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Detecting Psychopathy From Thin Slices of Behavior

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This study is the first to demonstrate that features of psychopathy can be reliably and validly detected by lay raters from "thin slices" (i.e., small samples) of behavior. Brief excerpts (5 s, 10 s, and 20 s) from interviews with 96 maximum-security inmates were presented in video or audio form or in both modalities combined. Forty raters used these excerpts to complete assessments of overall psychopathy and its Factor 1 and Factor 2 components, various personality disorders, violence proneness, and attractiveness. Thin-slice ratings of psychopathy correlated moderately and significantly with psychopathy criterion measures, especially those related to interpersonal features of psychopathy, particularly in the 5- and 10-s excerpt conditions and in the video and combined channel conditions. These findings demonstrate that first impressions of psychopathy and related constructs, particularly those pertaining to interpersonal functioning, can be reasonably reliable and valid. They also raise intriguing questions regarding how individuals form first impressions and about the extent to which first impressions may influence the assessment of personality disorders.

Keywords: thin slices, psychopathy, personality disorders, assessment

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Normal and abnormal personality are commonly assessed by self-report. Nevertheless, there are a number of concerns regarding the validity of self-report measures in assessing personality disorders (PDs). Individuals with certain PDs may be especially prone to experiencing their dysfunction as *ego-syntonic*, or an integral part of their self-concept. In contrast, individuals with Axis I conditions, such as mood disorders, are more likely to view their symptoms as *ego-dystonic*, or inconsistent with their self-concept. Ego-syntonic disorders are often marked by a lack of insight and are frequently more troublesome to others than to oneself (Grove & Tellegen, 1991).

One such pattern of maladaptive personality functioning is psychopathy, a syndrome characterized by profound affective and interpersonal deficits that predispose a person to antisocial behavior. Psychopathic individuals tend to be glib and superficially charming, giving a surface-level appearance of what Cleckley (1982) called "good intelligence" (p. 204). Furthermore, they tend to be manipulative and prone to pathological lying. Additionally, the affective experience of psychopaths tends to be shallow, and

they often lack a feeling of guilt for their actions, assigning blame for their misdeeds to victims. Many lead a socially deviant lifestyle marked by early behavior problems, irresponsibility, poor impulse control, and proneness to boredom. Early factor analytic studies suggested a two-factor structure of psychopathy (Hare, 1996a, 1996b; Harpur, Hakstian, & Hare, 1988; Harpur, Hare, & Hakstian, 1989). Within this model, Factor 1 comprises the affective and interpersonal symptoms of the syndrome (e.g., grandiosity, glibness or superficial charm, lack of empathy), and Factor 2 reflects the antisocial behaviors and deviant lifestyle often associated with psychopathy (e.g., early behavior problems, poor behavioral controls, lack of realistic long-term goals).

Psychopathy Assessment

Cleckley (1982) pointed to "specific loss of insight" (p. 204) as one of the core features of psychopathy. Because of psychopathic individuals' lack of insight into their maladaptive personality features, they may possess blind spots that may be better described by others than by themselves (Grove & Tellegen, 1991). Accordingly, several measures of psychopathy permit evaluation of psychopathic features by others. These include expert-rated measures of psychopathy, such as the most widely used tool in the assessment of psychopathy, the Psychopathy Checklist—Revised (PCL–R; Hare, 1991, 2003), as well as the Interpersonal Measure of Psychopathy (IM-P; Kosson, Steuerwald, Forth, & Kirkhart, 1997), an index derived from ratings of interpersonal and nonverbal behaviors during an interview. In a research context, these measures have been compared and contrasted with well-validated self-report measures of psychopathy, such as the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996).

Despite the widespread use of observer-rating measures of psychopathy, an unexplored area of inquiry in psychological assessment concerns others' preliminary impressions of psychopathy.

Can features of psychopathy be reliably and validly detected by observers from small samples of behavior?

"Thin Slices" of Behavior

An emerging literature documents the ability of observers to assess aspects of personality and predict important outcomes with relatively high accuracy from surprisingly impoverished information, often called *thin slices* (Ambady & Rosenthal, 1992; Gladwell, 2005). A thin slice is typically defined as a "brief, dynamic sample of a person's behavior, typically less than 5 minutes and most often identified as a segment or clip taken from a longer video recording of the person interacting with others or performing some kind of task" (Oltmanns, Friedman, Fiedler, & Turkheimer, 2004, p. 217). Ambady and Rosenthal (1992) meta-analyzed predictive accuracy for a variety of outcomes on the basis of short samples of expressive behavior across 38 studies, finding an overall effect size of .39, comparable with that from a meta-analysis of results from studies predicting similar outcomes from "thick slices" of behavior (overall $r = .31$; Wiggins, 1973). They found that individuals were most accurate when they had access to 30- to 60-s segments of behavior ($r = .57$) and found that nonverbal channels of information yielded greater accuracy overall than verbal channels ($r = .41$ vs. $r = .34$).

Criteria pertaining to important social and clinical outcomes, such as teaching evaluation ratings (Ambady & Rosenthal,1993) and physicians' likelihood of being sued for malpractice (Ambady et al., 2002; Levinson, Roter, Mullooly, Dull, & Frankel, 1997), can be significantly predicted from thin slices of behavior. In addition, people can accurately judge such traits as extraversion and other interpersonally relevant variables, such as status, kinship, and lie telling, on the basis of extremely brief interactions with complete strangers (Ambady, Hallahan, & Rosenthal, 1995; Costanzo & Archer, 1989; Kenny, Horner, Kashy, & Chu, 1992; Zebrowitz & Collins, 1997).

Rapid personality judgments may be clinically relevant given evidence that personality judgments predict a variety of behavioral outcomes including interpersonal attraction and liking; organizational decisions such as hiring, promotion, and firing (Borkenau, Mauer, Riemann, Spinath, & Angleitner, 2004); and judicial decisions such as sentencing (Zebrowitz & McDonald, 1991). Moreover, recent studies have demonstrated that preliminary personality judgments (i.e., first impressions) are often formed surprisingly quickly. Willis and Todorov (2006) found that when participants viewed human faces, judgments of such characteristics as attractiveness, likeability, trustworthiness, aggressiveness, and competence made after as little as 100 ms were highly correlated with judgments made in the absence of time constraints. Oltmanns, Friedman, Fiedler, and Turkheimer (2004) recently extended this work to investigate rapid assessment of traits associated with PDs. They asked a sample of strangers to rate targets' Big Five personality traits after viewing 30-s video clips of 229 military recruits (28% of whom met criteria for a probable *Diagnostic and Statistical Manual of Mental Disorders* [4th ed.; *DSM–IV*; American Psychiatric Association, 1994] PD). In keeping with Big Five patterns predicted for the disorders, strangers rated individuals with prominent features of paranoid, avoidant, schizotypal, and dependent PDs as low in Extraversion and those with histrionic PD as higher in Extraversion. These findings demonstrate that layper-

sons can make accurate judgments of personality characteristics associated with PDs on the basis of minimal information. Nevertheless, one notable limitation of this study is that only Big Five traits, not clinical disorders per se, were rated directly.

Friedman, Oltmanns, Gleason, and Turkheimer (2006) extended this work by examining ratings of thin slices of multiple channels of behavior, including sound-only, video-only, combined-channel (sound + video), and transcript conditions. In all conditions, individuals with Cluster B pathology (e.g., with narcissistic and histrionic PD features) were consistently rated by undergraduate strangers as more likeable and attractive than were individuals with other PDs. They attributed this finding to histrionic and narcissistic individuals typically being well-groomed and expressive, qualities that often make a positive first impression on others. Perhaps most interesting was that Friedman et al. found that unlike those with other Cluster B pathology, individuals with antisocial PD (ASPD) traits were rated as more likeable when only verbal or only nonverbal information was available. When the channels were combined, individuals with ASPD features were rated less likeable. This finding raises the possibility that a mismatch between the verbal and nonverbal behaviors of such individuals leaves observers with the impression that something about the individuals is off. As in the prior study, however, psychopathology was not rated directly.

The Present Study: Objectives and Hypotheses

Our primary objective in this study was to investigate the degree to which nonexpert raters can accurately assess features of psychopathy and related characteristics from thin slices of behavior. In contrast with prior studies (e.g., Friedman et al., 2006; Oltmanns et al., 2004), we directly compared rater assessments of psychopathology with criterion measures of psychopathology (e.g., well-validated assessments previously completed by trained raters). Toward this end, we used an archive of PCL–R interviews from which we extracted brief samples to be rated as our predictors and a previously collected data set consisting of behavioral and personality measures as our criteria.

Reliability was calculated as the consensus per individual thin-slice rating item (intraclass correlation coefficient; ICC) across raters. All thin-slice ratings consisted of single items comprising two-sentence descriptions of psychopathy, several other PDs, and other variables relevant to the construct of psychopathy (see the Method section). In keeping with the prior methodology of studies using thin slices of behavior, accuracy (i.e., validity) was defined as degree to which thin-slice ratings converged with external criterion variables.

Our hypotheses were as follows. First, we predicted that ratings of psychopathy based on thin slices of behavior would show significant reliability and accuracy. Additionally, we predicted significant reliability for PD ratings (antisocial, narcissistic, borderline, histrionic, schizotypal, and avoidant PDs) and significant accuracy for ASPD ratings. Because narcissistic, borderline, histrionic, schizotypal, and avoidant PDs were not assessed as part of the original data set and therefore did not have corresponding criterion measures, only reliability values could be computed for these disorders. However, we used ratings of these PDs to conduct exploratory analyses of the discriminant validity and incremental validity of psychopathy ratings over and above ratings of other PD

descriptions in predicting expert-rated psychopathy scores. These analyses shed light on whether raters are detecting features of general personality pathology or can more specifically detect certain features of different disorders from small samples of behavior.

Second, we predicted that more observable interpersonal characteristics of psychopathy would exhibit the highest levels of reliability and accuracy. Research examining the relationship between Big Five traits and psychopathy (e.g., Skeem, Miller, Mulvey, Tiemann, & Monahan, 2005) indicates that Extraversion correlates positively with the Factor 1 traits of psychopathy. Therefore, we predicted that thin-slice ratings of psychopathy would correlate more highly with the affective-interpersonal features of psychopathy reflected in PCL–R Factor 1, as well as in PPI-1, which correlates with criterion variables similar to those for PCL–R Factor 1 (Benning, Patrick, Blonigen, Hicks, & Iacono, 2005; Lilienfeld & Fowler, 2006). Further, because IM-P scores correlate more highly with PPI-1 than with PPI-2 (Zolondek, Lilienfeld, Patrick, & Fowler, 2006), which parallels PCL–R Factor 2 in terms of its relations with criterion variables (Benning et al., 2005), we predicted that IM-P scores would be significantly and highly correlated with thin-slice ratings.

Physical attractiveness is moderately correlated with ratings of a variety of characteristics, including those related to sociability and social effectiveness (Eagly, Ashmore, Makhijani, & Longo, 1991; Kenny et al., 1992). Psychopathic individuals are typically characterized by superficial charm (Cleckley, 1982), which is not synonymous with physical attractiveness. Considering this evidence, we asked raters to report their physical and interpersonal attraction to the target (see the Method section).

In keeping with psychopathic individuals' tendency to be glib and superficially charming, psychopaths exude a superficial appearance of "good intelligence" (Cleckley, 1982, p. 204) not reflective of actual intellectual superiority. Past findings demonstrate that thin-slice ratings (particularly those based on verbal behavior) can significantly predict intelligence test scores (Borkenau et al., 2004). Therefore, psychopaths may make a first impression of being more intelligent than others, particularly given a very brief and necessarily superficial behavioral sample. Thus, we conducted exploratory analyses examining (a) the degree to which thin-slice psychopathy ratings positively correlate with thin-slice intelligence ratings and (b) the degree to which psychopathy correlates with the residual between participants' perceived and objectively measured intelligence.

Finally, given the association between psychopathy and physical aggression (Hare, 2003), we conducted exploratory analyses to examine the degree to which raters' estimates of the target's proneness to violence converge with historical violence variables.

Method

Participants

This study included 40 participants who rated the target persons featured in the videotapes. Raters were 40 graduate and undergraduate students (31 women, 9 men) who participated in exchange for a $10 honorarium; 34 (85%) were Caucasian, 4 (10%) were African American, and 2 (5%) identified themselves as "other" ethnicity. Raters comprised 18 (45%) clinical psychology graduate students, 8 (20%) nonclinical psychology graduate stu-

dents, 6 (15%) undergraduate psychology majors in research laboratories studying psychopathy, and 8 (20%) undergraduate psychology majors not in research laboratories studying psychopathy. Rater age ranged from 19–32 years old, with a mean of 24.4 years ($SD = 3.38$) and a median of 25.0 years.

Each rater viewed video clips excerpted from a previously collected sample of PCL–R interviews (see the Measures section) conducted with 96 male inmates (the target participants) at a medium-security federal correctional institution in Tallahassee, Florida. As described in previous publications (Patrick, Zempolich, & Levenston, 1997; Zolondek, Lilienfeld, Patrick, & Fowler, 2006), inmates were recruited randomly from the prison roster. Inmates who demonstrated verbal competency in English and the ability to read a text description of the study aloud were selected for participation. They were informed that their questionnaire and interview responses would remain confidential and would not affect their sentence or status within the institution. Their mean age was 32.3 years ($SD = 7.3$, range = 19–55 years); 49.5% (46 inmates) were African American, 41.9% (39 inmates) were White, and 8.6% (8 inmates) were Hispanic.

Materials

To provide comparable behavior samples for each target participant, we excerpted a standard video segment from each of the 96 PCL–R interview recordings consisting of the first 30-s segment of uninterrupted speech by the participant occurring at least 10 min into the interview (i.e., to allow sufficient warm-up time for the interviewee). Utterances on the part of the interviewer that did not alter the flow of speech (e.g., "Mm-hmm," "Okay") were allowed. Segments in which the target participant spoke specifically about illegal or delinquent acts were excluded so that knowledge of the target's antisocial behaviors would not influence ratings. The segments presented to raters were of varying length: 20 s, 10 s, and 5 s. Within these three temporal conditions, interview excerpts were presented in three different modalities: sound only, video only, and combined audio and video. Thus, there were nine stimulus conditions, each composed of 10 clips. Raters participated in groups. Five groups of raters, each consisting of 3 to 10 raters, participated. Clips were organized by sensory modality (sound, visual, combined), then by length (e.g., sound only, 20-s clips, then 10-s clips, then 5-s clips). Each DVD comprised a different sensory modality condition, and the presentation order of the disks varied across groups. That is, if one group was presented with sound only, then visual only, then combined clips, the next group was presented with a different variation of this sequence.

Measures

Observer ratings of interviewee behavior served as predictor variables in the current study. Criterion variables consisted of independent diagnostic ratings, case history variables, and intelligence as indexed by a brief global measure.

Rater measures

Thin-slice ratings. After viewing each video clip, raters recorded their impressions of different aspects of personality and psychopathology in the target participants using Likert-type scales.

The ratings included three psychopathy-related judgments: the degree to which the target participant matched one- to two-sentence descriptions of overall psychopathy, Factor 1 (affective and interpersonal) psychopathy features, and Factor 2 (antisocial and criminal lifestyle) psychopathy features. Ratings of the degree to which the target matched one- to two-sentence descriptions of the following six *DSM–IV* PDs were also made: all Cluster B (dramatic or erratic) disorders (ASPD, narcissistic PD, borderline PD, and histrionic PD) and one disorder each from Cluster A (schizotypal PD) and Cluster C (avoidant PD). Schizotypal PD and avoidant PD were chosen as most prototypical of their respective clusters. Additionally, raters completed Likert-type ratings of physical and interpersonal attractiveness (e.g., "How much would you want to get to know this person better?") and violence proneness. Finally, an item pertaining to estimated intelligence (IQ) was included along with a list of qualitative descriptors (e.g., "high average") and corresponding IQ ranges. Raters were asked to specify a single numerical estimate of IQ for this item.

The one- to two-sentence descriptions of psychopathy and PDs were pilot tested on a small panel of three clinical psychology faculty at Emory University and 11 editorial board members of a major personality journal. Faculty who participated in the pilot evaluation were presented with prototype descriptions with the titles (e.g., "Avoidant Personality Disorder") removed and asked to specify the disorder described. No discrepancies were found between judges' answers and intended content, with the exception of three judges who labeled both ASPD and psychopathy descriptions *ASPD*; these raters reported that they used only *DSM–IV* diagnoses.

A complete version of the thin-slice ratings form can be found in the supplemental material.

Narrative description of rater strategies. Free-form narrative descriptions of strategies used in making rating decisions were provided by 36 raters. Of those, the number of strategies reported ranged from two to eight, with a mean of four. We constructed five categories that encompassed most responses, as well as one category called "other" that encompassed responses not otherwise categorized. The categories used to classify responses were (a) body language or posture, (b) facial expression cues, (c) speech content, (d) paralinguistic cues (i.e., verbal cues not related to content, such as tone, inflection, etc.), (e) physical appearance, and (f) other. Most responses were assigned to only one category unless they clearly reflected a compound strategy (e.g., "More articulate and well-groomed = lower violence"). Katherine A. Fowler and Scott O. Lilienfeld categorized the raters' reported strategies. They agreed on 94% (149 out of 159) of the ratings, and disagreements were resolved by discussion.

Target Measures

As noted earlier, target participants completed a large battery of diagnostic and self-report measures as part of a previous study on the emotional and personality functioning of psychopaths (see Patrick et al., 1997). Measures of the criterion variables in the present study are reviewed below.

Measures of Psychopathy and Antisocial Behavior

PCL–R (Hare, 1991, 2003). The PCL–R is a clinical instrument that provides the rater with a description of each of 20 criteria for psychopathy along with relevant behavioral exemplars. Information is gathered via a combination of an in-person or a videotaped semistructured interview and collateral information, such as correctional file data. Each item is scored on a 0–2 scale (0 = *definitely does not apply*; 1 = *applies somewhat, or only in a limited sense*; 2 = *definitely does apply*; Hare, 2003). PCL–R total scores range from 0 to 40 and are intended to represent the degree to which an individual matches a prototypical psychopath based on Cleckley's (1982) clinical description. As noted previously, early factor analyses of the PCL–R suggested two factors (Hare, Hart, & Harpur, 1991; Harpur, Hakstian, & Hare, 1988), one reflecting the interpersonal and affective dimensions of psychopathy (Factor 1) and the other reflecting the antisocial lifestyle often associated with these characteristics (Factor 2). Across samples of forensic patients and inmates, Hare et al. (1991) reported that the two factors correlate approximately .55, on average. Factor 1 comprises eight items, with a maximum score of 16; Factor 2 comprises nine items, with a maximum score of 18. Three PCL–R items do not load on either factor; hence, we examined PCL–R total scores in addition to Factors 1 and 2 in the analyses.

In this sample, the interrater reliability of the PCL–R was assessed by a second rater who observed the interview along with the interviewer. The ICC for total PCL–R scores (*N* = 91) was .91; for PCL–R Factor 1 and Factor 2 scores, the ICCs were .83 and .90, respectively. In the analyses reported here, the PCL–R scores were averaged across these two raters.

IM-P (Kosson, Steuerwald, Forth, & Kirkhart, 1997). The IM-P is an observer-rated measure of psychopathy, completed either during the course of or on later viewing of an interaction between an interviewer and an interviewee. It consists of 21 items assessing interpersonal interactions and nonverbal behaviors, such as "interrupts," "ignores personal boundaries," and "seeking of alliance." Raters are asked to determine whether items are characteristic of the target on a 0–4 scale (0 = *not at all*; 4 = *perfectly*). Kosson et al. (1997) reported interrater reliability of .83 and .60 in prison and undergraduate samples, respectively, and internal consistency of .91 in a prison sample.

The IM-P was scored from videotaped PCL–R interviews as part of a study examining its construct validity in a prison sample (Zolondek et al., 2006). Raters were blind to participants' PCL–R scores and other assessment information. Internal consistency of the IM-P was .89, comparable with that of Kosson et al. (1997). Interrater reliability between the two IM-P raters was .77, falling between the two ICCs (.60 and .83) reported by Kosson et al. (1997).

PPI (Lilienfeld & Andrews, 1996) Multidimensional Personality Questionnaire (MPQ)-derived factor scales (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003). The PPI is a self-report measure of psychopathy comprising eight subscales, which has demonstrated promising reliability and construct validity in undergraduate (Lilienfeld & Andrews, 1996) and prison (Poythress, Edens, & Lilienfeld, 1998) samples. Although the PPI per se was not administered, the two major factors underpinning the PPI were estimated from the MPQ's (Tellegen, 1982) lower order scales, using formulas described by Benning et al. (2003). PPI-1 is composed of the Fearlessness, Social Potency, and Stress Immunity subscales, whereas PPI-2 is composed of the Machiavellian Egocentricity, Impulsive Nonconformity, Carefree Nonplanfulness, and Blame Externalization subscales. The two PPI factors show

markedly different external correlates. MPQ-estimated PPI-1 is negatively associated with internalizing symptoms and positively associated with thrill and adventure seeking and fearlessness, whereas MPQ-estimated PPI-2 is positively associated with externalizing symptoms, trait anxiety, disinhibition, and boredom susceptibility (Benning et al., 2005). Although the two PPI factors are not isomorphic with the two factors of the PCL–R, the corresponding factors of the two instruments do correlate modestly and selectively with one another (Benning et al., 2003).

DSM–IV criteria for ASPD (American Psychiatric Association, 1994). Patrick et al. (1997) collected *DSM–IV* (American Psychiatric Association, 1994) ratings of ASPD for each participant on the basis of a set of structured interview questions appended to the PCL–R interview. These ratings were treated dimensionally (i.e., as symptom counts) in the present study.

Demographic and Life History Information

Patrick et al. (1997) collected background information from target participants' files, including basic demographic variables, violent and nonviolent childhood criminal charges, violent and nonviolent adult criminal charges, institutional charges, and number of childhood fights and adult fights. IQ was measured using the Shipley Institute of Living Scale (Shipley, 1983), a brief measure of global intelligence that correlates approximately .85 with IQ as assessed by the Weschler Adult Intelligence Scale (WAIS; Deaton, 1992).

Procedure

Presentation order of the three channel conditions (video, sound, combined) was randomized across rater groups to minimize order effects. Within each channel condition, clips were grouped by time (20 s, 10 s, and 5 s). After the presentation of the clips, raters were asked to write a brief narrative description of strategies used in making their ratings.

Results

Our results are organized as follows: First, descriptive statistics for thin-slice and criterion measures and reliability estimates for our thin-slice measures are reported. Next, zero-order correlations between our thin-slice measures and criterion measures are reported. These analyses represent the convergence between thin-slice impressions and their corresponding criteria (i.e., accuracy). They are grouped according to our major variables of interest in the following order: psychopathy measures, PD ratings, intelligence, attractiveness, violence proneness. Last, exploratory analyses of self-reported narrative strategies are reported.

Descriptive Statistics and Reliability

Table 1 reports interrater reliability and Table 2 reports means and standard deviations for Likert-format thin-slice ratings, thin-slice IQ estimates, and criterion measures. Caucasian targets were rated significantly higher than African American targets on thin-slice overall psychopathy, Factor 1 psychopathy, and Factor 2 psychopathy; antisocial, borderline, histrionic, and narcissistic PD traits; and IQ (ts = 2.51–6.21). These differences ranged from medium to large in magnitude ($d = 0.55$–1.08).[1] Consistent with

Table 1
Interrater Reliability of Thin-Slice Ratings

Item	ICC
Psychopathy (PD) ratings	
Overall psychopathy	.95
Factor 1	.96
Factor 2	.87
Personality disorder (PD) ratings	
Antisocial PD	.86
Borderline PD	.58
Histrionic PD	.90
Narcissistic PD	.94
Schizotypal PD	.83
Avoidant PD	.89
Estimated IQ	.95
Violence proneness	.87
Attractiveness	
Physical attractiveness	.95
Interest in dating	.92
Get to know better	.90
Set up with a friend	.91
Race	.99

Note. Intraclass correlation coefficient (ICC) values less than .70 are considered acceptable interrater reliability. Target $N = 96$, rater $N = 40$.

predictions, interrater reliability across all raters was high (ICC = .86–.99) for all items except Borderline PD (ICC = .58). Interrater reliability for psychopathy ratings was as follows: Overall psychopathy ICC = .95; Factor 1 ICC = .96; Factor 2 ICC= .87. Contrary to prediction, interrater reliability was relatively stable across time conditions.

Zero-Order and Partial Correlations

Psychopathy Measures

Table 3 shows, as predicted, that thin-slice ratings of overall psychopathy correlated moderately and significantly with varying criterion measures of psychopathy: PCL–R total, PCL–R Factor 1, IM-P, and PPI-1 scores (r range = .23–.41). Thin-slice overall psychopathy ratings did not correlate significantly with PPI-2 or PCL–R Factor 2. Thin slice Factor 1, thin slice Factor 2, and overall psychopathy ratings were highly intercorrelated.

Tests of the significance of the difference between dependent correlations were conducted throughout by first conducting Fisher's r-to-z transformation, then conducting z tests of the standard error of the means. A test of the significance of the difference between dependent correlations revealed that Factor 1 thin-slice ratings were significantly more highly correlated with overall psychopathy thin-slice ratings ($r_1 - r_2 = -0.26$, $z = -13.40$, $p < .01$) and with PCL–R Factor 1 than were Factor 2 thin-slice ratings ($r_1 - r_2 = -0.19$, $z = -1.96$, $p = .03$). This finding also converged with predictions. Thin-slice Factor 1 ratings were not significantly correlated with PCL–R Factor 2, but thin-slice Factor

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[1] Because of these differences, all correlational analyses reported here were also conducted as partial correlations controlling for race. All significant correlations remained significant after controlling for race. Therefore, only zero-order correlations are reported in the body of the article.

Table 2
Thin-slice and Criterion Ratings Descriptive Statistics

Measure	M	SD	Range
Thin-slice ratings			
Psychopathy ratings			
Overall psychopathy	3.45	0.86	1.90–5.88
Factor 1	3.35	0.95	1.65–5.93
Factor 2	3.48	0.52	2.23–4.80
Personality disorder (PD) ratings			
Antisocial PD	3.60	0.49	2.33–4.85
Borderline PD	2.02	0.21	1.60–2.55
Histrionic PD	1.92	0.47	1.30–3.73
Schizotypal PD	1.89	0.32	1.35–3.40
Avoidant PD	1.87	0.45	1.20–3.38
Estimated intelligence (IQ)	98	6	89–115
Violence proneness	3.65	0.46	2.63–4.73
Attractiveness			
Physical attractiveness	2.83	0.65	1.43–4.88
Interest in dating	1.97	0.47	1.08–3.43
Get to know better	2.48	0.50	1.40–3.88
Set up with a friend	2.05	0.46	1.13–3.53
Criterion measures			
PCL–R total	21.57	7.66	6–37
PCL–R Factor 1	9.12	3.24	3–15.50
PCL–R Factor 2	9.39	4.13	0.56–16.50
PPI-1	0.003	0.67	−1.54–1.50
PPI-2	−0.04	0.97	−1.68–1.59
IM-P total	7.07	6.93	0–26
Shipley-estimated IQ	84.90	15.35	55–118

Note. All ratings except IQ were on a scale from 1 (*not at all*) to 7 (*very much*), according to perceived similarity to prototype. Target participant $N = 96$, rater $N = 40$. All thin-slice ratings were averaged across raters. PCL–R = Psychopathy Checklist—Revised; PPI-1 = Multidimensional Personality Questionnaire–estimated Psychopathic Personality Inventory Factor 1; PPI-2 = Multidimensional Personality Questionnaire–estimated Psychopathic Personality Inventory Factor 2; IM-P = Interpersonal Measure of Psychopathy.

2 ratings correlated moderately and significantly with PCL–R Factor 2.

Partial correlation analyses were conducted to examine the interrelations among psychopathy thin-slice and criterion measures after controlling for the variance shared by Factor 1 and Factor 2. Partial correlations revealed that correlations of Factor 1 thin-slice ratings scores with PCL–R total and Factor 1 scores and IM-P scores remained significant and were not significantly different after controlling for Factor 2 thin-slice scores. Likewise, the correlation between Factor 2 thin-slice ratings and PCL–R Factor 2 scores remained significant and did not decrease significantly after controlling for Factor 1 thin-slice ratings. In contrast, correlations between Factor 2 thin-slice ratings and PCL–R total, PCL–R Factor 1, and IM-P scores became nonsignificant after controlling for Factor 1 thin-slice ratings ($r = .19$, *ns*; $r = .05$, *ns*; $r = -.08$, *ns*, respectively).

Examined separately by segment time (20 s, 10 s, 5 s), correlations between thin-slice psychopathy ratings and PCL–R total and factor scores were highest in the 5-s interval (see Table 4), contrary to the prediction that accuracy would increase with time. Significance tests revealed significant differences to differences approaching significance among these correlations (*p*s ranged from <.01 to .10). Analyses of variance (ANOVAs) testing for differences in PCL–R scores (total, Factor 1, Factor 2) and demographic variables revealed no significant differences across time conditions. With regard to PPI scores, all thin-slice ratings of psychopathy (overall, Factor 1, Factor 2) evidenced maximal correlations with PPI-1 in the 10-s time interval. The difference in correlations was significant for both the 10-s condition versus the 20-s condition ($r_1 - r_2 = -0.53$, $z = -3.16$, $p < .01$; $r_1 - r_2 = -0.52$, $z = -3.04$, $p < .01$; $r_1 - r_2 = -0.70$, $z = -4.02$, $p < .01$, respectively), and the 10-s condition versus the 5-s condition ($r_1 - r_2 = -0.32$, $z = -2.04$, $p = .03$; $r_1 - r_2 = -0.26$, $z = -1.64$, $p = .05$; $r_1 - r_2 = -0.45$, $z = -2.71$, $p < .01$, respectively).

Examined separately by channel condition (video only, sound only, combined), raters' thin-slice psychopathy ratings were most highly correlated with PCL–R total and factor scores in the video-only condition, followed by the combined condition (see Table 5). Significance tests revealed that correlations between thin-slice Factor 2 psychopathy and PCL–R Factor 1 were significantly higher in the video-only condition than in the sound-only ($r_1 - r_2 = -0.36$, $z = -2.21$, $p = .01$) or the combined condition ($r_1 - r_2 = -0.42$, $z = -2.53$, $p < .01$). No other correlations differed significantly. Thin-slice psychopathy ratings (overall, Factor 1, Factor 2) were most highly correlated with PPI-1 in the combined channel condition. This difference was significant for thin-slice overall, Factor 1, and Factor 2 psychopathy for combined versus sound-only conditions ($r_1 - r_2 = -0.58$, $z = -3.29$, $p < .01$; $r_1 - r_2 = -0.45$, $z = -2.53$, $p < .01$; $r_1 - r_2 = -0.52$, $z = -2.81$, $p < .01$, respectively) but not for combined versus video-only or video-only versus sound-only conditions. PPI-2 was not significantly correlated with thin-slice ratings of psychopathy in any of the three channel conditions. In addition, significance tests revealed that correlations of thin-slice overall psychopathy and thin-slice Factor 2 ratings with IM-P scores did not differ as a function of channel condition.

Personality Disorder Ratings

Thin-slice overall psychopathy ratings correlated moderately to highly with thin-slice Cluster B ratings, and they correlated moderately to highly and negatively with Cluster A and Cluster C thin-slice ratings. Multiple regression analyses revealed an incremental contribution of thin-slice psychopathy ratings over and above borderline ($\Delta R^2 = .07$, $\beta = .29$, $p = .01$) and narcissistic PD ($\Delta R^2 = .04$, $\beta = -.65$, $p = .04$) traits in predicting overall PCL–R rated psychopathy but not over and above antisocial PD ($\Delta R^2 = .004$, $\beta = .07$, *ns*) or histrionic PD ($\Delta R^2 < .001$, $\beta = -.04$, *ns*) traits. Thin-slice antisocial PD ratings correlated significantly with the number of *DSM–IV* antisocial PD symptoms ($r = .20$, $p = .05$). Broken down by time condition, thin-slice antisocial PD ratings correlated with the number of *DSM–IV* ASPD symptoms, with $r = .35$, *ns*, at 20 s; $r = .30$, *ns*, at 10 s; and $r = .25$, *ns*, at 5 s. These differences were not significant. For channel condition, thin-slice antisocial PD ratings were most highly correlated with the number of *DSM–IV* ASPD symptoms in the sound-only condition ($r = .51$, $p = .02$), followed by the combined condition ($r = .32$, *ns*), followed by the picture-only condition ($r = .16$, *ns*). Differences were significant between the sound-only condition and the picture-only condition ($r_1 - r_2 = -0.35$, $z = -2.09$, $p = .02$), but not between the sound-only and combined conditions.

Table 3

Intercorrelations Between Thin-Slice Psychopathy Ratings and Criterion Psychopathy Measures

Measure	1	2	3	4	5	6	7	8	9
1. Thin-slice overall psychopathy	—	.98**	.72**	.23*	.32**	.14	.31**	.06	.41**
2. Thin-slice Factor 1 psychopathy		—	.70**	.26*	.34**	.15	.29**	.07	.45**
3. Thin-slice Factor 2 psychopathy			—	.28**	.24*	.27*	.21*	.18	.24*
4. PCL–R total				—	.81**	.90**	.06	.27*	.41**
5. PCL–R Factor 1					—	.51**	.20	.14	.55**
6. PCL–R Factor 2						—	-.05	.34**	.22*
7. PPI-1							—	.02	.13
8. PPI-2								—	.02
9. IM-P									—

Note. PCL–R values are based on an average across two raters. All thin-slice ratings are averaged across 40 raters. Target participant $N = 96$. PCL–R = Psychopathy Checklist—Revised; PPI-1 = Multidimensional Personality Questionnaire–estimated Psychopathic Personality Inventory Factor 1; PPI-2 = Multidimensional Personality Questionnaire–estimated Psychopathic Personality Inventory Factor 2; IM-P = Interpersonal Measure of Psychopathy.
* $p < .05$. ** $p < .01$.

Intelligence

Thin-slice ratings of intelligence (estimated IQ) correlated moderately with Shipley-estimated WAIS IQ ($r = .34$, $p < .01$). Additionally, thin-slice IQ ratings were highly correlated with thin-slice overall and Factor 1 psychopathy ratings ($r = .70$, $p < .01$, and $r = .72$, $p < .01$, respectively) and correlated to a minor degree with thin-slice Factor 2 psychopathy ratings ($r = .21$, $p = .04$). Shipley-derived WAIS IQ scores were not significantly correlated with PCL–R total or factor scores.[2]

Attractiveness

Thin-slice ratings of physical and interpersonal attractiveness correlated moderately and significantly (r range = .31–.40, $p < .01$) with thin-slice psychopathy ratings but not with psychopathy criterion variables.

Violence Proneness

Thin-slice ratings of violence proneness did not correlate significantly with offense data or institutional violence but correlated moderately with the number of childhood fights and adult fights (both $rs = .30$, $p < .01$). Thin-slice violence proneness correlated significantly with thin-slice overall ($r = .37$, $p < .01$), thin-slice Factor 1 ($r = .37$, $p < .01$), and thin-slice Factor 2 ($r = .80$, $p < .01$) psychopathy ratings and with PCL–R total score ($r = .22$, $p = .04$), PCL–R Factor 2 ($r = .26$, $p = .02$), and PPI-2 ($r = .21$, $p = .05$). Tests of the significance of differences between dependent correlations revealed that thin-slice violence proneness ratings were more highly correlated with thin-slice Factor 2 ratings than with other thin-slice scores, which did not differ from one another. Partial correlation analyses revealed that correlations of Factor 2 thin-slice ratings scores with violence proneness remained significant and were not significantly different after controlling for Factor 1 thin-slice scores.

In addition, thin-slice violence proneness ratings correlated significantly with dimensional ratings of *DSM–IV* ASPD ($r = .24$, $p = .04$). Examined by channel, thin-slice violence proneness ratings correlated significantly with number of adult fights ($r =$ .61, $p < .01$), number of childhood fights ($r = .52$, $p < .01$), and the presence versus absence of violent institutional charges ($r = .41$, $p = .03$) in the sound-only condition but not in the video-only or combined channel conditions.

Narrative Descriptions

Raters reported using the coded information as follows, starting with those most frequently used: 22.9% reported using paralinguistic cues, 20.8% used body language and/or posture, 19.8% used facial expressions, 10.4% used physical appearance, and 10.4% used speech content. Further, 22.9% used a strategy classified as "other" (e.g., enthusiasm, IQ ratings, and interviewer noises).

In exploratory analyses, we investigated the association between the use of different strategies and rater accuracy. First, we calculated Pearson product–moment correlations between each individual rater's thin-slice psychopathy ratings and criterion psychopathy ratings (i.e., accuracy). Next, taking accuracy as its own variable, we calculated point-biserial correlations between the use versus nonuse of the coded strategies and mean accuracy, as well as the Pearson product–moment correlation between the number of strategies used and mean accuracy. The strategies used did not significantly correlate with accuracy with a few exceptions: Use of body language and posture information was significantly negatively correlated with accuracy of Factor 2 psychopathy ratings ($r_{pb} = -.46$, $p = .003$), and use of "other" strategies significantly negatively correlated with accuracy of Factor 1 psychopathy rat-

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[2] By time condition, thin-slice intelligence ratings correlated moderately and significantly with Shipley-estimated WAIS IQ at .43 ($p = .02$) at 20 s, .44 ($p = .02$) at 10 s, and nonsignificantly ($r = .25$, ns) at 5 s. By channel condition, thin-slice intelligence ratings correlated highly and significantly with criterion IQ scores in the sound-only condition ($r = .56$, $p < .01$), moderately and significantly in the combined condition ($r = .35$, $p = .04$), and nonsignificantly in the video-only condition ($r = .21$, ns). However, the differences among these correlations were significant only between sound-only and picture-only conditions ($r_1 - r_2 = -.36$, $z = -2.21$, $p = .01$).

Table 4
Intercorrelations Between Thin-Slice Psychopathy Ratings and Psychopathy Criterion Measures by Time

Measure and time	Thin-slice overall psychopathy	Thin-slice Factor 1 psychopathy	Thin-slice Factor 2 psychopathy
PCL–R total			
20 s	.11	.14	−.01
10 s	.17	.22	.27
5 s	.42**	.43**	.50**
PCL–R Factor 1			
20 s	.28	.28	.09
10 s	.23	.27	.26
5 s	.49**	.51**	.38**
PCL–R Factor 2			
20 s	.03	.07	−.02
10 s	.14	.18	.28
5 s	.25	.24	.44**
PPI-1			
20 s	.04	.02	−.14
10 s	.57**	.54**	.56**
5 s	.25	.28	.11
PPI-2			
20 s	.21	.21	.35
10 s	−.05	−.06	.06
5 s	.12	.14	.20
IM-P			
20 s	.49**	.48**	.13
10 s	.43**	.49**	.46**
5 s	.32	.38*	.10

Note. PCL–R values are based on an average across two raters. All thin-slice ratings are averaged across 40 raters. Target participant $N = 96$. For each time condition, $n = 30$. PCL–R = Psychopathy Checklist—Revised; PPI-1 = Multidimensional Personality Questionnaire–estimated Psychopathic Personality Inventory Factor 1; PPI-2 = Multidimensional Personality Questionnaire–estimated Psychopathic Personality Inventory Factor 2; IM-P = Interpersonal Measure of Psychopathy.
* $p < .05$. ** $p < .01$.

ings ($r_{pb} = −.34$, $p = .03$). The use of speech content trended toward a significant correlation with accuracy of Factor 2 psychopathy ratings ($r_{pb} = .29$, $p = .07$).

Discussion

This study is the first to demonstrate the ability of lay observers to detect psychopathic features from small samples, that is, thin slices of behavior, with adequate reliability across raters and adequate accuracy/validity. An interesting real-world implication of these findings, especially from an assessment perspective, is that people may be more influenced by first impressions, even of very complex psychological characteristics, than they realize. Perhaps even trained clinical psychologists and psychiatrists, who routinely conduct comprehensive cognitive and personality assessments, are influenced by impressions formed in the first few minutes or even seconds of interaction with a patient (e.g., Gauron & Dickinson, 1969).

First impressions of psychological characteristics are often informed by interpersonal interactions, and psychopathy is a disorder with a strong interpersonal impact: Psychopaths lie to and manipulate people, and they sometimes commit violent acts against others. In keeping with these observations and as predicted, thin-

slice ratings of overall psychopathy correlated moderately and significantly with psychopathy criterion measures assessing overall and interpersonal aspects of psychopathy. Indeed, our findings demonstrate that initial impressions of others' psychopathic features seem to be almost entirely informed by interpersonal features of psychopathy (viz., Factor 1) rather than by impressions of the target's propensity for criminal behavior. These findings are especially remarkable considering that the clips were selected to feature a one-sided response by the target rather than an interaction with the interviewer. Overall, raters' thin-slice psychopathy ratings correlated most highly with most criterion measures in the video condition, followed by criterion measures in the combined condition, suggesting that nonverbal behaviors are especially important in the detection of psychopathy. For the most part, tests for differences between independent correlations revealed no significant differences among these correlations. However, these negative findings may be attributable in part to low statistical power, as each condition comprised only 30 clips.

We found preliminary evidence that interpersonal features of psychopathy were better assessed when raters had less information to rely on. Contrary to prediction, raters' thin-slice psychopathy ratings were most highly correlated with some psychopathy crite-

Table 5
Intercorrelations Between Thin-Slice Psychopathy Ratings and Psychopathy Criterion Measures by Channel

Measure and channel	Thin-slice overall psychopathy	Thin-slice Factor 1 psychopathy	Thin-slice Factor 2 psychopathy
PCL–R total			
Combined	.31	.33	.21
Picture	.32	.34	.48**
Sound	.24	.30	.29
PCL–R Factor 1			
Combined	.32	.31	.13
Picture	.48**	.50**	.55**
Sound	.29	.39*	.19
PCL–R Factor 2			
Combined	.18	.21	.25
Picture	.23	.25	.43**
Sound	.18	.20	.29
PPI-1			
Combined	.50**	.46**	.38*
Picture	.27	.26	.14
Sound	−.07	.01	−.11
PPI-2			
Combined	.02	.06	.18
Picture	−.16	−.16	−.16
Sound	.19	.16	.36
IM-P			
Combined	.35	.36*	.15
Picture	.44**	.47**	.39*
Sound	.57**	.65**	.25

Note. PCL–R values are based on an average across two raters. All thin-slice ratings are averaged across 40 raters. Target participant $N = 96$. For each channel condition, $n = 30$. PCL–R = Psychopathy Checklist—Revised; PPI-1 = Multidimensional Personality Questionnaire–estimated Psychopathic Personality Inventory Factor 1; PPI-2 = Multidimensional Personality Questionnaire–estimated Psychopathic Personality Inventory Factor 2; IM-P = Interpersonal Measure of Psychopathy.
* $p < .05$. ** $p < .01$.

rion measures in the shortest (5-s) time interval. Follow-up analyses revealed no significant differences across time conditions in demographic features or levels of psychopathy in the sample that could account for these effects (e.g., differing levels of psychopathy in different time interval groups). Moreover, of the variables examined in this study, only psychopathy ratings showed this pattern with respect to accuracy: For all other variables, accuracy uniformly improved with time. An intriguing but speculative interpretation of this result is that because superficial charm is a central characteristic of psychopathy, first fleeting impressions may be more accurate in detecting that something is off about a psychopathic individual, because given more time, initial misgivings may be charmed away.

We also examined several thin-slice variables related to superficial charm and their relation to first impressions of psychopathy, namely, good intelligence and attractiveness. We found that thin-slice ratings of intelligence were significantly correlated with Shipley-estimated WAIS scores, particularly in conditions that included sound (i.e., sound only and combined). This result converges with previous findings (e.g., Borkenau et al., 2004) demonstrating that thin-slice ratings of intelligence showed the highest association with criterion measures when targets read aloud, as compared with nonverbal tasks. Our findings revealed that thin-slice IQ ratings were highly and significantly correlated with thin-slice psychopathy ratings but not with psychopathy criterion measures. The significant correlation between thin-slice ratings of intelligence and psychopathy, coupled with the lack of a relation between psychopathy and intelligence criterion measures (which we also assessed), suggests that raters judge those whom they perceive as more psychopathic to be more intelligent than they actually are. Likewise, physical and interpersonal attractiveness thin-slice ratings correlated moderately and significantly with thin-slice psychopathy ratings but not with psychopathy criterion variables. Taken together, these findings point to possible mechanisms by which psychopathic individuals may exploit and manipulate others: At first glance, they exhibit favorable characteristics such as intelligence and attractiveness.

Our findings also demonstrate that initial impressions of psychopathy can be distinguished from those of other PDs. Thin-slice ratings of overall psychopathy showed expected relations with thin-slice ratings of other PDs, correlating moderately to highly with thin-slice Cluster B PD ratings and moderately to highly in a negative direction with Cluster A and Cluster C thin-slice ratings. Multiple regression analyses revealed an incremental contribution of thin-slice psychopathy ratings over and above ratings of borderline and narcissistic PD, but not ratings of ASPD or histrionic PD, in predicting overall PCL–R rated psychopathy. These findings suggest that the animated emotional style associated with histrionic PD and the criminal behavior associated with ASPD may overlap too much with raters' mental representations of the prototypical psychopath to be easily differentiated. Thin-slice ratings of ASPD correlated significantly with criterion measures, particularly in conditions that included sound. This finding suggests that the verbal behavior of individuals provides important information regarding their predisposition to criminality and is striking considering that the stimulus samples were particularly selected to not contain explicit references to criminal or antisocial behaviors. This finding contrasts with the aforementioned results pointing to the greater importance of nonverbal (compared with

verbal) behaviors in detecting features of psychopathy: Although the *DSM–IV* (text revision; American Psychiatric Association, 2000) states that ASPD and psychopathy are synonymous, evidence indicates that they are separable (Hare, 1996a, 1996b; Hare et al., 1991; Lilienfeld, 1994; Patrick, 2007). Considering the relation between affect and nonverbal behaviors, it is logical that nonverbal behaviors would provide better indicators of psychopathy. Further, the observation that these findings differentiated ASPD from psychopathy lends support to the construct validity of psychopathy as separable from ASPD.

As noted previously, increased risk for violence is often associated with psychopathy, as well as with ASPD. Thin-slice violence proneness ratings correlated moderately and significantly with the number of fights as a child and as an adult. This result suggests that first impressions may provide a useful rough estimate of violence proneness. Thin-slice violence proneness scores also correlated significantly with thin-slice overall psychopathy ratings, as well as PCL–R total, PCL–R Factor 2, and PPI-2 scores. These findings point to raters' perception of individuals who are more psychopathic, according to both their own ratings and criterion measures, as more violent. This perception is well-founded, as psychopathic offenders show high rates of past institutional and community violence and an increased risk of future violence, compared with nonpsychopathic offenders (Forth, Hart, & Hare, 1990; Hare & McPherson, 1984; Serin, 1991). Further, the unique variance in Factor 2 thin-slice ratings was linked substantially to ratings of violence proneness. This is consistent with Patrick's (in press) recent suggestion that Factor 2 reflects not only disinhibition (i.e., pure externalizing) but also meanness (i.e., callous antagonism).

Several limitations to this study should be noted. First, the target participants featured across conditions (e.g., time and channel) were not the same. This limits the claim that certain time or channel conditions provided the most information, as the effects observed could be due to systematic group differences across different conditions. This possibility is unlikely, however, as targets were randomly assigned to groups, and analyses revealed no significant differences among time condition groups on any relevant variables. As a second limitation, the stimulus questions were not standardized across participants because of the constraints imposed by using clips from a preexisting archive. Third, the thin-slice clips were taken from full-length interviews that were also used to score one of our criterion measures, the PCL–R. This poses the possibility of criterion contamination. However, our use of multiple criterion measures helps guard against this possibility. Last, the use of a prison sample may have influenced certain ratings, especially those related to attractiveness.

The findings from this study point to several interesting future research directions. One implication is that on average, snap judgments regarding those who are likely to harm, deceive, take advantage of, and manipulate people may be at least somewhat accurate. Perhaps if persons in the community had access to more information regarding the features of psychopathy, they would be able to use these first impressions as preliminary warning signs. As an important caveat, however, there is a potential hazard in overestimating the accuracy of first impressions of psychopathy. As the findings clearly demonstrate, rater accuracy is far from 100%, and, particularly with respect to clinical assessment of psychopathy, a formal assessment approach using well-validated instruments is

required. Our findings in no way suggest that thin-slice ratings should be used as a formal clinical assessment method. One set of considerations that may impact the degree of overall rater accuracy in this and other studies is individual rater accuracy. Future research should examine what, if any, personal characteristics (e.g., gender, personality, education level) or abilities (e.g., nonverbal decoding abilities) are associated with rater accuracy.

Perhaps the most interesting questions for future research concern which cues emitted by target participants exert the greatest influence on raters' judgments. Given that the results of this study point to the importance of nonverbal cues in detecting psychopathic traits, research efforts should examine specific nonverbal behaviors associated with perceptions of psychopathy. Research has demonstrated that psychopaths tend to exhibit certain nonverbal behaviors that differ from the nonverbal behaviors of nonpsychopaths, such as making more eye contact, leaning forward more often, and using more hand gestures (e.g., Rimé, Bouvy, Leborgne, & Rouillon, 1978). Furthermore, psychopaths tend to use more "beats" (defined as hand gestures unrelated to the content of speech) when they gesture (Gillstrom & Hare, 1988). Examining the number and kind of gesticulations featured in the targets' clips could reveal patterns that inform judgments of psychopathy.

Ekman (2003) referred to extremely brief facial expressions (typically lasting under 1/125 of a second) called *microexpressions*, which are thought to reveal concealed emotions. It would be interesting to present the clips used in this study to a group of raters trained in the detection of microexpressions, particularly as much of Ekman's work focuses on deception, a core feature of psychopathy. Perhaps raters would detect microexpressions indicative of deception (on the basis of the appearance, timing, symmetry, and cohesion of facial expressions; Ekman & O'Sullivan, 2006) in targets that were rated more psychopathic according to thin-slice and criterion ratings. According to Cosmides and Tooby's (2004) controversial *social contract theory*, humans possess a specialized neurocognitive system for reasoning about social exchanges, with an evolved subsystem for cheater detection. If people are preferentially well equipped to detect features of deception, detection of the nonverbal signals of these behaviors may be an especially important component of first impressions of psychopathy.

A further possibility is that rather than using more fine-grained (i.e., molecular) perceptions, people use gross (i.e., molar) heuristics based on physical appearance or other broad characteristics when assessing psychopathy in interpersonal situations. Kruger (2006) found that men whose facial images were digitally altered so that the features appeared more stereotypically masculine (e.g., exaggerated brow ridges, strong chin) were judged by raters to be more likely to be aggressive and unfaithful to their mates. Following from this finding, researchers should examine the degree to which the target's possession of more stereotypically masculine facial features influences perceptions of psychopathy, antisociality, and violence proneness. Gangestad, Simpson, DiGeronimo, and Biek (1992) found that men's sociosexuality (i.e., willingness to engage in sexual relations in the absence of a committed relationship) is more accurately judged from thin slices of behavior than are other interpersonal variables such as social closeness, social potency, and stress reaction. An interesting question is whether perceptions of sociosexuality contribute uniquely to rapid judgments of psychopathy.

Finally, a comparison of the predictive validity of raters' strategies used in rating psychopathy from thin slices (e.g., vocabulary, speech, appearance) with other variables potentially associated with rapid perception of psychopathic features would be warranted. Such a comparison would assess the incremental contribution of explicit reasoning over and above implicit reasoning (and vice versa) in forming first impressions of psychopathy. As seen in our exploratory analyses, no self-reported strategy category was positively associated with greater accuracy of thin-slice ratings. Perhaps this negative finding is not surprising, given Nisbett and Wilson's (1977) findings that people often base their stated strategies on implicit causal theories that do not necessarily reflect actual cognitive processes. It could therefore be useful to extend the present research by using functional neuroimaging to examine raters' neural activation while engaged in rapid decision making related to first impressions of psychopathy. Such research would further elucidate the relative involvement of emotion-processing systems and higher order explicit reasoning systems in the rapid assessment of psychopathic features. In sum, the present study has demonstrated that accurate and reliable assessments of psychopathy can be made from thin slices of behavior. An overarching and compelling question remains: How?

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