Psychopathy as Psychopathology: Beyond the Clinical Utility of the Psychopathy Checklist—Revised

Joseph P. Newman, Chad A. Brinkley, Amanda R. Lorenz, Kristina D. Hiatt, and Donal G. MacCoon

In an article entitled "Psychopathy: A Clinical Construct Whose Time Has Come," Hare (1996) demonstrated that psychopathy is a construct with broad relevance for both the criminal justice system and clinical psychology. More specifically, he argued that the availability of a reliable method for identifying the construct has enabled researchers to (a) establish psychopathy's association with clinically significant behaviors such as violent and nonviolent crimes, substance abuse, and criminal recidivism and (b) document its association with etiologically relevant processes that include relatively specific physiological, learning, cognitive, emotional, and language anomalies.

Most investigators credit Cleckley with setting out the modern construct of psychopathy owing to his brilliant description and insightful hypotheses. However, it is not possible to study a clinical phenomenon such as psychopathy or advance the field without a reliable and valid measure of the construct. In this regard, Hare’s development of the Psychopathy Checklist (PCL) and the revised version (PCL–R; Hare, 1980, 1991, 2003) enabled the construct of psychopathy to “arrive” (i.e., reach its current level of significance). There has, in fact, been an explosion of interest in the psychopathy construct since the publication of Hare’s PCL–R, and the literature is rich with examples demonstrating the reliability and clinical utility of this measure.

Echoing the sentiments of numerous investigators who have examined the evidence, Harris, Skilling, and Rice (2001) recently concluded that “Hare’s Psychopathy Checklist–Revised is the best available assessment” of psychopathy. Moreover, they wrote “psychopathy is the most important psychological construct for policy and practice in the criminal justice field” (p. 197). However, in contrast to their strong praise for the clinical utility of the psychopathy construct, Harris et al.’s evaluation of its etiological validity was less flattering. They wrote “although psychopaths might exhibit very subtle neurological, psychological, and cognitive differences compared to other people, it is unclear whether these differences constitute defective brain func-
tion or the execution of a viable life strategy." An important implication of Harris et al.'s proposal is that psychopathy reflects a strategy as opposed to an affective or inhibitory deficit (Cleckley, 1976) is that it calls to question psychopathy's status as a form of psychopathology.

Harris et al.'s (2001) comments highlight the distinction between predictive and etiological validity. This distinction has important implications for the use of the PCL–R and the psychopathy construct more generally. Although the PCL–R was designed to tap the psychopathy construct as defined by Cleckley (1976), it is possible for the instrument to outperform other predictors of criminal conduct without necessarily capturing the psychobiological dysfunction described by Cleckley (see Brinkley, Newman, Widiger, & Lynam, 2004). Individuals who earn high scores on the PCL–R are characterized by a "callous remorseless use of others" and "antisocial lifestyle" (Harpur et al., 1989) and such attributes may be expected to predict chronic antisocial behavior regardless of the origins of these traits. Whereas some individuals meeting this profile may be chronic offenders because environmental and/or developmental factors have fostered extremely antisocial attitudes and beliefs, the same characteristics may relate more strongly to a psychobiological predisposition in others. Criminologists, for instance, have traditionally distinguished among subcultural, neurotic/inadequate, and psychopathic offenders (Quay, 1986). To the extent that all three processes contribute to a person's risk for chronic offending, then a risk assessment instrument may be successful regardless of its ability to distinguish among these offender subtypes. Identifying reliable etiologically relevant correlates of offenders, on the other hand, demands that such distinctions be operationalized and utilized.

To the extent that a person is interested in using PCL–R psychopathy to evaluate risk, the evidence supporting the predictive validity of the PCL–R provides a strong justification for using this construct regardless of its etiological validity (Hare, Clark, Grann, & Thornton, 2000). On the other hand, using the PCL–R to draw inferences about causal processes contributing to an individual's behavior problems for the purposes of designing theoretically guided interventions relies on the evidence supporting the etiological validity of the PCL–R (see Brinkley et al., 2004). In our view, the challenges associated with identifying etiologically relevant correlates of psychopathy are substantially greater than those related to establishing the predictive validity of a measure owing to the increased demands for homogeneity. When one takes into account the challenges inherent in establishing the etiological validity of a disorder, it is fair to say that impressive strides have been made.

In this chapter, we attempt to illustrate the progress that has been made in clarifying the etiologically relevant, psychobiological processes associated with psychopathy by comparing two independent programs of research.¹ In particular, we review the extent to which research in our labo-

¹The original purpose of this chapter was to address Robert Hare's remarkable contributions to the field of psychopathy for a Festschrift honoring his retirement. For this reason, the literature reviewed in the chapter focuses on Hare's applied, theoretical, and empirical contri-
ratory complements the theoretical and empirical contributions of the Hare laboratory. Despite the fact that these research programs reflect different theoretical perspectives, use widely different methodologies, and involve psychopathic offenders from different countries, the research appears to yield a relatively consistent and well-defined picture of the psychopath's cognitive-affective deficit.

PSYCHOPATHY AS PSYCHOPATHOLOGY:
CLECKLEY'S PERSPECTIVE

In his classic book *The Mask of Sanity*, Cleckley (1976) describes psychopathy as a grave form of psychopathology that rivals schizophrenia in depth of impairment. When discussing the severity of this disorder, Cleckley does not refer to the psychopathic individual's violent or criminal behavior but to a "very serious disability" (p. 367) that gives ready expression to virtually any response inclination.

Of course I am aware of the fact that many persons showing the characteristics of those here described do commit major crimes and sometimes crimes of maximal violence. There are so many, however, who do not, that such tendencies should be regarded as the exception rather than the rule, perhaps, as a pathologic trait independent, to a considerable degree, of the other manifestations which we regard as fundamental. It is, of course, granted that when serious criminal tendencies do emerge in the psychopath, they gain ready expression. (p. 262)

Although their propensity for violence may be the most salient aspect of psychopathic individuals, Cleckley did not view specific response inclinations (e.g., for violence, sex, money, and so forth) to be fundamental. Nevertheless, to the extent that psychopathy is responsible for the unusually high risk for antisocial behavior demonstrated by some individuals, reducing this risk is likely to require understanding the root cause or etiology of their problem. Although the current strategy of incapacitation through incarceration does not require such understanding, it is fair to say that progress in treating and preventing the disorder will.

In addition to his insightful and widely endorsed characterization of psychopathy, Cleckley (1976) offered a number of important insights regarding the psychopath's core dysfunction. He wrote that psychopaths have "a serious and subtle abnormality or defect at deep levels disturbing the integration and normal appreciation of experience" (p. 388). According to Cleckley, this...
integrative deficit interferes with the psychopath’s ability to understand and use affective, inhibitory, and other important cues that normally govern the behavior of others. Indeed, nearly all of the psychopath’s core characteristics (Cleckley, 1976) may be understood as a failure to accommodate the meaning of potentially relevant cues (Newman & Wallace, 1993). The meaningful associations elicited by such cues normally (a) mediate classical conditioning and facilitate learning from experience (e.g., passive avoidance), (b) give rise to appropriate and sustained emotions, and (c) enable a person to recognize and appreciate the emotional experience of others. Arguably, then, a deficit in utilizing such associations could explain the behavioral, affective, and interpersonal symptoms of psychopathy (see Hare, 1996).

THE RESPONSE-MODULATING FUNCTION
OF THE LIMBIC SYSTEM

Hare’s 1970 book, Psychopathy: Theory and Research contains many important facts and theoretical speculations about the nature of psychopathy. During his brief discussion of the electroencephalographic abnormalities associated with psychopathy, Hare focused on McCleary’s (1966) chapter on the “Response Modulating Functions of the Limbic System.” He wrote: “A more general effect of these lesions may be to produce perseveration of the most dominant response in a given situation. . . . According to McCleary’s concept of response perseveration, the result would be that the most dominant response in any given situation would tend to occur regardless of its consequences” (pp 33–34). Pursuing this intriguing association between psychopathy and limbic system dysfunction, Gorenstein and Newman (1980) proposed a physiological, animal model of psychopathy involving the septo-hippocampal-orbital frontal (SHF) system. Although their proposal has occasionally been misunderstood (e.g., Lykken, 1995), the authors did not propose that psychopathy was associated with a brain lesion or damage to this system. Rather, based on existing similarities between the laboratory correlates of psychopathy and those observed in animals with SHF dysfunction, Gorenstein and Newman proposed that the more extensive literature on SHF dysfunction could be used as a model for generating hypotheses about the psychological (e.g., perceptual, motivational, and learning) correlates of psychopathy. These early proposals regarding the SHF system have given rise to the response modulation hypothesis, which guides our laboratory’s etiological investigations of psychopathy.

The response modulation hypothesis provides a cogent explanation for the integrative deficit described by Cleckley (1976). As noted by McCleary (1966), poor response modulation is associated with perseveration of dominant responses and a failure to make use of nondominant (i.e., incidental) information that contraindicates the dominant response. Such deficits may well underlie the psychopath’s failure to inhibit punished responses (i.e., poor passive avoidance learning) and, by extension, their recidivistic antisocial
behavior. Although perseveration involves a tendency to carry out or enact
dominant responses despite environmental feedback (i.e., information) indi-
ca ting that a dominant response is no longer appropriate, most research on
SHF lesions involves laboratory rats and, thus, focuses on the consequences
of SHF lesions for ongoing behavior as opposed to potential information pro-
cessing deficits.

The response modulation hypothesis has evolved considerably during the
past 20 years. Although our laboratory’s early investigations focused on
response perseveration (Newman, Patterson, & Kosson, 1987), more recent
investigations place greater emphasis on psychopaths’ failure to use peri-
pheral information with implications for their ongoing behavior. In general,
the response modulation hypothesis holds that psychopathic individuals
meeting Cleckley’s criteria for the disorder have a deficit in response modula-
tion that underlies their failure to integrate incidental information with their
deliberate goal-directed behavior. Response modulation is defined as a brief
and relatively automatic (nondeliberate) shift of attention to accommodate
the meaning of incidental or peripheral information. Such information may
involve, among other things, response feedback, acquired or conditioned
associations, implicit rules of conduct, past experience in similar circum-
stances, and the meaning of others’ nonverbal communication (Patterson &
Newman, 1993; Wallace, Vitale, & Newman, 1999), as well as the affects
connotations of words, pictures, and other events (Newman & Lorenz, 2003).

CONDITIONED FEAR STIMULI AND POOR
PASSIVE AVOIDANCE LEARNING

Physiological models of psychopathology have become increasingly com-
mon during the past decade, which has been dubbed the “Decade of the
Brain” (Sabshin & Weissman, 1996). Because it is easy to be misled by super-
ficial similarities between psychopathology and the function of physiological
systems, Newman (1997) suggested that investigators distinguish between
the applicability and the utility of physiological models. Applicability con-
cerns the extent to which existing evidence may be interpreted as consistent
with a particular physiological dysfunction. Applicability establishes the
potential relevance of a proposed model but does not necessarily deepen
our understanding of behavioral problems. Utility is demonstrated when a
model advances our understanding of psychopathology by generating new
and valid hypotheses about the etiologically relevant, psychological, and
physiological processes associated with the disorder.

As noted by Hare (1970) and elaborated on by Gorenstein and Newman
(1980), the SHF model is compelling (i.e., applicable) because animals with
SHF lesions demonstrate poor fear conditioning, passive avoidance learn-
ing, and behavioral inhibition like psychopathic individuals. To demonstrate
the utility of the model, however, it is important to generate and test novel
hypotheses regarding psychopathy. Toward this end, Gorenstein and New-
man reviewed the literature on psychopathy to identify the most promising research developments and the implications of the SHF model for advancing these developments.

Inspection of the laboratory evidence on psychopathy indicated that Lykken's (1957) and Hare's (1965) research relating psychopaths' weak anticipatory fear responses to their poor passive avoidance learning was most promising. In addition to the theoretical and methodological rigor of the work, the research suggested a powerful hypothesis regarding psychopaths' antisocial behavior, namely that their inadequate fear conditioning undermines their passive avoidance learning and, consequently, disrupts normal socialization (see Lykken, 1995, Mednick, 1977; Trasler, 1978, for discussions of the link between passive avoidance and socialization). In agreement with the low-fear hypothesis, the SHF model holds that psychopaths are deficient in using conditioned punishment stimuli to inhibit behavior. However, the SHF model predicts that the performance deficits of psychopathic individuals will be both more specific (i.e., occur in only some avoidance contexts) and more general (i.e., appear in nonthreat contexts) than would be expected on the basis of a simple low-fear or insensitivity to punishment model. In contrast to their difficulty using punishment cues to inhibit dominant approach responses, rats with septal lesions appear at least as sensitive as control rats when sensitivity to punishment is measured using active rather than inhibitory indices. For instance, they perform at least as well as controls on active avoidance tasks and escape as quickly as controls from experimental chambers that have been associated with omission of expected rewards (i.e., a form of punishment). In addition, rats with septal lesions are relatively deficient at delaying gratification and otherwise inhibiting responses when anticipating reward.

Although Hare's research did more than anyone else's to advance the low-fear model of psychopathy, he was also among the first to document the specificity of psychopaths' insensitivity to punishment. Using the same laboratory paradigm that had demonstrated psychopaths' weak electrodermal activity in anticipation of aversive events, he showed that their electrodermal deficit was not paralleled by weak cardiovascular conditioning to threat cues. In his own words, "psychopaths showed poor electrodermal, but good cardiovascular, conditionability" (Hare, 1986, p. 9). Moreover, this combination of electrodermal and cardiovascular data led Hare to propose that psychopaths are adept at "tuning out" or ignoring aversive stimuli. In summarizing his extensive research in the area, Hare concluded that: "there is ample evidence that psychopaths are quite capable of giving normal electrodermal (and other autonomic) responses under appropriate conditions (i.e., they are capable of "feeling" fear but tune it out; see Hare, 1968, 1978). Anomalies in the autonomic responses of psychopaths are more likely a reflection of the particular motivational and cognitive demands placed on them, than an autonomic nervous system that does not function properly" (Hare, 1986, p. 13).

In addition to highlighting the specificity of psychopaths' insensitivity to threat cues, Hare and colleagues also demonstrated that their information-processing deficit is more general than would be expected on the basis of
the low-fear hypothesis alone. Underscoring the potential importance of a more general information-processing deficit, Jutai and Hare (1983) found that psychopaths were hyporeactive to affectively neutral stimuli as well as to punishment cues once their attention was allocated elsewhere. This and other findings led Hare (1986) to propose that “psychopaths may have difficulty in allocating their attentional and processing resources between competing demands of two tasks. It appears that rather than distributing resources between tasks they focus attention on the one that is most interesting to them” (p. 13).

Whereas in his laboratory, Hare and his colleagues demonstrated the specificity and generality of psychopath’s information processing deficits using psychophysiological measures, in our laboratory we have used performance measures to demonstrate the specificity and generality of their self-regulatory deficits. This difference notwithstanding, our findings are highly consistent with those of Hare and colleagues. According to the response modulation hypothesis, psychopaths are less likely than nonpsychopaths to interrupt a dominant response set to accommodate incidental information that would normally modulate ongoing behavior. According to this hypothesis, then, psychopaths’ failure to inhibit punished responses (i.e., poor passive avoidance) will be specific to conditions in which punishment cues are peripheral to their dominant response set. Conversely, they should regulate punished responses as well as control participants when doing so is part of their dominant response set or deliberate focus of attention.

To examine the specificity of psychopaths’ passive avoidance deficit, Newman and Kosson (1986) used a go/no-go discrimination task with four “go” and four “no-go” stimuli. The stimuli were two-digit numbers (e.g., 27, 86, 32, and 73) and were presented one at a time for approximately 2 s on a computer monitor. The set of eight numbers was repeated eight times in quasi-randomized orders. In one condition, participants earned 10 cents each time they responded to a go stimulus and lost 10 cents each time they responded to a no-go stimulus. A second group of participants performed the same task under punishment-only conditions. Specifically, participants began the task with a cash stake of $8 and lost 10 cents each time that they responded to a no-go cue or failed to respond to a go cue (see Fig. 7-1). Participants were told that they would see numbers appear one at a time and that their task was to learn, by trial and error, when to respond and when not to respond to maximize their earnings.

Based on the response modulation hypothesis, the authors predicted that psychopaths would commit more passive avoidance errors than control participants in the reward–punishment task but perform both punishment contingencies as well as control participants in the punishment-only task. In other words, they predicted that psychopaths’ avoidance deficit would be specific to the condition that required them to alter a dominant response set for reward. As shown in Fig. 7-2, this prediction was supported. Although participants found the punishment-only condition significantly more difficult than the reward–punishment condition, the group difference was specific to the reward–punishment condition. Similar findings have been reported by
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FIGURE 7-1. Reward plus punishment and punishment-only conditions of the go/no-go passive avoidance task. Responses to S+ stimuli constitute passive avoidance errors. No: responding to an S+ stimulus constitutes an omission error.

FIGURE 7-2. Number of passive avoidance errors committed by psychopathic and nonpsychopathic offenders in the reward plus punishment and punishment-only conditions of the passive avoidance study reported by Newman and Kosson (1986).

If psychopaths' insensitivity to punishment cues reflects a problem shifting sets to process incidental information, they should be less likely to display avoidance deficits when the need to attend to punishment cues is made highly salient, when their dominant response set is interrupted by task procedures, and when they are provided with ample time to attend to all aspects of the task. Consistent with this assertion, psychopaths performed as well as control participants on a reward–punishment task like those described earlier when it was modified to ensure that participants attended to both reward and punishment cues from the outset of the task (Newman et al., 1990, Experiment 3). In addition, psychopaths inhibited punished responses as well as control participants on a card-playing task in a condition when a 5-s pause was used to encourage participants to process the response feedback even though they perseverated reward seeking on the same task when they were allowed to play at their own pace (Newman et al., 1987). Also, psychopaths performed the go/no-go passive avoidance task as well as control participants when the requirement for effective response modulation was reduced by providing participants with a long (variable interval, 10 s) intertrial interval (Arnett, Howland, Smith, & Newman, 1993).

Regarding psychopaths' response to conditioned threat stimuli and passive avoidance learning, our findings complement those of Hare and colleagues in showing that the psychopath's laboratory anomalies are more specific than would be expected if a general incapacity for fear or insensitivity to punishment was responsible for the psychopath's passive avoidance deficit. Rather than displaying consistent insensitivity to punishment, this deficit appears to be moderated by the focus of their deliberate or dominant response set and the amount of time available to alter it.

Like Hare and colleagues, we have also examined psychopaths' responsibility to affectively neutral cues that are peripheral to their dominant response set. More specifically, we have used a variety of Stroop-like paradigms in which participants are instructed to focus attention on one aspect of a display and ignore other aspects. Nevertheless, such tasks are designed so that the to-be-ignored stimuli interfere with primary task performance by automatically engendering an incompatible (i.e., incongruent) response. In general, such incongruent stimuli are distracting because they require allocation of effortful processing to adjudicate the response conflict. Based on the response modulation hypothesis, Newman, Schmitt, and Voss (1997) predicted that psychopaths would be less distractible on such tasks because they are less likely to process and integrate the meaning of peripheral cues.

Newman et al. (1997) used a computerized, picture–word task developed by Gernsbacher and Faust (1991) to examine this hypothesis in psychopathic and nonpsychopathic offenders. Briefly, in this task participants are shown a "context display" for 700 ms, which always consists of a word and a super-
imposed picture. Following the context display by 50 or 1000 ms, participants are shown a "test display," which is either a word or a picture. Before each trial, participants are shown a "ready stimulus" that is a "-P-" if it is a picture trial or a "-W-" if it is a word trial. On picture trials, participants are supposed to indicate by pressing one of two buttons whether the pictures in the context and test displays are conceptually related while ignoring the word on the context display. On word trials, participants are supposed to focus on the words and ignore the picture. Of importance for engendering Stroop-like interference, on a subset of trials, the to-be-attended-to stimulus and the test display are unrelated but the to-be-ignored stimulus is related to the test display. For example, in a word trial, the word MONTH may appear with a picture of a broom superimposed as the context display and the word SWEEP as the test display. The corresponding comparison trial might involve the word MONTH with a picture of a sandwich superimposed and the same test display. In both cases, the correct answer is "unrelated," but in the first case the incongruent inputs produce response conflict because the peripheral, to-be-ignored stimulus primes a "related" response that conflicts with the unrelated response primed by the deliberate processing of the to-be-attended-to stimulus. Research by Gernsbacher and Faust indicates that such trials produce reliable interference at the 50-ms interstimulus interval even though most individuals can overcome or suppress this interference when the test display is delayed by 1000 ms (see Fig. 7-3).

Resembling the performance of healthy control participants, nonpsychopathic prisoners responded significantly more slowly when the to-be-ignored contextual cues were conceptually related to the test display, and this effect disappeared when test displays were delayed by 1000 ms. However, as predicted by the response modulation hypothesis, incongruent contextual cues had virtually no effect on psychopathic offenders regardless of the interstimulus interval (see Fig. 7-4). Thus, parallelizing their insensitivity to secondary punishment cues, psychopaths were less affected than control participants by emotionally neutral information that was peripheral to their dominant response set (primary focus of attention). In contrast to the evidence on psychopaths' passive avoidance deficits, however, which is open to a variety of interpretations, these findings provide more direct evidence of a fundamental deficit concerning the automatic accommodation of peripheral cues.

Schmitt and colleagues reported two conceptual replications of this finding. In the first task a simple 8.5 × 11-inch card that was divided into 30 rectangles was used. Each rectangle contained a simple line drawing (e.g., dog or hat) with a superimposed word (e.g., pig or shoe) that was incongruous with the picture. Another card contained the same pictures presented in a different order with superimposed nonwords (e.g., gip or seh). By subtracting the time to name all of the pictures on the nonword card from the time taken to name the pictures on the incongruent word card, it is possible to compute a measure of interference. Replicating the findings from the computerized picture-word task, psychopathic offenders displayed significantly less interference than nonpsychopathic control participants (Hiatt, Schmitt, &

Newman, 2004). The second task involved discrete trials that were presented on a computer monitor. In each trial a large rectangle in red, green, yellow, or blue with a word in the center was presented. Interference was computed by subtracting participants' response times to name the box color when nonwords versus incongruent color words appeared in the center. Here, too, psychopathic offenders displayed significantly less interference than nonpsychopathic control participants (Hiatt et al., 2004; see Fig. 7–5).

When findings from both the Hare and Newman laboratories are considered, there is good evidence that psychopaths' insensitivity to potentially important cues in their environment is not limited to threat cues. Thus, in addition to being more specific than expected, psychopaths' information-processing deficiencies appear to be more general than one would expect if a general incapacity for fear or insensitivity to punishment were responsible for their information-processing deficiencies.

EMOTION AND LANGUAGE PROCESSING ANOMALIES

Passive avoidance learning has special significance in psychopathy research because of psychopaths' legendary failure to inhibit punished behavior outside of the laboratory. However, their deficient passive avoidance is most
accurately regarded as one manifestation of a more pervasive biopsychological dysfunction. In this regard, R. D. Hare (personal communication, June 11, 1987) once argued that our early focus on impulsivity and passive avoidance learning was interesting but that we failed to address the core features of Cleckley's psychopathy construct. Indeed, a careful reading of Cleckley's (1976) book shows that his view of the psychopath's deficit is both more subtle and more profound than is generally understood. He wrote, "In attempting to account for the abnormal behavior observed in the psychopath, we have found useful the hypothesis that he has a serious and subtle abnormality or defect at deep levels disturbing the integration and normal appreciation of experience and resulting in a pathology that might, in analogy with Henry Head's classification of the aphasias, be described as semantic" (p. 388).

To the extent that Cleckley's writings capture the essence of the disorder, an accurate understanding of psychopaths' affective and self-regulatory deficits may require clarifying their more general difficulty appreciating the significance of events.

Hare and his colleagues used a variety of methods to study the psychopath's semantic deficit (see Hare, 1998; Hare, Williamson, & Harpur, 1988). In one of the most widely cited studies, the extent to which psychopaths and nonpsychopaths were influenced by the affective components of linguistic stimuli was examined (Williamson, Harpur, & Hare, 1991). Performing a lexical decision task with emotional and nonemotional words, participants pressed a button to indicate, as quickly as possible, whether a briefly presented letter-string was a word or nonword. Half of the strings were words and half of the words were emotional. A word's "emotionality" was determined by its ratings on indices of arousal and affective valence (Rubin & Friendly, 1986). Emotional words were either positive or negative in valence and relatively high in arousal (e.g., sunrise and devil) whereas neutral words were neither positive nor negative and were low in arousal (e.g., table and bowl). Resembling the performance of nonincarcerated individuals, nonpsychopathic offenders identified emotional words more quickly than neutral words. That is, they displayed emotion facilitation. Psychopaths, however, displayed significantly less emotion facilitation than control participants regardless of affective valence. Williamson et al. (1991) also recorded event-related potentials (ERP) during the lexical decision task. Whereas the ERP data for control participants revealed the expected difference between emotional and nonemotional words, the ERP for psychopaths did not. Such evidence is consistent with Cleckley's (1976) proposal that psychopaths are relatively unaffected by the meaning of words.

Using a modified version of this lexical decision task that allowed the investigators to take brain scans during the task, Intrator et al. (1997) reported a different pattern of results. Surprisingly, psychopaths displayed greater differentiation between emotional and neutral slides than control participants did. Interpreting these results, Hare (1998) proposed that the use of affective information was more automatic in control participants than in psychopaths. "In normal individuals the neurophysiological processes involved in decod-
ing the affective information contained in words no doubt are so overlearned and efficient that metabolic requirements are minimal. However, it is as if emotion is a second language for psychopaths, a language that requires a considerable amount of mental transformation and cognitive effort on their part” (p. 115).

Investigations of emotional facilitation using lexical decision tasks provide compelling evidence that psychopaths do not accommodate a word’s affective connotations as readily as nonpsychopathic control participants. Psychopaths’ anomalous processing of linguistic stimuli, however, is not specific to emotional meaning. Such findings raise the possibility that psychopaths’ insensitivity to the emotion connotations of words is best conceptualized as a subset of a more general problem in processing word meaning. For instance, Kiehl, Hare, McDonald, and Brink (1999) used lexical decision and word identification tasks to examine semantic and affective information processing in psychopaths and control participants. Relative to control participants, psychopaths committed more errors identifying abstract words than concrete words. Although group differences in ERP were observed for each of the tasks, psychopaths and control participants displayed comparable performance on the affective processing tasks.

Group differences in ERPs to nonemotional speech stimuli were also observed by Jutai, Hare, and Connolly (1987). Specifically, participants were instructed to discriminate between speech phonemes either alone (i.e., single-task condition) or while playing an engaging video game (dual-task condition). Although psychopaths and control participants displayed comparable ERPs during the single-task condition, significant differences were observed in their dual-task condition. Relative to control participants, psychopaths displayed a positive slow wave that overlapped their P300 response, suggesting less efficient processing of the speech stimuli and greater response uncertainty. According to the authors, the results suggest that “the demands of the Dual-Task used in the present study may have strained relatively limited left-hemisphere resources available to Group P” (p. 183).

Kiehl, Hare, Liddle, and McDonald (1999) examined ERPs during a visual oddball task that also emphasized nonemotional stimuli. In this task, participants were instructed to “respond as quickly and accurately as possible, by pressing a designated button on a computer keyboard whenever a small square (the target) appeared, but not to respond when a large square (non-target) appeared” (p. 1501). Targets appeared on 25% of the trials. Although there were no significant group differences in performance, analysis of the ERP data revealed a number of significant group differences. A significant Group × Target Condition interaction revealed that group differences were specific to the target (vs. nontarget) condition. Whereas nonpsychopaths displayed significantly larger P300 to target stimuli than to nontarget stimuli, this effect was not significant in psychopaths whose P300 to target stimuli was significantly smaller than that of nonpsychopaths. Kiehl et al. also found a significant Group × Hemisphere interaction, which indicated that, relative to psychopaths and similar to normal control participants, P300 was more later-
alized to the right hemisphere in nonpsychopaths. In this respect, the data for nonpsychopaths, but not for psychopaths, resembled those for nonincarcerated participants. Finally, psychopaths displayed a larger N550 than nonpsychopaths, which was inversely correlated with P300. According to the authors, their results “support the hypothesis that psychopathy is associated with difficulties in the effective modulation and allocation of attentional resources” (p. 1505). Moreover, their results “provide further confirmation that psychopaths exhibit an abnormal late centrofrontal negativity in a task . . . that places no explicit demands on linguistic processing” (p. 1505).

Research results from our laboratory are consistent with the findings published by Hare and colleagues and with Cleckley’s speculation regarding the integration of words and meaning. Using a modified version of the lexical decision task used by Williamson et al. (1991), Lorenz and Newman (2002) predicted and found that psychopaths display significantly less emotion facilitation than control participants (see Fig. 7–6). Moreover, in parallel with results from the Williamson et al. study, psychopaths demonstrated less emotion facilitation than control participants regardless of affective (i.e., positive or negative) valence (i.e., the Group × Valence interaction was not significant).

Beyond examining the speed and accuracy with which psychopaths process the meaning of verbal stimuli, Hare and colleagues also examined

![Graph showing emotion facilitation](image)

language production in psychopaths. Here too, significant differences have been found. For instance, Gillstrom and Hare (1988) found that psychopaths used more hand gestures that were unrelated to the content of their speech than did control participants. Using voice analysis, Louth, Williamson, Alpert, Pouget, and Hare (1998) demonstrated that psychopaths display less differentiation of affective and neutral words relative to control participants. Williamson (1991) analyzed the quality of speech produced by psychopathic and nonpsychopathic offenders using an established coding system and recorded speech segments. Her results indicated that psychopaths use fewer cohesive ties in their speech and are less likely to resolve plots (i.e., tie up loose ends) when telling stories. Moreover, there was some evidence that psychopaths’ speech anomalies were most apparent when describing emotional or personal events.

Following Williamson (1991), Brinkley, Newman, Harpur, and Johnson (1999) scored emotion-related speech segments produced by psychopathic and nonpsychopathic offenders. Consistent with her findings, the speech of psychopathic offenders consisted of smaller speech units (i.e., was choppy) and was characterized by fewer cohesive ties. In a separate study, Brinkley, Bernstein, and Newman (1999) instructed participants to tell a story using a series of plot elements (i.e., general story framework) that were listed on a printed card. Half of the participants were allowed to keep the card as they related the story whereas the other half had to remember the list of story elements. Consistent with Williamson’s earlier findings, the stories provided by psychopathic inmates were less coherent. That is, psychopaths were less likely than control participants to resolve plot units while telling their stories. However, contrary to prediction, psychopaths’ stories were especially incoherent when they were allowed to retain the list to assist them in story telling. Although the list was intended to make story telling easier for psychopaths because they would be able to focus on the story content without also attending to the story structure, the results indicated otherwise. In fact, the list of elements appeared to dominate the attention of psychopathic offenders and interfered with their story elaboration and coherence.

Although the studies are limited, it seems clear that psychopaths do, indeed, manifest a number of language-related (i.e., semantic) deficits. In particular, the performance of psychopathic offenders suggests that they have greater difficulty integrating the affective connotations of words, processing the abstract meaning of words, and remaining coherent while linking words with meaning in the process of speaking. Such findings are consistent with Cleckley’s proposal that the core deficit in psychopathy involves a failure to appreciate the affective, and more general significance, of events.

In light of such evidence, researchers from our laboratory set out to test the semantic deficit hypothesis more directly. In one study the extent to which psychopaths and control participants could use the meaning of a word to prime and thus facilitate the processing of a second word was compared. Each trial consisted of a 140-ms presentation of a word (prime) that was set off by
two asterisks followed by a letter string (target) that was a word on 50% of the trials and a pronounceable nonword on the remaining trials. For one-half of the target words, the prime was semantically and associatively related to the target word (e.g., Doctor–Nurse) whereas the prime and target were unrelated (e.g., Knife–Cotton) in the remaining trials. Contrary to prediction, both psychopaths and control participants demonstrated significant and comparable priming (see Brinkley, Schmitt, & Newman, 2005). That is, both groups identified words more quickly when they were preceded by a related word.

In a second study the extent to which incongruent semantic associations interfered with color naming using a modified Stroop procedure was examined. Specifically, Brinkley et al. (2005) used a computerized Stroop task in which participants were instructed to name the color of stimulus words while ignoring their meaning. Adopting a procedure used by Klein (1964), these authors examined interference using words with semantically incongruent meanings (e.g., the word lemon appearing in green) as well as the usual incongruent color words (e.g., the word green appearing in red). To the extent that psychopaths are deficient in semantic processing, they may be expected to display less interference than control participants on trials involving the color-related words. Contrary to hypothesis, however, psychopaths and control participants displayed comparable interference on incongruent color-related word trials as well as incongruent color-word trials. Although both groups demonstrated less interference on trials involving incongruent color-related words than on trials involving incongruent color words, this difference was comparable for both groups. In other words, the greater semantic processing required by the color-related words did not differentiate psychopaths and nonpsychopathic offenders.

One interpretation of this inconsistent evidence regarding semantic processing is that psychopaths' deficient processing of semantic information, like their processing of fear stimuli, is situation specific. That is, whether or not psychopaths and control participants differ in the processing of word meanings may relate to as yet unspecified aspects of the experimental tasks. In this regard, there is growing evidence that semantically related interference in psychopaths is more dependent on the location of incongruent stimuli than on their specific content. Using a variety of Stroop-like procedures, researchers from our laboratory showed that psychopaths demonstrate normal interference when the color to be named appears in the same space as the incongruent word but that psychopaths demonstrate significantly less interference than control participants when the color and word are spatially separated. For instance, consistent with the aforementioned study, psychopaths and control participants show comparable performance on standard color-word Stroop tasks (Hiatt et al., 2004; Smith, Arnett, & Newman, 1992) and on emotion Stroop tasks in which threat-related and other emotion-related words appear in diverse colors (Lorenz, Newman, & Lilienfeld, 2001). However, psychopaths demonstrate significantly less interference than control participants while naming the color of rectangles that surround incongruent
words and while naming pictures that appear in conjunction with incongruent words (Hiatt et al., 2004; Newman et al., 1997).

Regarding the situation specificity of psychopaths' emotional and more general semantic processing deficits, it appears that psychopaths display anomalous processing of semantic information that is incidental, as in the lexical decision assessments of emotion facilitation (Lorenz & Newman, 2002; Williamson et al., 1991), or presented in a different spatial location, as in the Stroop-like procedures described earlier (e.g., Newman et al., 1997). These conditions resemble those identified when the situational specificity of psychopaths' passive avoidance deficit is described. Recall that psychopaths are relatively insensitive to threat cues when they are engaged in reward seeking but were equally responsive to the threat cues when their primary focus was avoidance learning. Across these paradigms, psychopaths appear to process the meaning of stimuli as well as control participants when they are part of their primary focus or dominant response set, but they often appear insensitive to the same stimuli when they are secondary or peripheral to their dominant response set.

CEREBRAL ASYMMETRIES

An extraordinary aspect of Hare's investigations of psychopathy is his commitment to integrating research on the biological, psychological, and sociological correlates of psychopathy. For decades, Hare has been using a variety of techniques to study the physiological correlates of psychopathy and clarify their implications for psychopathic behavior. As already described, Hare and colleagues have used psychophysiological measures (e.g., skin conductance and heart rate) to elucidate psychopaths' restricted anticipation of aversive events, ERPs to document their anomalous information processing under conditions of distraction, and a combination of ERPs and brain imaging techniques to characterize psychopaths' inefficient and impoverished emotion processing (see Hare, 1998). Another particularly promising and long-standing area of investigation that illustrates Hare's attempts to integrate neurological and psychological explanations for psychopathy concerns his research on the abnormal cerebral asymmetries demonstrated by psychopathic individuals.

In his first investigation of cerebral asymmetries in psychopathy, Hare (1979) used a tachistoscopic recognition task "to test the hypothesis that psychopathy is associated with dysfunction of the dominant hemisphere" (p. 605). Three-letter words were presented, in a vertical orientation, to the left or right of a central fixation point. Contrary to prediction, both psychopaths and control participants identified words presented in the right visual field more accurately than those presented in the left visual field. That is, despite observing a highly significant laterality effect, this main effect was equally apparent in psychopathic and nonpsychopathic offenders. In discussing the results, Hare noted the possibility that differences between psychopaths and others
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may be found “with tasks that require a greater degree of semantic processing, place greater demands on the more anterior parts of the brain, or tap storage and retrieval processes” (p. 609).

Following up this early investigation, Hare and McPherson (1984) used a verbal dichotic listening task with a greater memory load to investigate linguistic processing in psychopaths and control participants. On each trial, two sets of three, one-syllable words were presented simultaneously to each ear using stereo headphones. After each trial, participants reported aloud all of the words that they could recall from that trial. Because language is processed preferentially by the left hemisphere, right-handed individuals tend to display superior processing when verbal stimuli are presented to their right ear as opposed to their left ear. Consistent with the performance of normal control participants, nonpsychopathic inmates displayed a strong right-ear advantage for verbal stimuli. However, psychopathic inmates displayed a significantly smaller right-ear advantage (i.e., less lateralized performance) than control participants. Of note, psychopaths’ overall performance was comparable to that of control inmates. In fact, psychopaths performed significantly better than control participants at recalling words presented to the left ear/right hemisphere.

Hare and Jutai (1988) used a divided-field methodology to examine semantic processing in psychopathic and nonpsychopathic offenders. On each trial, a concrete noun was presented tachistoscopically to the right or left visual field. In one condition, participants were required to decide whether the noun was the same as another word (i.e., identity match). In two other conditions, participants decided whether or not the noun was an exemplar of a specific or abstract category, respectively. Psychopaths and control participants did not differ in the identity match or specific category conditions. However, when the task required participants to classify nouns according to an abstract category, the groups displayed an opposite pattern of results. Whereas nonpsychopaths showed a right visual field/left hemisphere advantage as in the other two conditions, psychopaths performed the abstract categorization task more accurately when responding to nouns presented in the left as opposed to the right visual field.

Of relevance to the interpretation of these findings, Kiehl et al. (2001) examined the neural pathways associated with processing (i.e., making lexical decisions regarding) concrete and abstract words using functional magnetic resonance imaging. According to the authors, “a direct comparison between the abstract and concrete stimuli epochs yielded a significant area of activation in the right anterior temporal cortex” (p. 225) and provided “support for a right hemisphere neural pathway in the processing of abstract word representations” (p. 225). Consistent with past research, the authors reported that concrete words were identified more quickly than abstract words. These findings suggested that right hemisphere resources are recruited to assist with the more complex processing requirements associated with identifying abstract words. Combined with the Hare and Jutai results, these findings may indicate that, relative to control participants, psychopaths
are less able to benefit from right hemisphere resources while processing words presented to the right visual field/left hemisphere.

As in the other research domains, our assessment of cerebral asymmetries associated with psychopathy serve to replicate and extend the work of Hare and colleagues. In one study, Howland, Kosson, Patterson, and Newman (1993) used a version of Posner's cueing paradigm to examine behavioral inhibition and attentional switching in psychopathic and nonpsychopathic offenders. On each trial, participants were presented with a warning stimulus or cue that predicted with 80% validity the location of the target stimulus that followed. That is, if the warning stimulus appeared on the left or right side of the computer monitor, the target appeared in the same location on 80% of the trials. Participants were instructed to respond as quickly and accurately as possible to indicate whether the target stimuli appeared on the left or right side of the monitor using their left and right index fingers, respectively. Participants were also informed that the location of the warning stimuli would be the best predictor of target location. Such cuing establishes a dominant response set so that participants respond to right-sided targets more quickly when they are preceded by right-sided cuing stimuli and visa versa. By comparing participants' response times to targets presented in the expected and unexpected locations (relative to neutral trials), it is possible to examine a person's ability to alter a dominant response set (i.e., switch attention).

The results of this study yielded only partial support for our hypothesis that psychopaths would be deficient in altering a dominant response set. Of relevance to the current focus on cerebral asymmetries, support for this hypothesis was moderated by the location of the cuing stimuli. When participants were presented with a right-sided cue followed by a left-sided target, psychopaths committed significantly more errors than nonpsychopaths even though they performed as well as control participants when the left-sided cues were followed by right-sided targets.

Based on this finding and related results from the Hare laboratory, Kosson (1998) proposed that psychopaths' information processing deficiencies may involve "momentary over-arousal of left hemisphere resources" (p. 375). Consistent with this speculation, Kosson (1998, see also 1996) found that "psychopaths misclassified more secondary task and marginally more primary task targets than nonpsychopaths" (p. 373) under conditions involving differential activation of the left hemisphere.

As already described, Lorenz and Newman (2002) found that psychopaths demonstrated significantly less facilitation than control participants while identifying emotional and high-frequency words. Although not described earlier, another goal of this study was to evaluate Kosson's (1996, 1998) proposal regarding differential activation of the left hemisphere. Toward this end, Lorenz and Newman used alternating blocks of trials that were performed with the right or left hand to activate the left and right hemispheres respectively. Consistent with earlier findings and speculation by Kosson (1998), the authors found a significant psychopathy by response hand inter-
action with psychopaths demonstrating normal emotion facilitation in the left hand/right hemisphere blocks ($M = 20.0 \text{ ms}, SE = 9.4$ and $M = 28.9 \text{ ms}, SE 11.0$, for psychopaths and control participants, respectively) while showing no emotion facilitation in the right hand/left hemisphere condition ($M = -4.6 \text{ ms}, SE = 10.6$, and $M = 37.7 \text{ ms}, SE 8.5$, for psychopaths and control participants, respectively). The same interaction was also found in the word frequency analyses. Paralleling our laboratory’s findings with the Posner paradigm, these results suggest that psychopaths’ deficient processing of secondary unexpected cues is specific to conditions involving differential activation of the left hemisphere.

As noted by Hare and McPherson (1984), it is difficult to determine whether the weaker cerebral asymmetries demonstrated by psychopaths reflect an unusual distribution of language and emotional processing resources in the brain or some less specific problem related to left hemisphere arousal or interhemispheric integration. For this reason, it is important to examine whether psychopaths’ unusual perceptual asymmetries apply only to the emotional and abstract connotations of words or whether they are also found on tasks involving other types of secondary information. This question was examined by Bernstein, Newman, Wallace, and Luh (2000) using a recall task developed by Hockey and Hamilton (1970). Participants were told that they were going to see a series of eight words, presented one at a time, and that their task was to recall as many words as possible in their proper order. Participants were given a sheet of paper with eight lines that were numbered 1 through 8. Although not mentioned in the instructions, the eight words appeared in different spatial locations with two words appearing in each corner of the visual display. After giving participants a minute to write down all of the words they could remember, the experimenter noted that the words appeared in different locations and asked participants to recall the spatial locations of the words. This was done by having them draw a box next to each line and place an “X” in the corner where the word appeared.

The results of the Bernstein et al. (2000) study parallel other findings in this area. As in the Hare (1979) study, both psychopaths and control participants displayed a strong right visual field advantage for the verbal stimuli. That is, both groups recalled significantly more words from the right visual field than from the left visual field. However, paralleling results from more complex tasks involving abstract words, memory for multiple words, and emotional connotations, there was a significant Group $\times$ Side interaction for location recall. As in prior research, control participants demonstrated better processing of the secondary/incidental information (i.e., recall of locations) than psychopaths when stimuli were presented to the right visual field/left hemisphere whereas psychopaths tended to outperform control participants when stimuli were presented in the left visual field/right hemisphere (see Fig. 7.7). The authors proposed that psychopaths are less adept at processing secondary cues under conditions that differentially activate the left hemisphere. Moreover, the authors speculated that the psychopath’s difficulty in accessing secondary information relates to the coordination of left and right
hemisphere resources as opposed to deficits in emotional or semantic processing per se (see also, Kiehl, Liddle, et al., 1999).

Hiatt, Lorenz, & Newman (2002) examined perceptual asymmetries using a dichotic listening task developed by Bryden and MacRae (1988). The stimuli consist of four words (dower, bower, tower, and power) spoken in four affective tones of voice (sad, angry, fearful, and neutral). In one condition, participants were instructed to listen for a particular word, whereas in a second condition, participants were instructed to listen for a particular affect. Right-handed participants typically identify more target words when they are presented to the right ear/left hemisphere and they identify more target affects when they are presented to the left ear/right hemisphere. The authors reported mixed support for their hypothesis that psychopaths would display weaker asymmetries than control participants in both conditions. Contrary to expectation, both psychopaths and control participants demonstrated significantly greater and comparable accuracy for target words presented to the right ear/left hemisphere. Although psychopaths demonstrated a weaker asymmetry in the emotion condition as predicted, inspection of the group means indicated that psychopaths displayed better accuracy than control participants for right ear targets and comparable accuracy for targets presented to the left ear.

According to Hiatt et al. (2002), the results from the word condition are consistent with those of Hare (1979) and support his contention that psychopaths and control participants display comparable asymmetries when performing relatively simple word identification tasks. On the other hand, the reduced asymmetry demonstrated by psychopaths in the affect identification condition suggests that their emotion processing may be more distributed. That is, psychopaths' difficulty accommodating information from the right hemisphere when making right-handed or verbal responses may have resulted in greater distribution of emotion processing functions across cerebral hemispheres. Alternatively, if psychopaths use deliberate cognitive
strategies to process affective stimuli as proposed by Hare (1998) and others (e.g., Kiehl et al., 2001), then their emotion processing might be less dependent upon right hemisphere processing resources.

As in other research domains, investigations of cerebral asymmetries in psychopathy commonly reveal significant group differences, but these differences appear to be situation specific. Specifically, psychopaths and participants appear to display comparable cerebral asymmetries when performing simple tasks, but psychopaths typically display weaker asymmetries than control participants when performing relatively complex tasks or when processing secondary aspects of experimental stimuli. Furthermore, psychopaths are relatively deficient in the ability to access a word’s emotional connotations, abstract meaning, and spatial location while responding with their right hand or processing information from the right visual field. Yet, they perform the same tasks as well as control participants when responding with their left hand or when incidental information is presented to their right hemisphere via the left visual field or left ear. Such findings serve to link psychopaths’ emotion, language, and other information processing limitations and, moreover, raise the possibility that a dysfunction in interhemispheric integration underlies these diverse information processing anomalies.

INTEGRATION OF RESEARCH EVIDENCE

Owing to the range of specific hypotheses tested and paradigms used, it is easy to be overwhelmed by the apparent hodgepodge of laboratory findings on psychopathy. However, close examination of the existing literature reveals that there is impressive consistency and an emerging clarity with regard to the psychopathic deficit. Once psychopaths focus attention, they are unlikely to accommodate other (i.e., nondominant or incidental) information that modulates the ongoing behavior of others. We have referred to this problem as a response modulation deficit and demonstrated its effects by measuring psychopaths’ sensitivity to (a) secondary threat cues in passive avoidance tasks (Newman & Kosson, 1986), (b) changes in environmental contingencies using a modified extinction paradigm (Newman et al., 1987), (c) incongruent contextual cues using modified Stroop procedures (Newman et al., 1997), and (d) the affective connotations of words using a lexical decision task (Lorenz & Newman, 2002). In a recent summary of his work, Hare (1998) wrote that his findings and interpretation of the evidence were “consistent with the view that psychopaths exhibit information processing deficits that result in poor self-regulation, difficulties in linking current actions and stimuli to past experiences, and decoding of the significance of cognitive and affective contextual cues” (p. 122).

Regarding the underpinnings of their information processing deficits, Hare (1998) wrote that the “neurobiological basis for the difficulties psychopaths appear to have with affective and deep semantic processes are unknown but may involve anomalies in the integration of activities within
and between hemispheres" (p. 124). In this section, we attempt to clarify the association between psychopaths' anomalous cerebral asymmetries and their situation-specific information processing deficits. To foreshadow our conclusion, we propose that the anomalous cerebral asymmetries demonstrated by psychopaths indicate that their left and right hemisphere processing resources are difficult to integrate, whereas the more typical cerebral asymmetries demonstrated by nonpsychopaths indicate that the processing resources of their left and right hemisphere are more readily coordinated. In addition, we propose that the functional dissociation of left and right hemisphere processing resources in psychopaths favors selective attention over the automatic integration of peripheral information whereas the greater interhemispheric cooperation of nonpsychopaths enhances response flexibility at the expense of distractibility.

Despite years of investigation, the differential functions of the cerebral hemispheres are still a matter of debate, as are the factors governing interhemispheric interactions (Banich & Nicholas, 1998; Beaumont, 1997). For the present purposes, we assume that the left and right hemispheres are capable of operating as separate information processors and that, with few exceptions related to particular language functions, both hemispheres are able to process the same information (Banich & Belger, 1990; Banich & Shenker, 1994). Following Chiarello, Burgess, Richards, and Pollock (1990), we also assume that the left hemisphere is especially adept at selective attention (i.e., focusing narrowly on information that is directly relevant to one's goal or dominant response set) whereas the right hemisphere is relatively unselective. Furthermore, because the focus of right hemisphere processing is less selective, we assume that it routinely processes information that is beyond the focus of the left hemisphere. Although the hemispheres are capable of acting in a relatively independent manner, they are especially likely to coordinate processing resources as task complexity increases (Weissman & Banich, 2000). Under such conditions, we assume that a person's right hemisphere processing resources normally follow and enhance their left hemisphere-mediated focus of attention. However, as already noted, we believe that psychopaths are relatively unable to accommodate the products of right hemisphere processing to supplement the more specific left hemisphere focus that mediates goal-directed behavior (Davidson, 1992; Harmon-Jones & Allen, 1998; Sutton & Davidson, 1997).

Although this proposal is speculative, we, like Hare (1998), believe that it offers a useful means of integrating psychopaths' emotional, semantic, and language processing anomalies and is generally consistent with the laboratory evidence on psychopathy. Given a relatively simple processing task, both psychopaths and control participants perform the task using left hemisphere processing resources primarily. This contention is consistent with the fact that both psychopaths and control participants display a left hemisphere (i.e., right ear and right visual field) bias when performing simple tasks (e.g., Hare, 1979; Hiatt et al., 2002). It is also consistent with the fact that psychopaths perform as well as control participants on relatively simple or unidimensional tasks.
As demands for information processing increase, however, people are more likely to perform tasks using a combination of left and right hemisphere resources because the enhanced processing capacity associated with interhemispheric integration begins to outweigh the costs associated with integrating information across hemispheres (Belger & Banich, 1998). Furthermore, when bilateral processing is called for, in most cases the person's right hemisphere resources will be used to augment their specific goal-directed behavior as determined by the left hemisphere. Consistent with this latter statement, nonpsychopathic control participants display a left hemisphere processing bias for most tasks and, thus, display a right ear and visual field advantage regardless of complexity. In contrast to control participants, the relatively weak interhemispheric cooperation associated with psychopathy works against a clear left hemisphere advantage. Thus, psychopaths will tend to favor the left or right hemisphere processing resources depending upon the nature of the task. Whereas the superior selective attention associated with the left hemisphere enhances processing of expected targets presented to their right ear and right visual field, the more holistic processing of the right hemisphere facilitates their multidimensional processing of more complex stimuli. Thus, relative to control participants, psychopaths have more difficulty processing complex stimuli or performing complex analysis of stimuli presented to the right ear or right visual field. Conversely, the fact that psychopaths perform as well as or better than control participants when such stimuli are presented to the left ear or visual field probably indicates that their right hemisphere resources are more available to process such stimuli because, relative to those of control participants, they are less likely to be co-opted by the attentional bias of the left hemisphere.

This speculation concerning the relative independence of psychopaths' left and right hemisphere processing is consistent with recent findings reported by Bernstein et al. (2000). Although both psychopaths and control participants showed superior processing of words (i.e., the deliberate task) presented to the right spatial field/left hemisphere, only control participants displayed this advantage for the incidental, location cues. Whereas the incidental recall of control participants paralleled their primary focus, psychopaths' recall of incidental cues was comparable across the two spatial fields (i.e., was independent of their left hemisphere-mediated attentional bias). Thus, as task complexity increases, we assume that controls use a combination of left and right hemisphere processing resources to process the multiple dimensions of task stimuli but, because they also continue to show a right visual field advantage, we also assume that their left hemisphere has remained dominant. We assume that psychopaths are more likely to use a combination of left and right hemisphere processing resources as task complexity increases. However, in contrast with control participants, this dual activation of the hemispheres works against the standard asymmetry because the increasing activation of the right hemisphere equalizes their attentional bias as opposed to strengthening the right visual field/left hemisphere bias.
Although psychopaths in the Bernstein et al. (2000) study recalled fewer incidental cues than control participants from the right spatial field, they recalled more incidental cues from the left spatial field and, thus, performed as well as control participants overall. The Bernstein et al. study illustrates the fact that psychopaths display weaker cerebral asymmetries as task complexity increases, but it does not necessarily clarify the association between psychopaths’ anomalous cerebral asymmetries and their response modulation and self-regulatory deficits. Indeed, the processing of secondary location cues in this study was essentially irrelevant for participants’ primary task performance (i.e., word recall).

Of greater relevance to psychopaths’ response modulation and self-regulatory deficits is the investigation of emotion facilitation conducted by Lorenz and Newman (2002). This is because performance on the primary task (i.e., recognizing stimulus words) is influenced by a word’s affective connotations that, although secondary to the primary task, serve to facilitate word recognition. In this regard, the lexical decision task resembles the incidental use of emotion cues to modulate dominant responses and, thus, has immediate relevance for self-regulation (see Newman & Lorenz, 2003). Notably, the psychopath’s failure to use emotion cues to facilitate lexical decisions was specific to the right-hand condition. Assuming that the left hemisphere was more likely to be controlling task performance in the right-hand condition than in the left-hand condition, the results are consistent with our proposal that the selective attention of psychopathic individuals is less likely to be augmented by right hemisphere processing of secondary cues. Although we assume that the right hemisphere is processing the affective connotations of words in psychopaths as well as in control participants, we have proposed that psychopaths are relatively unable to coordinate this information with their left hemisphere processing.

It seems clear that the information processing of psychopathic offenders is better suited to primary task performance than it is to response flexibility and elaborative processing. It is, however, often difficult to specify what information is secondary and, thus, what information will or will not influence the psychopath’s behavior. We believe that the literature on cerebral asymmetries and interhemispheric communication is particularly useful in this regard. When participants are motivated by a specific goal, we assume that the left hemisphere focuses narrowly on aspects of the situation that are deemed directly relevant to achieving their goal. We also assume that the right hemisphere is less selective and thus processes more information. Furthermore, to the extent that the incidental information processed by the right hemisphere has relevance for the dominant response set, it will normally gain salience, perceived significance, and merit selective attention by the left hemisphere. By contrast, the right hemisphere processing of psychopathic individuals is relatively unlikely to influence their dominant response set.

This integration of response modulation and cerebral asymmetries may clarify why spatial separation appears to moderate Stroop interference in
psychopathic individuals. In three separate studies, we have found that incongruent pictures and words engender significantly less interference in psychopaths than in control participants when the incongruent stimuli are spatially separated from the target stimuli (Hiatt et al., 2004; Newman et al., 1997). In three other studies, we observed comparable Stroop interference in psychopaths and control participants when the incongruent and target stimuli were spatially coincident (Brinkley et al., 2005; Hiatt et al., 2004; Smith et al., 1992). Assuming that the left hemisphere focuses primarily on the target stimuli and that the focus of the right hemisphere includes surrounding stimuli, then a deficit in interhemispheric integration would be more likely to reduce response conflict/interference when incongruent information is spatially separated as opposed to coincident.

To the extent that negative affect and behavioral withdrawal are processed preferentially by the right hemisphere as proposed by Davidson and colleagues (e.g., Davidson, 1992), the current proposal is also consistent with research and clinical observations regarding psychopaths’ insensitivity to punishment stimuli. If, as proposed, psychopaths’ dysfunction involves accommodating right hemisphere processing once a dominant response set has been adopted by the left hemisphere, it follows that they would be relatively insensitive to punishment cues and prone to behavioral disinhibition. This assertion is consistent with the fact that psychopaths commit excessive passive avoidance errors while responding for reward but perform as well as control participants when avoiding punishment is their dominant response set (Newman & Kosson, 1986).

It is also worth noting that although language processing is typically associated with the left hemisphere, there is growing evidence that the right hemisphere plays an important role in supporting left hemisphere-mediated language production and reception (Beeman & Chiarello, 1998). Indeed, the right hemisphere appears to be especially important for the type of abstract, semantic, and elaborative processing described in this chapter (e.g., Chiarello et al., 1990; Kiehl, Liddle, et al., 1999). Thus, the current integration is highly consistent with Hare’s (1998) focus on psychopaths’ semantic, language, and emotion deficits.

In light of the fact that psychopaths’ performance deficits are largely consistent with the proposal that they have difficulty integrating the products of right hemisphere processing, it is reasonable to speculate that a deficit in interhemispheric transfer gives rise to their information processing deficiencies. What remains unclear, however, is whether their failure to accommodate incidental information reflects a problem in interhemispheric transfer per se or some other problem that hampers interhemispheric integration. For example, psychopaths’ difficulty with integrating information from the right hemisphere could also reflect an exaggeration of their left hemisphere-mediated selective attention or a dysfunction in the neurological circuitry that mediates the automatic direction of selective attention to potentially important information.
SUMMARY AND IMPLICATIONS

In comparison to other areas of psychopathology, there has been relatively little research using laboratory paradigms to identify the psychobiological underpinnings of psychopathy. Despite the dearth of research, there is good evidence that psychopaths manifest an array of performance anomalies that are consistent with regarding psychopathy as a manifestation of psychopathology as opposed to an alternative lifestyle. For instance, relative to control participants, psychopaths display (a) less electrodermal activity in anticipation of punishment or in response to conditioned threat cues, (b) weaker inhibition of punished responses, (c) smaller evoked potential to affectively neutral stimuli that are peripheral to their primary focus of attention, (d) less interference of primary task performance by incongruent peripheral cues, (e) less utilization of emotional connotations to distinguish words from nonwords, (f) a lack of verbal fluency and coherence especially while telling stories or describing past events, and (g) poor processing of emotion cues, abstract meaning, location cues, and recall of simple words while left hemisphere resources are being taxed.

Historically, interpretation of these and other correlates of psychopathy has been relatively specific. For instance, psychopaths' weak electrodermal activity to threat cues and poor passive avoidance have been attributed to a fear deficit (Lykken, 1995). Other investigators have posited specific deficits in processing negative affect (Patrick, 1994), general emotion processing (Hare, 1998), deficient behavioral inhibition (Fowles, 1980), a dysfunctional violence inhibition mechanism (Blair, 2001; Fisher & Blair, 1998), and language and semantic processing deficits (Hare, 1998; Hare et al., 1988). Although experimental research provides support for each of these proposals, there are good reasons to contemplate the associations among these explanations.

First, proposing numerous deficits for one disorder lacks parsimony. Although there is no guarantee that psychopaths' weaker processing of emotional and affectively neutral contextual cues are related, the philosophy of science teaches us that a unitary explanation is preferable to multiple explanations even if it is simpler to interpret each set of results using separate theories. Second, positing separate deficits for each research domain revealing group differences reduces the likelihood that researchers will identify abstract principles that cut across the diverse domains. Third, the inconsistent findings observed in each research domain reviewed in this chapter are difficult to reconcile with content-specific processing deficits. There is substantial evidence that psychopaths do not manifest fear deficits, emotion processing deficits, cognitive deficits, language reception or production deficits, or anomalous cerebral asymmetries under all experimental circumstances.

Once the convenient, but questionable, strategy of postulating multiple deficits is questioned, a variety of new questions and implications become apparent. Most important is the possibility that the diverse laboratory corre-
lates of psychopathy reflect a common vulnerability or processing deficit. Another implication is that it may be possible to identify particular task requirements that expose the psychopathic deficits across diverse research domains. A further implication concerns the search for neurological substrates of psychopathy. Whereas consideration of content-specific deficits such as fearlessness may lead investigators to focus on particular anatomical substrates such as the amygdala, psychopaths' language processing deficits and insensitivity to affectively neutral peripheral cues implicate other neurological substrates.

Overall, research suggests that psychopaths typically process information as well or better than control participants by attending selectively to the primary demands of a situation. Although this strategy enables them to achieve their explicit goals in a relatively efficient manner, psychopaths are less likely to process a range of incidental information that normally provides perspective on behavior. Failure to accommodate such information hampers self-regulation because it renders the individual relatively insensitive to unexpected feedback that signals potential punishment, unexpected changes in environmental contingencies which indicate that current behavior is no longer adaptive, incidental affective cues that normally guide interpersonal interactions, and a range of other incidental cues that would otherwise accentuate alternative response strategies (e.g., delay of gratification).

Cleckley (1976) wrote about a "selective defect or elimination which prevents important components of normal experience from being integrated into the whole human reaction" (p. 374), a process with obvious resemblance to the attentional deficit characterized earlier. In reference to this defect, he argued that "if we grant the existence of a far-reaching and persistent blocking, absence, deficit, or dissociation of this sort, we have all that is needed, at the present level of our inquiry, to account for the psychopath" (p. 371).

Owing, in large part to Hare's (1991) PCL-R, psychopathy has become "the most important psychological construct for policy and practice in the criminal justice field" (Harris et al., 2001, p. 197). The basis for this statement concerns the superior predictive validity of the PCL-R. However, psychopathy is also a grave form of psychopathology and, as such, has substantial significance for the fields of clinical psychology and psychiatry as well as for the criminal justice system (Cleckley, 1976). The potential significance of the construct in this domain is that it may identify etiological processes that result in personally and socially devastating consequences. To treat and, more importantly, prevent this disorder, it is essential to characterize these etiologically relevant processes and the factors that moderate their expression. Although we have provided only a superficial summary of his work in this area, it seems clear that Hare's program of research and writings have provided clinicians and researchers alike with an invaluable foundation for conceptualizing psychopaths' dysfunction. In our view, it is this aspect of Hare's contribution that is most essential to the ultimate goals of early identification, clinical management, and primary prevention of psychopathy.
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