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## Cohesion in texts produced by psychopathic and nonpsychopathic criminal inmates

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### Abstract

Although there has been much speculation about psychopaths' distinctive use of speech, to date there have been no published data documenting that psychopaths communicate any differently than others. This study examined the clinical observation that psychopathic speech is poorly integrated compared to that of controls. 39 inmates from a Wisconsin state penitentiary were asked to produce two stories. Cohesion analysis was used to measure how well integrated the narratives were. As predicted by Williamson [Williamson, S. E. (1991). *Cohesion and coherence in the speech of psychopathic criminals*. Unpublished Ph.D. Thesis, University of British Columbia.], psychopathy was associated with a tendency to use fewer cohesive ties per clause. Contrary to the Williamson (1991) predictions, however, psychopaths did not use more incompetent references than controls. Despite its limitations, this study provides a foundation for future work elucidating psychopathic speech. © 1999 Elsevier Science Ltd. All rights reserved.

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### 1. Introduction

Psychopathy is a personality disorder characterized by social and personal dysfunction over the span of a person's lifetime (Millon, 1981). Symptoms include behavioral and affective components which manifest themselves in childhood and can be assessed reliably by the time a participant reaches adolescence (Forth, Hart, & Hare, 1990). Prototypic psychopaths commonly display behaviors which are egocentric, deceitful, manipulative and callous. Their affect is typically blunted and psychopaths show an inability to form long term relationships or

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make lasting commitments (Cleckley, 1976). They are, as a group, impulsive. Although criminal activity is not a necessary feature of the disorder, psychopaths often do commit numerous violent and nonviolent crimes (Williamson, Hare, & Wong, 1987; Serin, 1991) just as they show a tendency towards excessive substance abuse (Hare, McPherson, & Forth, 1988; Hart & Hare, 1989; Smith & Newman, 1990).

Psychopaths are traditionally thought of as being fluent, expressive and glib individuals. Indeed, glib and superficial charm is one of the 20 items on Hare's Psychopathy Checklist-Revised (PCL-R; Hare, 1991). Psychopaths' affinity for language and their ability to use it to obscure insincere and callous motives has often been discussed in the literature (Gillstrom & Hare, 1988). Clinical observers cite numerous instances in which hapless victims are engaged in artful deceptions carried out with surprising ease.

Cleckley (1976), for example, noticed that the psychopaths he detailed in *The Mask of Sanity* were likely to use jargon and/or change trains of thought, thus leaving their audiences confused. Eichler (1965) evaluated the discourse of males classified as sociopathic by the Diagnostic and Statistical Manual (APA, 1952) (a group that, today, would most likely be classified as psychopathic). He discovered that, compared to normal adult males, they used more negations, retractions and qualifiers. These clinical observations suggest that psychopaths break no obvious grammatical rules, but that they are difficult to understand because of the ambiguity of their statements and the poor integration of their texts.

One possible explanation for this phenomenon is that psychopaths are among the most resourceful and effective of speakers (Cleckley, 1976), making skillful use of tactics commonly associated with advertising and political speeches to confuse and deceive their audiences. An alternate possibility, suggested by Gillstrom and Hare (1988), is that psychopaths may have difficulty constructing integrated speech because they suffer from some kind of cognitive deficiency which prevents them from readily relating spoken words to underlying concepts. Each of these explanations has important and different implications for our understanding of psychopaths. The first might indicate that psychopaths consciously choose to be the way they are while the second could support the idea that they have a cognitive deficit.

Obviously it is important to our understanding of psychopathy to determine which of these interpretations has more merit. One way to tease these possible explanations apart is to construct experimental paradigms in which psychopaths have no motivation to obscure their speech. An alternative is to put them in a situation wherein performing well on a language task is in their best interests. If the psychopath does poorly on these kinds of tasks, then it would imply that the observed linguistic differences are not purely motivational.

A number of experiments involving psychopathic language perception have been published by Hare and colleagues (Hare, Williamson, & Harpur, 1988). Unlike interview situations, these tasks provide the psychopath with no rewards for attempting to deceive or confuse the investigator (such as a better parole decision). In fact, psychopaths were paid relatively well (typically US\$10 per task) for accurate performance on the task. Despite these incentives, these experiments consistently indicate that psychopaths are unusual in their language processing.

Hare and Jutai (1988), for example, reported that psychopaths do not demonstrate the right visual field advantage displayed by controls when processing abstract linguistic stimuli. Hare and McPherson (1984) demonstrated that psychopaths also show less right ear advantage on a dichotic listening task. These results suggest psychopaths may have difficulty processing

language using left hemisphere resources, the part of the brain normally allocated to such tasks.

Other research has suggested that psychopaths have difficulties processing language with emotional content. Williamson, Harpur, and Hare (1991) found that, when asked to distinguish between words and nonwords, psychopaths did not show the same facilitated response times or increased event-related brain potential that controls did when presented with emotional as opposed to neutral stimuli. In a complimentary experiment, Intrator and her colleagues reported that psychopaths differed from controls in their patterns of relative cerebral blood flow while they were processing emotional words in a semantic priming task (Intrator, Hare, Strizke, & Brichtswein, 1997). A second experiment conducted by Williamson, Harpur, and Hare (1990) found that psychopaths were less likely to categorize words by emotional polarity than were nonpsychopaths. Finally, Williamson et al. (1990) found that psychopaths were more likely than other inmates to make mistakes when trying to match clauses on the basis of affective content. These results provide support for the idea that psychopaths have difficulties making use of the underlying emotional content of words, even when doing so impairs the psychopaths' performance on a task. It thus seems that psychopaths' deviant language perception can not be satisfactorily explained by a motivational hypothesis.

Though the data cited above provide evidence that psychopaths have difficulties with *language perception* which seem to be independent of motivation, to date there have been no published studies of *language production*. This is problematic given that psychopaths' unusual discourse was what originally drew researchers to study their language capabilities. Is there experimental evidence which suggests psychopathic language production is unusual? If there is, does this evidence fit better with a motivational model or a cognitive deficit model?

What little we currently know of psychopathic speech comes from an unpublished study by Williamson (1991). Williamson (1991) recorded pairs of stories told by prison inmates. Based on the Cleckley (1976) observations, Williamson (1991) predicted that psychopaths' speech would be poorly integrated and she hypothesized that this deficit would be measurable using a technique called cohesion analysis.

Cohesion is defined as "the semantic relations within a text which make it a unit" (Halliday & Hasan, 1976; Rochester & Martin, 1979). Cohesion analysis, then, is a method for systematically measuring how well someone connects the individual elements of a text to one another in order to make it an integrated, coherent, whole. Take, for example, the following two independent clauses:

The *small boy* entered the house.

*He* was carrying his book bag.

In the second clause, "he" refers back to "the small boy" described in the first clause. A cohesive link is formed between the two units and these two independent clauses become a single, unified text which can be understood. If only the second of these items were present, the text would fail to be cohesive since understanding the meaning of "he" in the second clause requires knowledge of "the small boy" from the first clause. When a participant provides a reference which does not have a referent, an incomplete cohesive tie is formed (referred to as an incompetent reference) and the text becomes disjointed and difficult for a listener to follow.

The Williamson (1991) specific predictions regarding psychopaths' use of cohesion were twofold. First, she hypothesized that, relative to controls, psychopaths would use fewer cohesive ties to make their texts unified. Second, she predicted psychopaths would make more incompetent references than would controls. Williamson (1991) made these predictions despite the fact that psychopaths were paid to perform this task (US\$7) and had nothing obvious to gain by confusing their audiences.

Williamson (1991) found mixed support for her predictions. Psychopaths' speech was significantly less cohesive than controls in one of two stories. Moreover, there was a trend for psychopaths to use fewer cohesive ties in the second story. Similarly, psychopaths used more unclear references, but only in the story in which they did not use fewer cohesive ties.

These results provide potentially important evidence for a language production deficit in psychopaths, but the mixed results make it unclear how to interpret the data. One explanation for these relatively weak findings is that Williamson did not include some measure of anxiety as a factor when analyzing her results. Newman and colleagues (e.g. Newman, Patterson, Howland, & Nichols, 1990; Smith, Arnett, & Newman, 1992; Arnett, Smith, & Newman, in press) have found that anxiety, as measured by the Welsh Anxiety Scale (WAS; Welsh, 1956), can moderate the effects of psychopathy on a variety of performance measures. Therefore, it is possible that some of Williamson's results did not reach significance because there was an anxiety effect she did not account for in her study.

Another possible explanation pertains to the Williamson (1991) control group. Williamson's control group included all participants with PCL-R scores of less than 30. Hare (1996), however, reports that some researchers have found scores as low as 25 to be good cutoffs for psychopathy. As a result, it has become common for researchers to select as controls only those individuals with particularly low PCL-R scores. Although the criteria for inclusion in control groups has varied, most studies have used cut off scores on the PCL-R which are below the reported means of 22 to 24 (Hare, 1991, 1996) for their control groups. If there were participants with psychopathic features in the Williamson (1991) control group, they may have reduced the chances of detecting potentially significant effects.

The current study seeks to clarify and extend the Williamson (1991) research by (1) controlling for level of anxiety and (2) including in the control group only those participants with low scores on the PCL-R. Following Williamson (1991), we predicted that low-anxious psychopaths would (1) use fewer cohesive ties than their low-anxious nonpsychopathic counterparts and (2) make more incompetent references than low-anxious controls. Like Williamson (1991), we made these predictions in spite of the fact that participants were paid for performing the task and provided with no obvious reason to confuse their audience.

## **2. Methods**

### *2.1. Participants*

The participants for this experiment were 39 Caucasian male inmates from a minimum security prison located in Wisconsin. Despite preliminary evidence for the reliability and validity of the PCL-R when used with African American offenders, recent work has suggested

that differences in the observed performance of Caucasian psychopaths and controls on laboratory tasks often do not extend to African American groups (Kosson, Smith, & Newman, 1990; Thornquist & Zuckerman, 1995; Newman, Schmitt, & Voss, 1997). Given the exploratory nature of this research, we felt it was appropriate to focus on Caucasian inmates for this preliminary investigation.

The participants were classified as psychopathic or nonpsychopathic using the Psychopathy Checklist, Revised (PCL-R). This 20 item scale has been shown to provide both valid and reliable assessments of psychopathy (Hare, 1991). Using institutional data and information collected in an extensive personal interview, raters assessed each participant's behaviors and personality in order to determine a score for each item on the PCL-R. Scores range from zero to two, zero indicating the absence and two indicating the presence of the characteristic. A global measure of psychopathy is provided by the summed score which ranges between zero and 40.

In the current experiment, interviews and ratings were carried out by research assistants, other than the experimenters, trained in the use of the PCL-R. Although reliability checks were available for only eight of the relevant PCL-R ratings, interrater reliability was found to be 0.84 for the sample. This number is roughly comparable to previous reliability ratings reported by investigators using the PCL-R (Smith & Newman, 1990; Hare, 1991).

For the purposes of this experiment, participants were considered psychopathic only if their PCL-R score was 30 or greater and nonpsychopathic only if they had a PCL-R score of 22 or less. Previous research has demonstrated that such cut off scores yield meaningful group differences in laboratory performance tasks and on measures of social behavior (Hare, 1980, 1991; Smith & Newman, 1990; Newman et al., 1997). Thus, individuals with PCL-R scores between 23 and 29 were excluded from the present study and the 39 selected participants represent all Caucasians from a larger sample who could be classified as either psychopaths or controls.

Participants also completed the Welsh Anxiety Scale (WAS; Welsh, 1956). The WAS is a 39-item questionnaire widely used as a measure of an individual's disposition to experience negative affect and anxiety. Participants scoring 12 or higher on the WAS were considered prone to high anxiety and those scoring less than 12 were considered prone to low anxiety. Dividing the sample based on PCL-R and WAS scores resulted in a total of 9 low-WAS controls, 10 low-WAS psychopaths, 12 high-WAS controls and 8 high-WAS psychopaths.

Finally, we administered the Shipley Institute of Living Scale (SILS; Zachary, 1986), a brief measure of general intellectual functioning consisting of a 40-item vocabulary test and a 20-item abstraction test. This test has demonstrated good psychometric properties and the revised scoring procedures make it possible to obtain reliable estimates of Wechsler Adult Intelligence Scale, Revised (WAIS-R) scores (Zachary, 1986). The SILS was included to examine the possibility that any observed group differences in verbal performance might be due to group differences in general intelligence.

## 2.2. Procedure

Approximately 1 week following the original PCL-R interview, participants were asked to produce two narratives based on personal experience. The first story was about a time when

they were angry and the second about a time when they were afraid<sup>1</sup>. The task required participants to recall some event in their past and relate that event to the interviewer. The directives for these stories were as follows:

I want you to tell me a story about a time when you were (angry/afraid). Like most stories, it should have a beginning, a middle and an end. Tell the story as if you were there. Describe what happened and what you did. I'll give you a few minutes to think about it. When you're ready, I want you to tell me what happened just like it was a story. You should speak for a few minutes. Are there any questions?

The interviewer answered any questions the participant had concerning the instructions and then requested that he should not ask questions of the interviewer during the story. After all questions had been answered, the interviewer repeated the instructions again and asked the participant to begin. If the participant asked questions of the interviewer during the stories, the interviewer responded only with "mmm", encouraging the participant to continue. Upon completion of the anger narrative, these instructions were repeated and the participants told the fear story. All narratives were tape recorded. Participants were paid US\$5 if they produced two stories of minimally useful length.

### 2.3. Cohesion and reference ratings

Undergraduate laboratory assistants transcribed both stories elicited from the participants. These speech samples were divided into independent clauses using the method of Rochester and Martin (1979). Their definition of an independent clause is any unit which is capable of standing on its own as a grammatical structure. Sentence modifiers, relative and adverbial clauses and all compliments were considered to be a part of this basic unit. Once divided, counts were taken of the number of independent clauses and words used.

Cohesion was rated using the method described by Halliday and Hasan (1976) in their book *Cohesion in English*. It should be noted that Brown and Yule (1983) have criticized cohesion analysis. They point out that, based on the Halliday and Hasan (1976) definition of cohesion, it is possible to create a text which has numerous cohesive ties but which makes no sense. Thus cohesion can not be considered a comprehensive explanation of the elements which makes a discourse sensible.

Although this is a valid criticism of cohesion analysis, we elected to use this particular coding system for a number of reasons. First, cohesion analysis is specifically designed to address how well integrated narratives are. Given that this is one of the hypothesized difficulties with psychopathic speech, cohesion analysis seems to be a particularly appropriate form of measurement to use. Second, it is a relatively simple coding system which raters can be taught to use reliably and which also provides a quantifiable estimate of how well integrated a

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<sup>1</sup> We would like to have counterbalanced the stories in this experiment. Unfortunately, our data was collected as part of a larger study and we did not have complete control over the experimental design.

text is. Third, this method has already been used successfully to evaluate the speech of a number of pathological populations (Chaika, 1974; Durbin & Martin, 1977; Cohen, 1978; Grossman & Harrow, 1984; Oltmans, Murphy, Berenbaum, & Dunlop, 1985; Mentis & Prutting, 1987; Norris & Bruning, 1988; Ripich & Terrell, 1988). Finally, cohesion analysis was the coding system used by Williamson (1991) and the present study was an attempt to replicate her work.

In addition to the guidelines provided by Halliday and Hasan (1976), a condensed unpublished manual written for a similar set of experiments (Harvey, 1983; Williamson, 1991) was used to clarify certain issues. Hanging clauses were not scored for cohesion or included in the word count unless they contained information necessary to the understanding of later utterances. Repetitions of words or phrases were only scored and counted once (using the later instance of the repetition).

Halliday and Hasan (1976) discuss a number of different cohesive ties. Following Williamson (1991), however, only the three most common forms of cohesive links (referential, conjunctive, and lexical) and incompetent references were coded in this study. A brief description of each of these types of links follows. Full definitions of these cohesive links may be found in Halliday and Hasan (1976).

*Reference* links occur when knowledge of a referent from a previous clause is necessary to interpret a reference within a current clause. Comparatives, demonstratives and pronominals are all examples of referential links. (Example: *Mindy* went to the store. *She* came home with the groceries.) *Conjunctive* cohesion is used to create logical relations between clauses. Texts may be related through additive, adversative, causal, temporal and continuative links. (Example: Jack fell down *and* he broke his crown). *Lexical* cohesion, perhaps the simplest of the three, merely involves the repetition of one element of text. The repetition need not be exact but could take the form of a synonym, hyponym or word formed from the same root. Words which are used as general items, like “thing”, may also count as lexical ties between portions of texts. (Example: I need some *groceries*. Why don’t you go to the *grocery* store.) Incompetent references were defined as any instance in which a speaker generated a reference for which no clear or appropriate referent had been provided. (Example: Jack and Jim went up the hill. *He* had a pail of water.) All three types of cohesion were counted, scored separately and summed to create a total cohesion score for each story told by each participant. Following Williamson (1991), incompetent references were tallied separately.

Interrater reliability for coding cohesion was computed using the Pearson product moment correlation for a subset of 18 stories from the sample. The obtained correlations were 0.94 for division of clauses, 0.99 for number of words, 0.80 for lexical cohesion, 0.81 for referential cohesion, 0.90 for conjunctions and 0.75 for incompetent references. With the exception of incompetent references, these reliability estimates compare favorably with previous estimates from the work of Rochester and Martin (1979), Harvey (1983) and Williamson (1991). Although the reliability of 0.75 for incompetent references is above the minimal standard of 0.70, it is still substantially lower than the 0.91 correlation obtained by Williamson (1991).

### 3. Results

#### 3.1. Preliminary analyses

To determine whether the stories elicited for this study were of similar duration, the total number of words and independent clauses were calculated. We then analyzed these data using a mixed-model analysis of variance (ANOVA) with psychopathy and WAS anxiety as the between-participants variables and story as the within-participants variable. These analyses revealed no significant effects for story type, indicating that the anger and fear stories were of comparable length. Neither the main effect for group nor the group by story interaction approached significance. Preliminary analyses were also conducted to test for possible group differences in intelligence (i.e. the SILS). An ANOVA using psychopathy and WAS anxiety as the between participants variables verified that there were no significant main effects or interactions involving intelligence.

#### 3.2. Cohesion analysis

A mixed model ANCOVA with stories as the repeated variable was conducted to look at possible differences between psychopaths' and nonpsychopaths' use of cohesion as measured by the summed cohesion index. Because cohesive links can only be made between clauses, the number of clauses one generates is related to the opportunity one has to make cohesive links. Thus, number of clauses was used as a covariate in all of the analyses reported below. Before completing these analyses, however, we first verified the ANCOVA assumption that the relationship between the number of clauses and cohesion did not differ by group using a regression analysis.

ANCOVA revealed three significant main effects. First, psychopaths used significantly fewer cohesive links than the controls did [ $F(1, 34) = 4.05, p = 0.05$ ]. In addition, high-WAS participants produced fewer cohesive links than low-WAS participants [ $F(1, 34) = 4.96, p < 0.05$ ]. Finally, all participants used more cohesive links in the second story than in the first story [ $F(1, 34) = 6.16, p < 0.05$ ]. None of the interactions approached significance. A separate ANCOVA, conducted to examine incompetent references, revealed no significant main effects or interactions. Means, standard deviations and the  $F$ -values for group differences and story differences can be found in Table 1.

Based on the *a priori* hypotheses, two planned comparisons were conducted to examine group differences between low-WAS psychopaths and controls on measures of total cohesion and incompetent references. Contrary to prediction, the planned comparisons revealed no significant differences for either total cohesion [ $t(17) < 1$ ] or incompetent references [ $t(17) < 1$ ]. Although we made no predictions about the high-WAS groups, we performed two *post-hoc* comparisons for the sake of completeness. High WAS-psychopaths and controls did not differ significantly in their use of either total cohesion or unclear references.

It would have been interesting to conduct follow up regression analyses to determine if use of cohesion is more strongly related to one of the two factors of the PCL-R (personality or antisocial action; Harpur, Hare, & Hakistan, 1989). Unfortunately, we could not conduct such analyses. Because transcribing stories and coding for cohesive ties is a time consuming process,

Table 1  
Covariate adjusted means and standard deviations of the dependent variables for the anger and fear stories for psychopathic and nonpsychopathic individuals

Variable	Low-WAS nonpsychopathic individuals ( <i>n</i> = 9)		Low-WAS psychopathic individuals ( <i>n</i> = 10)		High-WAS nonpsychopathic individuals ( <i>n</i> = 12)		High-WAS psychopathic individuals ( <i>n</i> = 8)		<i>F</i> -Scores (df = 1, 34)		
	<i>M</i>	S.D.	<i>M</i>	S.D.	<i>M</i>	S.D.	<i>M</i>	S.D.	P	A	story
Total cohesion											
Story 1	70.52	22.95	69.79	33.39	67.94	18.43	54.47	30.58	4.05*	4.96**	6.16**
Story 2	81.73	27.99	73.44	37.02	70.73	24.25	64.72	32.69			
Mean incompetent references											
Story 1	3.38	2.51	4.47	2.27	3.73	1.89	2.87	2.83	0.09	0.69	0.41
Story 2	4.42	1.12	2.63	1.00	2.83	0.83	2.37	1.25			
Total number of words											
Story 1	253.11	105.29	297.5	121.36	227.92	89.35	217.75	69.17	0.91	2.46	0.96
Story 2	244.33	118.68	322.0	139.42	226.92	107.62	239.5	104.54			
Total number of clauses											
Story 1	30.67	11.65	39.18	16.56	30.08	11.65	33.38	10.84	2.58	0.52	0.10
Story 2	28.11	12.76	40.64	19.30	28.75	16.63	33.38	19.63			

There were no significant interactions. WAS = Welsh Anxiety Scale; P = psychopathy effect; A = Welsh Anxiety Effect. \**P* = 0.05. \*\**p* < 0.05.

cohesion data was not collected for individuals with PCL-R scores between 23 and 29. Thus we did not have the necessary data to run the aforementioned regressions.

#### **4. Discussion**

The results of this study provide mixed support for the hypothesis that psychopaths' speech is more poorly integrated than that of controls. Psychopaths did not differ from controls in the number of incompetent references made. Psychopaths did, however, use fewer cohesive ties than controls relative to the amount of speech they produced. Thus, psychopaths made fewer attempts to make their discourse a unified whole but when they did, they did so competently.

One goal of this study was to replicate the Williamson (1991) findings with a better control group and, in some respects, it does so. Like Williamson, we found evidence that psychopaths used fewer cohesive ties per clause than controls. Williamson's results differ from the current findings in that she found this to be true in only one narrative. She did, however, find a statistical trend suggesting that psychopaths used fewer cohesive ties in the second story as well. What Williamson detected as a trend might have become a significant result in the current study due to the use of a more homogenous control group.

On the other hand, this study failed to replicate the Williamson (1991) findings concerning psychopaths' use of incompetent references. Williamson found some evidence that psychopaths made more incompetent references in one of her two story conditions whereas the present study found no group differences in either condition. While this discrepancy is problematic, it might be explained by differences in the lengths of stories from the two studies. When compared to the narratives generated by the Williamson (1991) participants, those produced in the current experiment were shorter. Participants in Williamson's study used more words, more clauses, more cohesive ties and more incompetent references. The discrepancy in story richness and length may explain why the present work failed to replicate Williamson's results. Longer texts provide more opportunity for speakers to make mistakes. Thus, our failure to replicate this aspect of the Williamson study may relate to the limited opportunity to produce incompetent references.

Alternatively, we must concede that the small sample sizes of our own study limits the power of the current analyses. As such, our results may be inconsistent, not due to real differences in the results of studies, but rather due to an inability to detect significant differences. It is noteworthy, however, that despite this low power, one of the two hypotheses investigated in this study was supported by the overall ANCOVA results. Further, the present findings are at least partially consistent with results reported by Williamson (1991). This implies a potentially powerful effect which can be detected despite a small sample size.

One way in which the present study sought to expand on Williamson's work was by including WAS anxiety as a factor in the analyses. Although the difference between psychopaths and controls was not specific to low-WAS participants as predicted, it is clear from the results that WAS anxiety is an important variable to consider when examining language production. High-WAS participants used fewer cohesive ties per clause than did low-WAS participants. It appears that participants disposed towards high levels of anxiety have

more difficulty integrating their texts than those individuals disposed towards low levels of anxiety.

A possible explanation for this may relate to the emotional nature of the evoked stories. Individuals more prone to experience negative affect may have become more aroused by the emotional content of the stories (fear and anger). This arousal may, in turn, have been detrimental to their performance. Unfortunately, there is no way to evaluate this hypothesis with the current data set as we did not administer a measure of state anxiety to the participants during the task.

Even though WAS anxiety did not interact with psychopathy, failure to consider proneness to negative affect could still be problematic. If WAS anxiety were distributed differently in the psychopathic and nonpsychopathic groups, then the variance it accounts for would affect those two groups differently. Thus, variance from WAS anxiety could artificially enhance or diminish the main effect for psychopathy if it is not included as a factor (see Newman & Brinkley, 1997).

Based on previous research (Smith et al., 1992; Newman et al., 1997; Arnett et al., in press), it was anticipated that group differences would be specific to the low-WAS groups. Contrary to prediction, however, the planned comparisons involving these groups revealed no significant differences. Although the reason for this discrepancy is not immediately clear, Newman, Wallace, Schmitt, and Arnett (in press) have suggested a potential explanation. They believe that WAS anxiety may moderate behavior only in paradigms in which successful performance requires the suspension of a dominant response set. If this is the case, then the previously reported interaction between psychopathy and WAS anxiety may be either less apparent or nonexistent in tasks like the current one. Further research is needed to clarify the precise relationship between psychopathy and anxiety.

One intriguing result was the significant difference between the two story conditions. The present study has demonstrated that all participants used significantly less cohesion in the anger condition than in the fear condition. While it is unclear precisely why the two story conditions differed, one likely explanation is that participants always told the anger story first. Thus, the greater cohesion of the fear story may reflect a practice effect. Due to the lack of counterbalancing, however, it is not possible to distinguish the impact of practice from emotional state or story condition. This limitation is especially unfortunate given that many authors believe that emotion plays a key role in the linguistic deficits demonstrated by psychopaths (Williamson et al., 1990, 1991). Future studies should not only counterbalance emotional conditions, but also include a neutral emotional condition as a baseline measure so that the impact of emotion on linguistic processing in psychopaths can be assessed.

The present study was constructed such that participants would be motivated to do well (due to monetary incentives) and not be motivated to confuse their audience (because they had nothing obvious to gain by doing so). Given the results of previous experimental work, it is likely that the monetary reward was sufficient to motivate the psychopaths to do well (Hare, 1996). Without a manipulation check, however, we can not verify that the psychopaths were not motivated to confuse their audience. So although the observed linguistic differences between groups do not seem to be due to motivation, the current data do not rule out a motivational hypothesis.

Given that the present findings do seem consistent with the literature on psychopathic language perception, however, it appears unlikely that a motivational explanation for psychopathic language processing deficits will prove a convincing one. As a result, future investigations should systematically evaluate other explanations for poor psychopathic language use. Newman (1998), for example, has proposed that psychopaths have difficulty making use of contextual cues while engaged in goal directed behavior. If this is the case, then we might not expect psychopaths to make use of the emotional valence of a word (a contextual cue) while engaged in the goal directed task of trying to determine whether or not a letter string is a word (cf. Williamson et al., 1991). Similarly, a psychopath focused on the goal of relating a specific incident to someone may not attend to the contextual aspects of their speech which might make their story more cohesive. Cognitive theories such as that of Newman (1998) should be systematically compared with motivational hypotheses in future work.

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