et al., 2004; Newman et al., 2010). Although the possibility has yet to be directly investigated, it is plausible that tasks that emphasize balancing attention between primary and peripheral information (i.e., affective and neutral) and paying attention to rule changes may induce changes in specific attentional pathways that are associated with attention to contextual information—and thereby reduce the disinhibited behavior of individuals with psychopathy. Corroborating this idea is evidence from work with the card perseveration task (Newman et al., 1987). Under typical conditions, individuals with psychopathy selected significantly more cards at the expense of losing more money. However, in another condition, in which participants were forced to pause 5 seconds before selecting the next card, individuals with psychopathy did not display a disinhibited response style and performed like nonpsychopathic individuals. Thus, when individuals with psychopathy were forced to stop and reflect, there was a change in the quality of their decision making.

In fact, Newman and collaborators have designed cognitive–affective interventions that are believed to target the specific cognitive, affective, decision-making, and self-regulation deficits associated with externalizing and psychopathy, respectively. The potential advantage of such treatment is that it is based on an etiological theory that targets the unique deficits associated with externalizing and psychopathy.

Closing Remarks

The concept of equifinality is used in relation to syndromes involving similar phenotypic expressions (e.g., violence, impulsivity, substance abuse), but which appear to reflect different etiological/developmental pathways. In this regard, it is noteworthy that cognitive–affective accounts of externalizing and psychopathy appear to be relatively distinct. Based on existing evidence, externalizing-related disinhibition involves affective hyperreactivity, a tendency to overallocate attention toward motivationally salient information (e.g., threat, rewards, drug cues), and a deficit in executive functions (e.g., cognitive control, inhibition, working memory). Ultimately, the cascade of events results in behavioral as well as emotional dysregulation. Alternatively, for psychopathy, we propose that this form of disinhibition stems from an early attention bottleneck that precludes the processing of peripheral information, including affective information, resulting in a myopic perspective on goal-directed behavior and poor decision making.

Externalizing and psychopathy are behaviorally similar disorders associated with etiologically distinct pathways. Although the general processes associated with these pathways may be discussed using similar terms (e.g., *attention, executive function*, and *affective dysfunction*), it is clear that they function differently in each and combine to produce two relatively distinct syndromes. It is important for future research to keep these multifaceted relationships (i.e., cognition–emotion interactions) in mind and work toward a specified understanding of the diverse pathways to disinhibition. Moreover, with regard to disinhibitory psychopathology more generally, understand-

ing these cognition–emotion interactions will aid in working toward specified treatment and prevention programs.

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