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Hungry like the wolf: A word-pattern analysis of the language of psychopaths

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Purpose. This study used statistical text analysis to examine the features of crime narratives provided by psychopathic homicide offenders. Psychopathic speech was predicted to reflect an instrumental/predatory world view, unique socioemotional needs, and a poverty of affect.

Methods. Two text analysis tools were used to examine the crime narratives of 14 psychopathic and 38 non-psychopathic homicide offenders. Psychopathy was determined using the Psychopathy Checklist-Revised (PCL-R). The Wmatrix linguistic analysis tool (Rayson, 2008) was used to examine parts of speech and semantic content while the Dictionary of Affect and Language (DAL) tool (Whissell & Dewson, 1986) was used to examine the emotional characteristics of the narratives.

Results. Psychopaths (relative to their counterparts) included more rational cause-and-effect descriptors (e.g., 'because', 'since'), focused on material needs (food, drink, money), and contained fewer references to social needs (family, religion/spirituality). Psychopaths' speech contained a higher frequency of disfluencies ('uh', 'um') indicating that describing such a powerful, 'emotional' event to another person was relatively difficult for them. Finally, psychopaths used more past tense and less present tense verbs in their narrative, indicating a greater psychological detachment from the incident, and their language was less emotionally intense and pleasant.

Conclusions. These language differences, presumably beyond conscious control, support the notion that psychopaths operate on a primitive but rational level.

More than any other aspect of human behaviour, language communicates directly one's thoughts to another person. Words can reveal significant insights about psychological functioning (Gottschalk & Bechtel, 1995; Pennebaker, Mehl, & Niederhoffer, 2003) including depression (Pennebaker & Graybeal, 2001), personality (Oberlander & Gill, 2006), and even whether a person is lying (Hancock, Curry, Goorha, & Woodworth, 2008). A growing set of research suggests that subtle patterns in word choice can

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reveal underlying cognitive and emotional processes, largely because of the automatic and non-conscious operation of language production that is tightly coupled with basic psychological states and dynamics.

A more refined understanding of particular psychological characteristics can potentially be achieved through statistically based text analysis programmes that efficiently analyse a variety of linguistic variables (for reviews see Landauer & Dumais, 1997; Pennebaker *et al.*, 2003). For example, a recent computerized analysis of language produced by psychiatric patients revealed fewer words pertaining to optimism, basic cognitive functions, references to the future, and communication with others compared to a sample of community volunteers (Junghaenel, Smyth, & Santner, 2008). Indeed, psychopathological research suggests that quantitative word counts can be used as a tool in the identification and examination of abnormal psychological processes. Patients diagnosed with major depression, paranoia, and somatization disorder in one study could be classified based on an analysis of their speech more accurately than a clinician's judgement (Oxman, Rosenberg, Schnurr, & Tucker, 1988).

Although such research suggests that psychopathology may be reflected in idiosyncratic linguistic styles, there has been little examination of the speech associated with psychopaths (Hare, 1993), who comprise about 1% of the general population (Hare, 2006) and 15–25% of male offenders in federal correctional settings (e.g., Porter, Birt, & Boer, 2001). Psychopaths have specific combinations of cognitive, social, and emotional characteristics that differentiate them from the general population (Hare, 2003, 2006). They exhibit a wholly selfish orientation and profound emotional deficit, as evidenced from studies of psychophysiology, neurology, and behaviour (see Hare, 2003). In lay terms, psychopaths seem to have little or no 'conscience' (Hare, 2006; Porter & Porter, 2007). The psychopath's diminished capability for moral sensibility appears to have biological underpinnings; neuroimaging research indicates potential structural and functional abnormalities, including grey matter reductions in frontal and temporal areas (Oliveria-Souza *et al.*, 2008), and anomalies in the prefrontal cortex, *corpus callosum*, and hippocampus (e.g., Raine *et al.*, 2004, 2003). Yet, psychopaths exhibit no apparent deficits in intellect (see Patrick, 2006). In fact, psychopaths typically are skilled conversationalists and use language to lie to, charm, and ultimately 'use' others for material gain, drugs, sex, or power. Canadian psychopathic offenders, for example, are two and a half times more likely than their counterparts to be successful in their applications for parole, despite a substantially higher rate of re-offending (Porter, ten Brinke, & Wilson, 2009). Some may even use their penchant for conning others to become cult leaders, corrupt politicians, or successful corporate leaders (Babiak & Hare, 2006).

Despite this apparent interpersonal skill, limited previous studies have revealed that psychopath's language appears to be paradoxically *less* cohesive than non-psychopaths. Cleckley (1976) observed, through case studies, that the discourse of psychopaths was more likely to include a tangential and incoherent quality. Only two (older) empirical studies examined the issue. Williamson (1993) analysed the narratives of psychopaths and non-psychopaths, finding that the former used more contradictory, logically inconsistent statements. Similarly, Brinkley, Newman, Harpur, and Johnson (1999) found that narratives by psychopaths contained fewer cohesive ties and more poorly integrated details. What might the speech of such an emotionally barren, highly manipulative psychopath look like upon closer analysis? The present study is the first to uniquely examine the specific qualities of psychopathic language by using more sophisticated statistical text analysis tools.

Using these tools, we examined the language characteristics of psychopaths (in describing their violent crimes) on three major characteristics: their instrumental nature, unique material and socioemotional needs, and emotional deficit.

First, psychopaths appear to view the world and others instrumentally, as theirs for the taking (Porter & Woodworth, 2007). For example, nearly all (93.3%) of the homicides perpetrated by psychopaths are primarily instrumental (premeditated and motivated by an external goal) compared to 48.4% of those by non-psychopathic offenders (Woodworth & Porter, 2002; also see Flight & Forth, 2007). Mokros *et al.* (2008) demonstrated the selfish, goal-driven, non-cooperative nature of psychopaths in their propensity to exploit others while engaged in a Prisoner's Dilemma scenario. We were interested in testing if their instrumental orientation would be reflected in their speech in the form of more explanatory and causally framed language concerning their criminal actions, with a relatively high level of the usage of subordinating conjunctions (i.e., 'because', 'since', 'as', 'so that'). These words connect a dependent clause with the main clause, and are associated with cause and effect statements.

Secondly, we expected that psychopaths have unique drives and socioemotional needs that would result in particular linguistic patterns. Psychopaths appear to focus on what Maslow (1943) referred to as basic or material needs, reflecting fundamental physiological needs such as food, sex, and shelter, whereas higher level needs such as meaningful relationships, spirituality and self-esteem are likely to be of minimal interest. A defining characteristic of psychopathy is an inflated and immutable sense of self-worth (Hare, 2003), presumably making the need to maintain or increase high self-esteem a low priority. Endres (2004) suggested that psychopaths may be stuck in the lowest stage of ego development. Huprich, Gacono, Schneider, and Bridges (2004) found that psychopaths showed little need for interactions or dependency on others on a Rorschach test, unless they related to narcissistic enhancement or aggression. Given this orientation, we were interested if their narratives about their crimes would contain more (relative to other criminals) semantic references to physiological and material needs such as food, drink, clothing, sex, and resources (money), and fewer semantic categories that reflect higher level needs, such as love, family, and spirituality.

Third, psychopaths exhibit a generalized deficit in their ability to interpret and experience emotion (see Patrick, 2007). This deficit is reflected in their difficulty in identifying emotional faces and identifying subtle emotional expressions (Hastings, Tangney, & Stuewig, 2008; Wilson, Juodis, & Porter, 2011), and problems identifying emotional words and concepts. Hare (2003) speculated that the speech pattern of psychopaths may reveal their difficulty in elaborating on the deeper meaning and context of emotional material (Lorenz & Newman, 2002; Williamson, Harpur, & Hare, 1991). We investigated if this emotional deficit would be reflected in several dimensions of their language. We examined if psychopaths would (1) produce fewer and less intense emotional words; (2) produce more disfluencies (e.g., 'uh', 'um'), which increase when a subject is faced with multiple cognitive choices or demands (e.g., Schachter, Christenfeld, Ravina, & Bilous, 1991); and (3) use language that reflects increased psychological 'distancing' (Cocking & Renninger, 1993) from, and a lack of current personal responsibility for, the crime. Psychological distancing has been associated with a higher rate of past tense and fewer present tense verb forms, and a higher rate of articles, or by extension, concrete nouns (Pennebaker & King, 1999). We expected psychopaths to use language consistent with psychological distancing and describe their murders as taking place further in the past and with more articles than controls.

Method

Participants

The sample was comprised of 52 psychopathic ($n = 14$) and non-psychopathic ($n = 38$) male murderers incarcerated in Canadian correctional facilities who admitted their crime and volunteered for this study. Overall, eight (16%) convictions were for first-degree murder, 32 (64%) of convictions were for second-degree murder, and 10 (20%) were for manslaughter. There were no differences between type of crime (e.g., manslaughter, second-degree murder, first-degree murder) and psychopathy versus control. Their mean age at the time of their current homicide was 28.9 years ($SD = 9.2$; range of 14–50 years). The two groups did not differ on age (psychopaths: $M = 39.71$ years, $SD = 7.53$; controls: $M = 39.91$, $SD = 9.76$, $t(50) = .06$, n.s.) or the amount of time since the homicide was committed (psychopaths: $M = 11.87$ years, $SD = 7.78$; controls: $M = 9.82$, $SD = 6.78$, $t(50) = .93$, n.s.).

Materials

Psychopathy was measured using the Psychopathy Checklist-Revised (PCL-R; Hare, 1991, 2003), the most extensively used approach to the assessment of psychopathy in forensic samples over the past 20 years (Hemphill & Hare, 2004). Psychopathy, as measured by the PCL-R, is characterized by 20 criteria scored from 0 to 2 for a maximum score of 40. The clinical diagnostic cut-off for psychopathy is scores of 30 or above. PCL-R items tap affective/interpersonal traits (Factor 1; facets 1 and 2) and traits representative of an impulsive and antisocial lifestyle (Factor 2; facets 3 and 4). Examples of Factor 1 items include superficial charm, lack of remorse, and pathological lying, while examples of Factor 2 items include criminal versatility, and a parasitic lifestyle. The PCL-R score is highly reliable over time and has a high level of validity, according to several indices (Stone, 1995).

The PCL-R assessments in the current study were completed by extensively trained prison psychologists (39 of the files) and, when not available in the correctional file, a researcher (13 of the files) who was well trained in the coding of the PCL-R. An inter-rater reliability check was conducted on the PCL-R scores by having a trained graduate student re-code 10 randomly selected case files. Results indicated that the total PCL-R scores for Rater 1 and Rater 2 were significantly correlated in a positive direction, $r(10) = .94$, $p < .001$.

Using a cut-off score of 25, which has previously been justified for research purposes (Hare, Clark, Grann, & Thornton, 2000; Jackson, Rogers, Neumann, & Lambert, 2002), 14 offenders were classified as psychopathic and 38 were non-psychopathic. Although there is an ongoing unresolved debate over whether psychopathy represents a distinct taxon or is better conceptualized on a continuum (e.g., Wright, 2009), it is common for the disorder to be considered as a dichotomous variable.

Procedure

Potential participants were asked whether they would be interested in participating in a research study. If they indicated that they were interested, an interview was scheduled. At the beginning of the interview, the purpose of the study (to examine the manner in which homicide offenders recall their homicide offense) and procedure was explained to them verbally. While being audiotaped, participants were asked to describe

their homicide offense in as much detail as possible. In this open-ended interviewing procedure, each participant was encouraged to provide as much information about the crime as possible, from beginning to the end, omitting no details. Participants were prompted to provide as much detail as possible regarding their homicide incident using a standardized procedure known as the Step-Wise Interview (see Yuille, Marxsen, & Cooper, 1999). The interviewers consisted of two senior psychology graduate students and one research assistant, all of whom were blind to the psychopathy scores of the offenders. Interviews lasted approximately for 25 min.

The narratives subsequently were transcribed, with disfluencies such as 'uh' and 'um' included in the transcription as close to verbatim as possible. The transcripts were subsequently checked to ensure that spelling errors were corrected, all interviewer comments were deleted, and proper nouns and abbreviations were spelled out.

Linguistic analysis

Two text analysis tools were used to analyse the transcripts. The first was the corpus analysis program Wmatrix (Rayson, 2003, 2008), which was used to compare parts of speech and to analyse semantic concepts contained in the psychopath and control corpora. Parts of speech (e.g., noun, verb, adjective, etc.) tagging classifies words according to their parts of speech based on the surrounding context (e.g. the 'fly' in 'a house fly' is a noun, while it is a verb in 'birds fly'). Parts of speech tagging in Wmatrix typically achieves 96–97% accuracy (Rayson, 2008). Semantic content analysis groups words together into a multi-tier structure with 21 major discourse fields (e.g., language and communication, social actions, states and processes, time, etc., see Rayson, 2008). This system applies a lexicon of approximately 37,000 words and 16,000 multi-word units (idioms) to classify words according to McArthur's Longman Lexicon of Contemporary English (McArthur, 1985). For example, it classifies both 'cash' and 'dollar' as being in the semantic category 'money'. Wmatrix's semantic analysis tool has a 92% accuracy rate when analysing text in English (Rayson, 2008).

Wmatrix compares statistically significant pairwise differences in word usage between text corpora using log-likelihood ratios (LLR) (Rayson, 2003), an approach that differs in several important ways from more traditional text analysis tools, such as the Linguistic Inquiry and Word Count (LIWC) tool (Pennebaker, Booth, & Francis, 2007), which employs a word-counting approach that matches words to a dictionary. First, because Wmatrix is computationally more advanced than word counting, it can extract language information critical to our analysis that is lost with simple word count (Campbell & Pennebaker, 2003), such as subordinating conjunctions, disambiguating parts of speech, and fine-tuned analysis of the temporal orientation of verbs. As Mehl and Gill (2010) note, word counting neglects grammar and does not distinguish between 'The mother yelled at her child' and 'The child yelled at her mother', a distinction that is critical in the present analysis examining a murderer's explanation of their homicide.

Secondly, the sample of texts produced by the psychopaths in the present study, in which there are relatively few psychopaths but who each produced substantial discourse, is more amenable to a corpus-comparison approach than word counting. While a sample of 14 incarcerated psychopaths is large relative to other psychopathy studies, studies using word counting, a sample of 14 in one condition is small and would be considered underpowered.

The second text analysis tool was the Dictionary of Affect in Language (DAL) software program (Whissell & Dewson, 1986) was used to examine the affective tone of the

words. DAL is a dictionary-based tool that assesses emotional properties of language along the affective dimensions of evaluation (positive vs. negative), activation (low vs. high intensity) and imagery (low vs. high imagery). Unlike Wmatrix, which compares all psychopathic language with all non-psychopathic language, DAL assigns a score for the pleasantness and intensity of emotional language for each participant's statement. Further, unlike other general tools that capture the valence of emotion in text, such as LIWC, the DAL's analysis of emotion also captures intensity, a key dimension of emotionality in language potentially related to psychopathy.

Results

The general analytic approach was a corpus analysis using Wmatrix, in which all of the speech produced by psychopaths (the psychopath corpus) was compared to all of the speech produced by non-psychopaths (the control corpus). In contrast to more typical analytic approaches in social psychology that involve a comparison of means and variances, the comparisons across the psychopath and control corpora reported below involved one degree of freedom *LLR* calculated from contingency tables of the word frequencies in each corpus (see Rayson, 2003). To control for multiple LLR computations, a more conservative $p < .01$ cut-off was used. The exception to this approach was the emotional expression results derived from DAL, which reports scores for each participant and relies on parametric statistics.

The interviews of the psychopaths and controls produced a total 1,27,376 words. The 14 psychopath narratives contained 29,562 words and averaged 2,201.5 ($SE = 408.1$) per participant; the 38 control narratives contained 97,814 words and averaged 2,554.3 ($SE = 367.0$) per participant. There was no significant difference in the average number of words produced by psychopaths and controls, $t(50) = .59$, n.s.

Instrumental language analysis

As predicted, psychopaths produced more subordinating conjunctions (*freq* = 538, 1.82% of words in corpus) than controls (*freq* = 1,509, 1.54%), *LLR* = 10.54, $p < .0001$, suggesting that psychopaths were more likely to describe cause and effect relationships when describing their murder, using words such as *because*, *since*, *as*, and *so that*.

Hierarchy of needs analysis

Relative to control language, psychopath language was expected to reflect more basic needs such as food, sex, and shelter, but fewer higher level social needs such as meaningful relationships and spirituality. As Table 1 indicates, psychopaths used approximately twice as many words related to basic physiological needs, including eating, drinking, and monetary resources when describing their murder than controls (see Table 2, e.g.). In contrast, controls used significantly more language related to social needs, including family, religion, and spirituality. Taken together, the pattern of language regarding both basic and social needs support the hypothesis that psychopaths focus more on physiological needs than higher level needs.[1]

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[1] *To compare with the output that a LIWC-based analysis would provide, we examined the LIWC categories that most closely corresponded with the categories reported in Table 1: Food, Drink, Clothing, and Money (there is no equivalent of 'clothing' in*

Table 1. Semantic content of homicide descriptions, related to Maslow's hierarchy of needs and temporal representations, across psychopathic and non-psychopathic offenders

	Psychopaths		Controls		Log-likelihood
	Frequency	%	Frequency	%	ratio
Physiological and safety needs					
Food	89	.30	117	.12	40.03***
Drink	196	.66	370	.38	37.72***
Clothing	120	.41	266	.27	12.56**
Money	78	.26	160	.16	11.27**
Social needs					
Family	84	.28	555	.57	41.19***
Religion	36	.12	201	.21	9.41**
Temporal construal					
Lexical verbs – past tense (e.g., gave, worked)	1,798	6.08	5,466	5.59	9.57**
Lexical verbs – present tense (e.g., give, work)	727	2.46	2,853	2.92	17.44**
Articles (e.g., a, the)	1,281	4.33	3,877	3.96	7.54**

Note. **$p < .01$; ***$p < .001$.

Table 2. Discourse examples by category from psychopathic offenders

Language category	Language example
Subordinating conjunctives	I said I have to do something *because* there is no way I want to end up losing all my life in prison
Lower level needs	The *money* was excellent and the little girls wanting to hang with me was even better.
	. . . then we left to go get some more, some more *booze* and some more *drugs*.
Callousness and lack of empathy	. . . I just turned around and looked at him and I just stabbed him and I said, 'None of your fucking business'.
Disfluencies	We got *uh*, we got high, and had a few beer, I like whiskey so I bought some whiskey, we had some of that, and then we *uh*, went for a swim.

Emotional expression in language

The degree to which the psychopathic offenders had psychologically distanced themselves (or were simply detached) from the homicide was examined through the use of the past and present form of verbs and the rate of articles (see Table 1). Consistent with our prediction, psychopathic offenders used more past tense forms of lexical verbs (e.g., stabbed) but fewer present tens forms of lexical verbs (e.g., stab) than controls. Further, the psychopaths produced a higher rate of articles than controls, revealing that their language involved more concrete nouns. Taken together, these data suggest that psychopaths linguistically framed their homicide as more in the past and in more

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LIWC). First, we looked at the frequencies for each category. Of the 14 psychopaths, each of them used some language related to 'Eating' (Food and Drink in Wmatrix), with a range of .11–1.6% of their total word count, and all but two psychopaths used words related to 'Money', with a range of 0–1.56% of total word count. Secondly, we calculated standardized tests of skewness for each of these LIWC variables (calculated as Skew/Std. Error of Skew) and found that none were significantly skewed (i.e., <1.96). These parametric data strongly argue against the possibility that just one to two psychopaths contributed disproportionately to the base rates. Indeed, the means from the LIWC analyses are all in the same directions reported in Table 1.

psychologically distant terms than controls despite the fact that there was no difference in time since the homicide across the two groups.

Secondly, as expected, psychopathic language was significantly less fluent (*freq* = 1,112, 3.76%) than controls (*freq* = 2,767, 2.83%) [*LLR* = 61.72, *p* < .0001]; the speech of the psychopaths contained approximately 33% more disfluencies (e.g., 'uh', 'um') than the speech of non-psychopath controls.

Finally, an examination of the DAL scores revealed no significant differences in the emotional content of language between the two groups in terms of pleasantness (psychopaths: *M* = 1.84, *SD* = .01; controls: *M* = 1.84, *SD* = .02) intensity (psychopaths: *M* = 1.66, *SD* = .01; controls: *M* = 1.67, *SD* = .02) or imagery (psychopaths: *M* = 1.54, *SD* = .05; controls: *M* = 1.53, *SD* = .05). However, the distinction between psychopath and non-psychopath groups was based on total PCL-R scores, which includes two factors: Factor 1 scores, which assess interpersonal and affective deficits, and Factor 2 scores, which assess symptoms related to antisocial behaviour. Because DAL assigns scores for each offender's statement, we conducted a second analysis correlating the DAL scores with only the Factor 1 scores, which tap affective deficits. The Factor 1 scores were negatively correlated with the pleasantness (*r* = −.34, *p* < .05) and intensity (*r* = −.33, *p* < .03) dimensions of language, suggesting that higher scores on Factor 1 of the PCL-R were associated with less positively valenced and less emotionally intense language.

Discussion

We presume that psychopaths lack emotion, hold a selfish, instrumental world view, and prey upon and exploit others, using aggression and manipulative conversational skills as weapons. Despite the presumed central role of this 'gift of gab' to the psychopathic personality, this study was the first to investigate the nature of the language of such predators using a statistical corpus analysis. We predicted that they would show unique linguistic patterns relating to their instrumental world view, primitive physiological (vs. higher level) needs, and profound affective deficit, when describing a major autobiographical event – a homicide for which they were responsible. The findings were generally consistent with our predictions; narratives by psychopaths included a higher level of instrumentality and more explanation themes, focused on self-preservation and bodily needs, and were more disfluent, past oriented, and had less emotional intensity relative to non-psychopathic offenders. Importantly, such stylistic differences likely are beyond conscious control and are difficult to alter intentionally in one's speech (Chung & Pennebaker, 2007).

The first finding was that psychopaths were more likely than their counterparts to use explanatory and causally framed language concerning their criminal actions, with a relatively high level of subordinating conjunctions, indicating more cause and effect statements (see Table 2). This pattern suggested that psychopaths were more likely to have viewed the crime as a logical outcome of a plan (something that 'had' to be done to achieve a goal), consistent with previous findings that their violence is indeed more instrumental and goal driven than that of other offenders (e.g., Porter & Woodworth, 2007; Woodworth & Porter, 2002). However, it is noteworthy that the narratives were produced more than a decade after the crime, on average. During this time, most of the offenders (in Canada) would have presumably received treatment for their criminal behaviour and be expected to acknowledge that killing their victim was not warranted or logical, and that their crime was related to their own criminogenic (or psychological)

needs as opposed to any minor external goal achieved by the violence. Even after an average of a decade of incarceration, psychopaths continue to frame their actions as goal oriented.

Secondly, we found that psychopaths used approximately twice as many words related to basic physiological and self-preservation needs, including eating, drinking, and money when describing their violence than their counterparts (see Table 2). On the other hand, the non-psychopathic offenders used more language relating to social needs including family and religion/spirituality. This pattern is consistent with conceptualizations of psychopaths as being focused on a lower level of necessities in Maslow's (1943) hierarchy of needs or in an earlier stage of ego development (Loevinger, 1993). While Maslow's hierarchy has been critiqued in terms of the specific levels of the hierarchy (see Whaba & Bridwell, 1987), the general notion that individuals can focus on lower or higher level needs is non-controversial. In the context of a committed murder, it is likely that the non-psychopaths were aware of and affected by the profound effects their crime would have had on their own families and the victim's family. Further, they may have sought the support of their family and religion in dealing with their actions and perhaps, in rehabilitation efforts. Psychopaths generally lack the capacity for bonds and, presumably, the capacity for religious experience or spiritual enlightenment. As such, they continue to describe the crime in a cool, detached manner and in terms of the basic physiological needs they met at the time. The results, however, may also simply reflect that psychopath's are more likely to remember details peripheral to the murder (such as what they ate that day) than non-psychopaths who are more likely recall more central details of the homicide (e.g., Christianson *et al.*, 1996).

Another important finding concerned the affective content of the narratives, which described an incident that almost anyone would characterize as being powerful and emotional. Specifically, offenders with higher Factor 1 scores (tapping the core affective/interpersonal issues such as lack of empathy) produced less intense emotional terms. We expected that psychopaths would describe the horrific event in a cold, unemotional way that is consistent with existing theoretical and empirical knowledge. For example, Gray *et al.* (2003) tested a group of homicide offenders on a modified Implicit Association Test, and found that the violence was simply less emotionally salient for psychopaths compared to non-psychopaths. Higher Factor 1 scores also correlated with more negatively valenced language. That is, individuals scoring highly on the PCL-R Factor 1 gave less emotionally intense descriptions of the crime and also used less emotionally pleasant language, which effectively demonstrates the darker nature of their personality. Alternatively, the emotional negativity might also simply reflect their general state of mind during their incarceration which (contrary to some non-psychopaths) would be viewed as restricting their ability to fulfill many of their basic and thrill-seeking drives (see Porter, Demetrioff, & ten Brinke, 2010).

The finding that psychopaths framed their murder as taking place further in the past, as indicated by increased past tense but fewer present tense verbs, may be consistent with this idea. Trope and Lieberman's (2003) temporal construal theory proposes that individuals will refer to previous events in a more abstract manner and in the past tense as a function of emotional distance. We think that the psychopaths viewed their crime in a detached way, as representing a problem from their past, with little relevance to their current functioning (other than being practically cumbersome), and with little or no remorse or empathy for the victim or his/her family (see Table 2). Non-psychopaths on the other hand may view and describe the event in the present, as an incident that continues to affect the victim's family and himself in terms of personal growth, remorse,

etc. One alternative to this explanation is that the psychopaths were simply better at following instructions and were more compliant in describing the past event. While this alternative is impossible to rule out, it seems unlikely given that psychopaths are not known for their compliancy (Hare, 1993).

The final major finding was that psychopathic language was substantially more disfluent than that of their counterparts. The specific task of describing a powerful 'emotional' event to another person in a manner that appears appropriate (i.e., impression management) may place increased cognitive load on the psychopath (see Hare, 2003), leading to less fluent and cohesive speech (see also Schneider *et al.*, 2000). In discussing a related finding, Brinkley *et al.* (1999) speculated that psychopaths may become so focused on the task of relaying a specific incident (and engaging in impression management) that they may not attend to particular contextual aspects of their speech production, making the story appear less cohesive (see also Williamson, 1993). Consistent with the current findings, the *particular* contextual information, such as the inordinate amount of references to food relayed by psychopaths, may further serve to make their account appear to be less cohesive and illogical.

Alternatively, several studies suggest the possibility that disfluency is a more generalized feature of psychopathic speech. Paulhus and Williams (2002) found that the constructs of psychopathy and machiavellianism were associated with more overt verbal difficulties when compared to the other key construct comprising their Dark Triad of personality deficits, narcissism. More recently, Gawda (2010) observed increased syntactic repetitions and negations relating to hypomania, or the impulsive and difficulty in delaying gratification associated with psychopathy. When combined with the present results, these consistent findings suggest that disfluency may be an important feature of psychopathic speech. Future research should more fully address the issue of whether their disfluent speech is specific to particular types of narratives or a more generalized feature of psychopathy.

There are some limitations that should be kept in mind in interpreting our results. First, our statistical text analysis was conducted on narratives concerning one type of event – a homicide, obviously an unusual type of event in terms of base rate and emotional content. Indeed, some of our results reflect the fact that psychopath's are more likely to commit instrumental murders and would understandably be more inclined to describe them in a consistent manner. Future research should examine the characteristics of psychopaths' speech production in describing various emotional and non-emotional events. Secondly, the offenders were asked to describe an event for which a videotape (or another source of reliable ground truth) was not available. It is certainly possible, likely even, that some psychopaths were not honest about the actual details of the event, even in the context of an anonymous research interview (see Porter & Woodworth, 2007). Although this was not a major issue in terms of objective speech production given that most aspects of linguistic production considered here were 'automatic' and difficult to control voluntarily (see Pennebaker *et al.*, 2003), future research should examine other types of emotional stimuli in which the ground truth of the 'event' is known. For example, a sample of psychopaths and non-psychopaths could view two standardized short video clips (of both high and low emotional intensity) and then be required to describe what they have observed.

In summary, our analysis of the language of psychopaths suggests that they describe powerful emotional events (their crimes) in an idiosyncratic manner. Relative to those of other individuals, their narratives contain more cause and effect statements, more references to primitive physiological needs, are less emotional and less positive, show

an emotional detachment in terms of a higher use of the past tense, and reveal high rates of disfluencies indicating that the task is cognitively challenging. Overall, these findings on speech begin to open the window into the mind of the psychopath, allowing us to infer that the psychopath's world view is fundamentally different from the rest of the human species. Such stylistic differences, likely beyond conscious control, support views that psychopaths operate on a primitive but rational level.

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