Journal of Abnormal Psychology
2013, Vol. 122, No. 4, 1088–1093

0021-843X/13/$12.00 DOI: 10.1037/a0034062

BRIEF REPORT

Revisiting Psychopathy in Women: Cleckley/Hare Conceptions and Affective Response

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Despite increased interest in female psychopathy, more work is needed to establish commonalities between the nomological networks for psychopathy in men and women. The current study sought to advance understanding of affective deficits in female psychopathy, as assessed by the Psychopathy Checklist-Revised (PCL-R). Forty-eight female inmates were tested in an affect-startle paradigm involving passive viewing of emotional and neutral picture stimuli. Results showed that women scoring high on PCL-R psychopathy exhibited deficits in startle reactivity to unpleasant pictures, especially with regard to victim-distress scenes, highlighting a specific insensitivity to the vicarious distress of others. The deficient affective modulation was specific to interpersonal-affective features and not adult/child antisocial features. These data confirm deficits in affective responding among women high on psychopathy, with implications for fear- versus empathy-related conceptualizations of psychopathic women.

Keywords: psychopathy, women, startle, affective deficits, empathy

Psychopathy entails a constellation of clinical features, including deficient emotional responding, superficial interpersonal relationships, and impulsive (often criminal) behavior (Hare, 2003), criteria largely based on Hervey Cleckley's influential monograph (Cleckley, 1976). Historically, empirical research on psychopathy has focused almost exclusively on incarcerated men (Hare, 2003). In recent years, there has been a growing interest in the manifestation of psychopathy in other groups, including women (e.g., Sprague, Javdani, Sadeh, Newman, & Verona, 2012), although critical theoretical questions remain. The few descriptions of female psychopaths in Cleckley's *Mask of Sanity* emphasized their shallow expressions of nurturance (e.g., Roberta), highlighting violations of female socialization in female psychopathy (see Verona & Vitale, 2006).

In that regard, there is a dearth of experimental research systematically assessing the nature of affective deficits associated with psychopathic traits in women. For example, it is relatively unknown whether one of the putative biological hallmarks of the disorder (e.g., weak defensive response) is manifested similarly in men and women (see Forouzan & Cooke, 2005). As a way of expanding the literature on female psychopathy, the present study undertook an examination of affective/empathic deficits among women assessed using the most validated psychopathy measure available, the Psychopathy Checklist-Revised (PCL-R; Hare, 2003).

Female Psychopathy and Defensive (Fear) Reactivity

Research on female psychopathy has demonstrated substantial similarity in the factor structure and item functioning of psychopathy measures, particularly the PCL-R, in women and men (e.g., Salekin, Rogers, & Sewell, 1997). However, the correlates of psychopathy in women do not always parallel those found in men. For example, work in the assessment literature indicates poorer performance of PCL-based assessments in predicting dangerousness and recidivism in female offenders of different ages (Edens, Campbell, & Weir, 2007), and internalizing symptoms as well as Borderline Personality Disorder (BPD) are more strongly related to psychopathy in women than men (e.g., Sprague et al., 2012). For this reason, the clinical meaning of high PCL-R scores among women remains a relatively unexplored topic, especially with regard to how indicative they are of affective deficits and physiological responding (with a few exceptions, as noted below).

Cleckley (1976) proposed that impairments in emotional sensitivity and responding were central to psychopathy. Consistent with this conceptualization, multiple studies have reported that males high in psychopathy, in contrast with low psychopathic controls, fail to show enhancement (and at times inhibition) of the blink-startle response while viewing unpleasant relative to neutral pictures (Levenston, Patrick, Bradley, & Lang, 2000; Patrick, Brad-

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We are grateful to the residents and staff of FCI-Tallahassee, and in particular Chief Psychologist Allen Hanley, for their support of this work. We also thank Elizabeth Sullivan and David O'Connor for their contributions to the diagnostic assessment component of the project. Edelyn Verona was supported by NIDA Grant DA027140. Christopher J. Patrick was supported by NIMH Grants MH52384, MH072850, and MH089727.

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ley, & Lang, 1993; Vaidyanathan, Hall, Patrick, & Bernat, 2011). Moreover, these results appear specific to individuals high in the interpersonal-affective ("Factor 1") features of psychopathy (Vaidyanathan et al., 2011). Taken together, these results suggest that affective modulation of the startle response is a useful indicator of affective dysfunction in psychopathy. If deficits in defensive responding represent a physiological indicator of the syndrome, these deficits should be observed in high-psychopathy women as well as men.

Only three prior studies have examined affective modulation of the startle reflex in women with psychopathic traits. The only study involving a forensic sample of women scoring in the psychopathic range on the PCL-R was by Sutton, Vitale, and Newman (2002). These investigators mostly replicated prior findings, reporting that incarcerated women high in psychopathy failed to show blink-startle potentiation during unpleasant as compared to neutral foreground images. Two other studies have used a self-report based assessment of psychopathy, the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996), in nonincarcerated samples. In one of these, undergraduate women scoring high but not low in overall PPI psychopathy showed decreased startle potentiation for unpleasant as compared with neutral pictures (Anderson, Stanford, Wan, & Young, 2011). In the other study, Justus and Finn (2007) recruited young adults from the community with advertisements designed to elicit participation from individuals with a range of psychopathic traits. They found an absence of startle potentiation for noise probes occurring 2 s after unpleasant picture onset among high-psychopathy men but not women, although results for psychopathy were the opposite for probes occurring at 4.5 s after picture onset. Thus, overall results are difficult to interpret given the latter unexpected findings.

In addition to the mixed findings and dearth of research on affective responding in female psychopathy, it is possible that consideration of a more specific deficit in negative emotional reactivity may be necessary to understand psychopathy, including in women. Along this line, Blair (1995) posited empathic deficits to be central to the disorder, with psychopathic behavior arising from an inability to develop a normal sense of morality. Blair's perspective can be viewed as a special case of the defensive response deficit hypothesis, implicating slightly different neural networks linked to processing self versus other experiences and motives (Lamm, Decety, & Singer, 2011). Consistent with this perspective, Levenston et al. (2000) found deficient startle potentiation in high-psychopathy male offenders during viewing of scenes depicting others' distress (e.g., being attacked), but not during exposure to depictions of threatening images (e.g., snakes, pointed gun). However, no study has examined such effects in women.

Current Study and Hypotheses

In the present study, a sample of incarcerated women were assessed with the PCL-R and tested in an affect-startle paradigm while viewing emotional and neutral picture stimuli. Following Levenston et al. (2000), the design included subsets of unpleasant pictures depicting victims in distress (e.g., women or men being attacked) along with direct-threat scenes (e.g., gun pointed at the viewer). Hypotheses were that (1) women scoring high versus low on psychopathy, especially the primary affective-interpersonal (or Factor 1) features, would show deficient modulation of the startle reflex to aversive pictures, and (2) lack of startle potentiation in psychopathy would occur more so during the presentation of scenes depicting victims than during scenes depicting direct threat. This represents a novel component of the current research relevant to recent work on empathic responding (Lamm et al., 2011).

Method

Participants

Participants were 48 female inmate residents of a medium-security federal correctional institution in Florida selected from a larger cohort of individuals ($n = 226$) who were assessed for psychopathy using the PCL-R (Hare, 2003). Interview and questionnaire data have been published using this larger assessment sample (e.g., Kennealy, Hicks, & Patrick, 2007; Verona, Hicks, & Patrick, 2005). Individuals from the assessment cohort not represented in the present experimental testing sample were excluded either because they did not meet inclusionary criteria for one of the study groups (see below) or because they had left the prison before they could be tested. Ethnic/racial representation for the current experimental testing sample was as follows: 24 (50.0%) African American, 19 (39.6%) Caucasian, and 5 (10.4%) Hispanic. Participants ranged in age from 19 to 44.

Assessments

Psychopathy Checklist-Revised (PCL-R). Information from a structured interview was used together with prison file data to assign scores on the PCL-R. Two independent raters, the primary interviewer and a second assessor who viewed a tape of the interview, completed diagnostic ratings. All raters were advanced graduate or undergraduate students in psychology who had undergone extensive training by one of the authors (C.J.P.) in the use of the PCL-R. Correlational analyses using Pearson's r revealed that PCL-R total scores for the two raters were correlated .91. Diagnostic group assignments were made using the average of the ratings for the two independent raters. The sample *M*s and *SD*s for PCL-R Total, F1, and F2 scores were 21.3 and 10.0, 8.7 and 4.7, and 9.8 and 4.4, respectively. Mean scores for the PCL-R in the present sample did not differ from those for assessment sample participants who were not recruited for the experimental testing component, $ps > .64$.

Participants were assigned to two groups based on their PCL-R total and factor scores. The *low psychopathy group* ($n = 24$) had total PCL-R scores of 20 or less and scores at or below the midpoint on PCL-R Factors 1 and 2 (i.e., ≤ 8 and ≤ 9, respectively). The *high psychopathy group* ($n = 24$) scored 25 or higher on the PCL-R as a whole, and two thirds or more of the maximum on PCL-R Factors 1 and 2 (i.e., ≥ 12 and ≥ 11, respectively). As detailed in the top part of Table 1, the diagnostic groups did not differ in terms of age or ethnic/racial status.

Information from the above-mentioned interview and from prison files was also used to rate each of the criteria of Antisocial Personality Disorder (ASPD) based on *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM–IV*; American Psychiatric Association, 2000), including childhood conduct disorder and ASPD symptoms. Responses to questions about each

Table 1
Demographic and Diagnostic Differences Between the Two Psychopathy Groups

	Low psychopathy (n = 24)		High psychopathy (n = 24)		Group differences
	M (*SD*)	Min/Max	*M* (*SD*)	Min/Max	t (46) = −.16 / *ns*
Demographic variables					
Age	29.3 (7.6)	19/44	29.7 (6.6)	20/42	
Ethnicity	Frequency	%	Frequency	%	χ^2 (2) = .84 / *ns*
European-American	11	45.8	8	33.3	
African-American	11	45.8	13	54.2	
Hispanic	2	8.3	3	12.5	
Measures					
PCL-R total	12.1 (4.9)	4.5/21.0	30.4 (2.7)	26.0/35.0	$t(46) = -16.1$ / $p < .001$
PCL-R factor 1	4.4 (2.2)	1.0/8.5	13.0 (1.4)	10.5/15.0	$t(46) = -16.3$ / $p < .001$
PCL-R factor 2	6.2 (2.6)	0.5/11.0	13.7 (1.7)	10.5/17.0	$t(46) = -11.8$ / $p < .001$
Adult antisocial behavior symptoms	2.9 (1.7)	0.0/7.0	6.0 (0.7)	4.5/7.0	$t(46) = -8.4$ / $p < .001$
Child conduct disorder symptoms	1.1 (1.0)	0.0/3.5	4.4 (2.7)	0.0/10.5	$t(46) = -5.7$ / $p < .001$

criteria were compiled into symptom-count variables, and examined in relation to startle potentiation to evaluate the specificity of defensive reactivity deficits to affective-interpersonal features as compared to antisocial-externalizing features. Again, two independent raters completed ratings on adult and child antisocial symptoms (number of criteria met for each), with correlations of .74 and .83, respectively, across the two raters.

Experimental Procedures

Participants viewed a series of 66 pleasant, neutral, and unpleasant IAPS picture stimuli. Blink-eliciting noise probes were presented during 54 of the picture-viewing trials (18 during pictures of each valence); 9 other picture trials (three of each valence) were "buffer" trials on which no noise probe occurred, included to reduce the predictability of the probe stimulus. The remaining three trials consisted of practice pictures positioned at the start of the series to habituate the atypically large startle responses that occur to initial presentations of the noise probe. Pictures were presented for 6 s each with a varying intertrial interval of 10–20 s between completion of picture ratings (not reported here) and appearance of the next picture.

Neutral pictures in the series consisted of nonexpressive human faces and household objects (e.g., hanger, iron). As typical, the pictures within the pleasant and unpleasant categories were chosen based on normative ratings of valence and arousal for young nonincarcerated women (Lang, Bradley, & Cuthbert, 2008). Unpleasant pictures included 3 disgust, 3 mutilation, 6 victim-distress (e.g., man or woman being assaulted), and 6 direct-threat scenes (e.g., gun pointed at viewer, snakes), which were all used in main analyses. The latter two contents were included in supplemental analyses to examine differences in defensive reactivity versus empathic responding (cf. Levenston et al., 2000). The pleasant picture stimuli comprised 6 each of three types: thrill (e.g., adventure, sports), erotic (e.g., couples, attractive nudes), and "cute" (e.g., babies, puppies). Six orders of presentation were used to ensure that all valence and content categories were counterbalanced for presentation order across groups and participants. (Contact the authors for exact picture contents used).

Acoustic startle probes (105-dB, 50-ms white noise bursts with near-instantaneous rise time) were administered binaurally through headphones to elicit blink responses. Startle probes occurred at varying points (3, 4, or 5 s) after picture onset, and also intermittently during intertrial intervals (either 2, 3, or 7 s after picture offset, or 10 s after picture ratings).

Aversive Startle Potentiation

Blink responses to noise probes were recorded from Sensor Medics 4 mm Ag-AgCl electrodes positioned over the orbicularis oculi muscle beneath the left eye, one below the pupil and the other immediately lateral. The raw electromyographic (EMG) signal was recorded using a Coulbourn S75–01 High Gain Bioamplifier with filter cutoffs of 90 and 1000 Hz and a Coulbourn S76–01 Contour Following Integrator (time constant: 80 ms). Data were sampled at 1000 Hz beginning 50 ms before probe onset and continuing for 250 ms after. Blinks were scored off-line for magnitude using custom software. To control for substantial variability in general magnitude of blink response evident among participants, raw magnitude scores were z-score standardized across probe trials within individuals (cf., Patrick et al., 1993) and then transformed to t scores (M = 50, SD = 10).

Data Analyses

Startle response data were analyzed using multilevel modeling (MLM), which is robust to many of the limitations of repeated measures ANOVA (e.g., missing data, violation of sphericity; Quené, & van den Berg, 2004). The Level 1 (or within-subject) factor was Valence Category, represented by two dummy variables. One dummy variable indicated the difference between unpleasant and neutral pictures (*unpleasant* = 1, *neutral and pleasant* = 0), and the other indicated the difference between pleasant and neutral pictures (*pleasant* = 1, *neutral and unpleasant* = 0), representing *defensive responding* versus *pleasant engagement* contrasts, per our a priori hypotheses. The Level 2 (or between-subjects) factor was psychopathy level, which was coded 0 for participants in the low psychopathy group and 1 for individuals in the high psychopathy group. Intercepts were treated as a random effect, meaning they were free to vary across participants. We also included trial number as a random effect, to account for individual differences in habituation of the startle response over the course of

the experiment. We used the model comparison based log-likelihood deviance statistic to test for the *omnibus* main effects and interaction. *Follow-up tests* involved the use of the model parameter estimates, reported as unstandardized regression coefficients (γ). To facilitate communication across studies, we report effect sizes using the *pseudo-r^2* statistic, which indicates the proportion of variance explained by the addition of a parameter (Singer, 1998). In terms of power to detect effects, our sample size at Levels 1 (trials) and 2 (participants) is consistent with recommendations based on simulation studies (i.e., at least 30 per level; van der Leeden & Busing, 1994).

Results

Psychopathy Groups: Demographics and PCL-R Scores

Although the two groups did not differ in age or race/ethnicity (see Table 1), the high psychopathy group scored significantly higher than the low psychopathy group on PCL-R scores, which served as the basis for groupings.

Psychopathy Groups: Startle Modulation Effects

Picture valence effects. Consistent with previous work on valence effects on startle responding, the MLM deviance test revealed a main effect of Valence Category for both defensive responding and pleasant engagement contrasts on startle magnitude, $\chi^2(2) = 39.7$, $p < .001$, *pseudo-r^2* = .02, and no main effect of psychopathy, $\chi^2(1) = 1.9$, $p > .19$, *pseudo-r^2* = .00. The former was qualified by a Group × Valence Category interaction, $\chi^2(2) = 6.0$, $p < .05$, *pseudo-r^2* = .01. As shown in Figure 1, simple effects tests of defensive responding revealed that women low on PCL-R psychopathy showed the typical robust potentiation for unpleasant as compared with neutral pictures, $\gamma = 2.60$, $t(2468) = 4.66$, $p < .001$, *pseudo-r^2* = .03. However, this effect was significantly reduced for women high in PCL-R psychopathy, $\gamma = -1.79$, $t(2468) = -2.28$, $p < .05$, *pseudo-r^2* = .01. In fact, for women high in psychopathy, the response difference between unpleasant and neutral pictures was not significant, $\gamma = 2.60–1.79 = .81$, $t(2468) = -1.46$, $p > .14$, *pseudo-r^2* = .00. In contrast, the attenuation of the startle response during viewing of pleasant relative to neutral pictures did not differ between groups, $\gamma = -.27$, $t(2468) = -.35$, $p > .72$, *pseudo-r^2* = .00, indicative of intact pleasant engagement across groups.

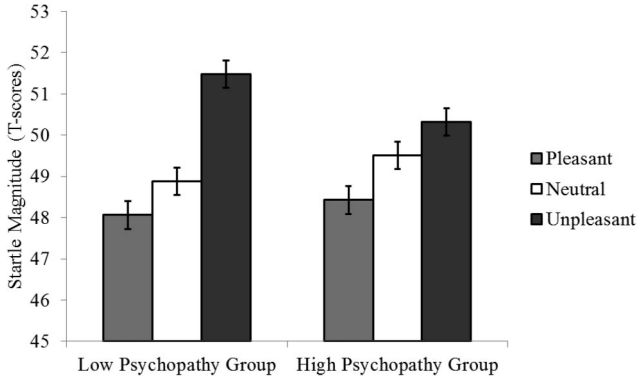

Figure 1. Standardized startle magnitude as a function of picture valence (pleasant, neutral, unpleasant) and psychopathy group.

Effects for unpleasant picture contents. To clarify the source of defensive response deficits in women high on psychopathy, we conducted analyses comparing startle response modulation for the two unpleasant picture contents, victim and threat, across the two psychopathy groups. The coding scheme was similar to that above; however, in this analysis threat and victim pictures were compared to neutral pictures. The results revealed a significant two-way interaction reflecting a difference in startle potentiation for the victim pictures between the high and low psychopathy groups, $\gamma = -2.30$, $t(1372) = -2.30$, $p < .05$, *pseudo-r^2* = .01. As illustrated in Figure 2, the high psychopathy group failed to potentiate during the viewing of victim scenes relative to neutral scenes, $\gamma = 2.53–2.30 = .23$, $t(1372) = -1.51$, $p > .13$, *pseudo-r^2* = .00, in contrast with the robust potentiation shown by the low psychopathy group, $\gamma = 2.53$, $t(1372) = 3.17$, $p < .01$, *pseudo-r^2* = .02. Although the high psychopathy group showed lesser potentiation than the low psychopathy group for threat scenes as well, the two-way interaction in this case was not significant, $\gamma = -1.21$, $t(1372) = -1.07$, $p > .23$ *pseudo-r^2* = .00. This pattern of results raises the possibility that the lack of aversive startle potentiation observed for high psychopathy women was attributable to a specific deficit in empathic capacity, as opposed to a broader deficit in fear reactivity.

Impaired Defensive Responding and Primary Features of Psychopathy

To examine whether defensive startle responding might distinguish core affective-interpersonal features of psychopathy from impulsive-antisocial traits, we conducted regression analyses using startle potentiation scores (unpleasant picture *M* – neutral picture *M*) as a continuous DV. In one analysis, PCL-R Factor 1 and Factor 2 scores were entered as predictors, revealing a trend toward reduced defensive responding as a function of higher scores on Factor 1 ($B = -.40$, $p = .11$), but not Factor 2 ($B = .16$, $p = .65$). In a second regression analysis, Factor 1 scores were included along with adult antisocial symptoms and child conduct disorder symptoms as predictors; scores on Factor 2 were excluded from this analysis because of multicollinearity with the latter two variables (VIF = 7.41). This analysis revealed a significant negative relationship with defensive responding for Factor 1 ($B = -.52$, $p = .03$), with adult antisocial symptoms showing a trend-level positive relationship (Bs = .39, $p = .12$) and child conduct symptoms showing a minimal relationship ($B = -.11$, $p > .40$). Combined, these results suggest that defensive startle responding represents a physiological indicator of core affective-interpersonal features of psychopathy as opposed to impulsive-antisocial traits.

Discussion

Most previous work on female psychopathy has proceeded under the implicit assumption that psychopathy in women has a similar nomological network to psychopathy in men. Results of this study contribute to the nomological net for female psychopathy, showing that women scoring high on PCL-R psychopathy exhibited deficits in defensive reactivity that have been tied to

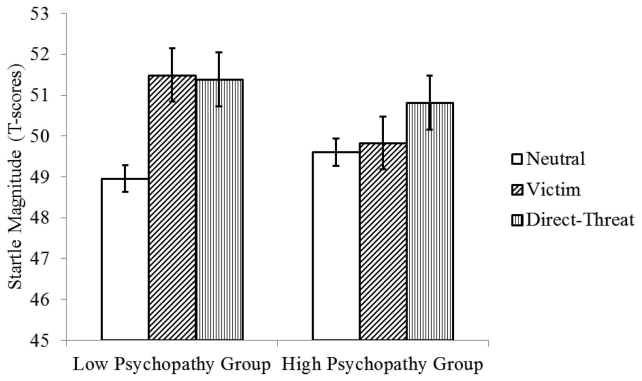

Figure 2. Standardized startle magnitude as a function of unpleasant picture content (victim vs. direct-threat), and psychopathy group. Nonoverlapping error bars within groups indicate significant differences.

psychopathy in men (Patrick et al., 1993). Further confirmation of the strong links between the primary features of the disorder emphasized by Cleckley and deficits in defensive reactivity came from the regressions examining the unique effects of Factor 1 and indices of externalizing or antisocial symptoms. Deficient defensive responding was characterized by higher PCL-R Factor 1 scores but not child or adult antisocial symptoms. Together, this multimethod data serve to confirm that deficits in affective responding are observed in PCL-defined psychopathy in women, with specific links between affective deficiencies and the primary features of psychopathy.

Our results showing larger deficits in startle potentiation (relative to neutral) for victim pictures compared with direct-threat pictures among high-psychopathic women in our study were especially intriguing. It could be argued that decreased startle modulation in psychopathy may represent a more specific deficit in response to the distress of others, as opposed to a general deficit in fear reactivity. Such an explanation is consistent with the perspective of Blair (1995) that psychopathic individuals are uniquely insensitive to vicarious affective stimuli. An alternative fear-related explanation focuses instead on a heightened threshold for defensive activation in psychopathy, such that a threat must be explicit and direct to engage the brain's defensive system (cf. Levenston et al., 2000); thus, vicarious images of others' distress does not initiate the defensive process. These two perspectives may not be mutually exclusive, and further research can help differentiate their respective influences on affective startle modulation in psychopathy.

Although there is evidence of overlapping neural networks involved in the direct experience of pain and empathy for others' pain (e.g., medial cingulate cortex; Lamm et al., 2011), distinct brain regions are important for developing action representations of others' experience (e.g., parietal and frontal "mirror" neurons) and then translating these representations into emotional responses via the limbic system (e.g., insula; Carr, Iacoboni, Dubeau, Mazziotta, & Lenzi, 2003). In addition, taking the perspective of others versus oneself evokes stronger activity in regions of the ventromedial/orbitofrontal and dorsolateral cortices (van der Heiden, Scherpiet, Konicar, Birbaumer, & Veit, 2013)— regions that have been implicated in seemingly psychopathic behaviors (Blair, 2004; Mitchell et al., 2006). Much more work is needed to elucidate points of overlap and divergence between neurobiological systems for fear and empathy in ways that can help to explain emotional deficits in psychopathy.

Our results should be considered in light of some limitations of the current study. One concern is the relatively small sample size. Though our sample size is within recommendations for cross-level interactions in MLM (e.g., van der Leeden & Busing, 1994), there is the possibility of Type I and II errors. A further limitation is that our results are cross-sectional. Consequently, it remains unknown whether the reported deficit in startle potentiation precedes the full emergence of psychopathic symptoms. The field could benefit greatly from research directed at understanding the development of psychopathy and deficient emotionality/empathy in girls and women.

Our study also has some important strengths worth noting. First, we systematically included different picture contents within valence categories. This gives our study a more nuanced view compared with previous psychophysiological studies of female psychopathy (e.g., Sutton et al., 2002), especially with regard to vicarious distress and empathic arousal. Second, we used multiple raters and validated instruments and paradigms, and these were integrated to interpret the data more broadly. Third, in analyses of our startle data, we used the leading-edge statistical method of MLM to deal with many of the issues inherent in repeated measures ANOVA (e.g., violation of sphericity, missing data; Quené, & van den Berg, 2004). Thus, our analyses were less likely to involve Type I errors, reducing the likelihood of spuriousness. In conclusion, the results of the current study will likely encourage important directions for future research on female psychopathy, including on empathy-related deficits in women and men scoring high on psychopathy.

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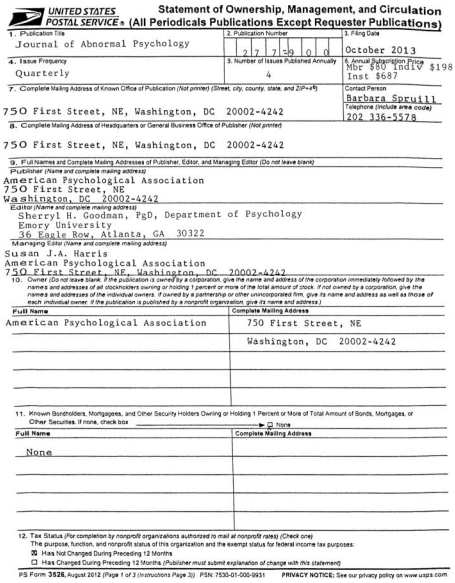
Received February 8, 2013
Revision received June 28, 2013
Accepted July 2, 2013 ■



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1. Publication Title	2. Publication Number	3. Filing Date
Journal of Abnormal Psychology	0 2 7 7 5 0 0 0	October 2013
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
Quarterly	4	Mbr $80 Indiv $198 Inst $687

7. Complete Mailing Address of Known Office of Publication (Not printed) (Street, city, county, state, and ZIP+4®): 750 First Street, NE, Washington, DC 20002-4242 — Contact Person: Barbara Spruill, Telephone (Include area code): 202 336-5578

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printed): 750 First Street, NE, Washington, DC 20002-4242

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Publisher (Name and complete mailing address): American Psychological Association, 750 First Street, NE, Washington, DC 20002-4242

Editor (Name and complete mailing address): Sheryl H. Goodman, PgD, Department of Psychology, Emory University, 36 Eagle Row, Atlanta, GA 30322

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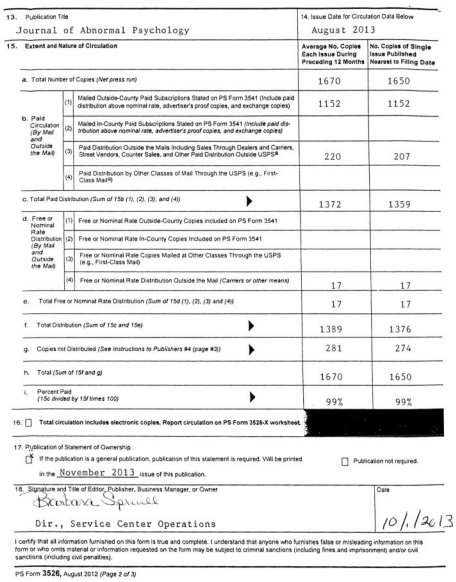

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