



Brief report

Attentional bias towards negative affect stimuli and reactive aggression in male batterers

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ABSTRACT

Spouse abuse is listed as a V code in DSM-IV-TR and worthy of further clinical investigation, although research has focused predominantly on the victims of family violence rather than the batterers themselves. This study tests the hypotheses that (a) batterers have a neurocognitive bias favoring negative affect (aggressive) stimuli and (b) batterers are more characterized by reactive than proactive aggression. Tasks were administered to 23 male batterers and 24 controls to assess attentional bias to both negative affect stimuli (emotional Stroop) and affectively neutral stimuli (cognitive Stroop). Batterers relative to controls showed longer reaction times in naming the color of negative affect words than affectively neutral words. No such abnormality was observed for the non-affective cognitive control task. Results remained significant after controlling for comorbid depression. Batterers scored significantly higher on reactive (but not proactive) aggression. Results suggest that batterers may have a bias in allocating more attentional resources to aggressive words, potentially making them over-sensitive to negative affect stimuli in the environment. Future treatment programs addressing this neurocognitive abnormality may be more successful in reducing spouse abuse.

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1. Introduction

While there has been extensive research on the effects of spouse abuse on its victims, there has been a relative dearth of research on the perpetrators of violence. The dominant perspective on wife battering is that physical abuse of the spouse is a rational, instrumental act aimed at regulation, control, and conflict resolution. An alternative perspective is that there may be internal risk factors that play a significant role in predisposing some men to resort to violence for conflict resolution in the home (Dutton, 1998). Spouse abuse is currently listed as a V code (V61.12) in DSM-IV-TR. While not a clinical disorder as such, spouse abuse is viewed in DSM as a condition that is a focus of further clinical investigation. To date, clinical research studies of the correlates of spouse abuse have largely focused on demographic factors, prior exposure to violence, and psychopathology (Riggs et al., 2000). In contrast, little research has been conducted on neurobiological or neurocognitive factors (although see George et al., 2006).

A neurocognitive perspective on spouse abuse suggests that batterers have significant cognitive impairments that may contribute

to their violent lifestyle. Neuropsychological impairments have been reported in male batterers at a higher level than in controls (Teichner et al., 2001). One recent laboratory study indicated that a general antisocial-violent subgroup of spouse abusers showed impairments in the recognition of facial affect (Babcock et al., 2008). More generally, Eckhardt et al. (1998) observed that batterers tended to commit a variety of cognitive errors, including making assumptions in the absence of objective evidence, constructing a general rule from isolated incidents, overestimating the significance of events, and attributing the cause of an event to the hostile intentions of another person. While the source of these cognitive errors is not known, one hypothesis is that batterers have a bias towards over-allocating attentional resources to negative affective stimuli in the home environment, at the expense of appropriate rational processing of ongoing discourse. Such a kind of bias processing has also been consistently shown in anxiety and other disorders (Williams et al., 1996; Jansen et al., 2005).

Relatedly, we also tested the hypothesis that batterers would be characterized predominantly by a reactively aggressive personality. Two relatively distinct forms of aggression with different correlates have been identified: proactive aggression, which is the deliberate, planned, and relatively “cold-blooded” use of aggression to achieve an instrumental goal, and reactive aggression, which is a more unplanned, impulsive, and emotional expression of aggression in response to a provocation (Raine et al., 2006). Historically, the prevailing clinical

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perspective on spouse abuse is that it represents a conscious, deliberate, and premediated use of power aimed to subjugate and control the female partner for selfish instrumental gain (Babcock et al., 2004). An alternative hypothesis is that spouse abuse is reactively aggressive.

In illustration of this approach, George et al. (2006) have hypothesized that spouse abusers as a group are hypersensitive to stimuli in social encounters that could be interpreted as threatening (e.g. slights, signs of disapproval), resulting in increased negative affect, and reacting out of proportion to the social context (George et al., 2004). In contrast, one study observed that spouse abusers could be divided into both proactively and reactively aggressive subgroups based on their acts of abuse (Chase et al., 2001). Surprisingly, to our knowledge there appears to have been no formal test of the hypothesis that batterers as a group have higher reactive (but not proactive) aggression scores than controls on a validated trait reactive-proactive personality instrument.

Based on this background, the present study aimed to examine two key issues. First, a cognitive bias towards negative affect stimuli in batterers was examined using both cognitive and emotional Stroop interference tasks. It was hypothesized that batterers would be particularly sensitive to the interference effects of emotional word stimuli. Second, trait levels of proactive and reactive aggression were assessed in batterers and controls. It was hypothesized that batterers as a whole group would be characterized more by reactive than proactive forms of aggression, reflecting the existence of a substantial group of spouse abusers who may have less inhibitory control of their behavior in the context of an emotionally provocative stimulus.

2. Method

2.1. Subjects

Subjects comprised 23 male batterers and 24 male healthy volunteers. Batterers were recruited on a voluntary basis from the Family and Child Protective Service Unit or

the Clinical Psychology Units of the Social Welfare Department in Hong Kong dealing with spouse abuse. Referrals were made to these sources either by the Police Department or the Integrated Family Service Centers (Lee et al., 2008, 2009). Controls were recruited from the community and lacked a history of wife battering as assessed by the Conflict Tactics Scale 2 (Straus et al., 1996). Ethical approval was obtained from the university research ethics committee. After complete description of the study to the subjects, written informed consent was obtained.

2.2. Demographic, cognitive, and psychological characteristics

Participants were assessed on the Raven's Standard Progressive Matrices (RSPM; Raven, 1965), the Conflict Tactics Scale 2 (CTS-2; Straus et al., 1996 — a measure of spousal assault), the State Anger Scale (SAS; Spielberger, 1988), the Trait Anger Scale (TAS; Spielberger, 1988), the Barratt Impulsivity Scale 2 (BIS-2; Barratt, 1994), the Beck Depression Inventory 2 (BDI-2; Beck and Steer, 1987), the Marital Adjustment Test (MAT; Locke and Wallace, 1959 — a measure of marital satisfaction), and the Reactive-Proactive Aggression Questionnaire (RPQ — Raine et al., 2006). Data were missing on the RPQ for three controls and three batterers. Demographic information was also obtained in an interview.

Means, standard deviations, and group comparisons are provided in Table 1. Groups were comparable on age, years of education, years of marriage, intellectual functioning, and state anger. As expected, batterers had significantly higher rates of unemployment, divorce/separation, depressive symptoms, trait anger, impulsivity, and also lower marital satisfaction.

2.3. Attentional bias to negative affect stimuli

Cognitive bias to negative affect stimuli was assessed using the emotional Stroop task (Eckhardt and Cohen, 1997). In this task, the target word was either an affectively neutral (e.g. "change") or a high negative affect (aggressive) word (e.g. "kill"). After presentation of a color name (e.g. blue), participants were presented with the target word and had to judge whether its color was the same as the color name previously shown. A longer reaction time to negative affect words relative to neutral words indicates a cognitive bias to negative affect. Aggressive and neutral words were selected from the Contemporary Chinese Word Frequency Dictionary (Beijing Linguistic Institute, 1986).

Words were rated by a panel of clinical psychologists blind to the purpose of the study on a 7-point Likert scale for neutral words (3 = very positive to -3 = very negative), and on a 5-point Likert scale for negative affect words ranging from 0 (not aggressive) to 5 (very aggressive). Fifty aggressive and 50 neutral words were selected, matched on word frequency (neutral words mean = 0.001, S.D. = .002; aggressive words mean = 0.001, S.D. = 0.003). Affective scores were as follows: neutral words

Table 1
Demographic, wife battering, cognitive, and psychological characteristics of the batterers and controls.

	Controls mean (S.D.)	Batterers mean (S.D.)	df	t-value / χ^2 value	P value
Demographic					
Age	44.33 (8.29)	44.57 (6.97)	45	-0.10	0.918
Years of marriage	14.19 (8.77)	13.45 (7.29)	42	0.30	0.766
Unemployment rate	8.3%	39.1%	2	7.75	0.021
Separated or divorce rate	0%	43.5%	1	13.26	0.000
Wife battering (prevalence rate)					
Thrown something at wife	0%	60.9%	1	20.81	0.000
Twist their wives' arm or hair	0%	52.2%	1	16.82	0.000
Pushed or shoved their wives	0%	69.6%	1	25.31	0.000
Grabbed their wives	0%	69.6%	1	25.31	0.000
Slapped their wives	0%	39.1%	1	11.62	0.001
Used a knife on their wives	0%	17.4%	1	4.56	0.033
Hit their wives with something	0%	65.2%	1	22.99	0.000
Choked their wives	0%	39.1%	1	11.62	0.001
Slammed wives against a wall	0%	26.1%	1	7.18	0.007
Beaten up their wives	0%	69.6%	1	25.31	0.000
Kicked their wives	0%	26.1%	1	7.18	0.007
Cognitive					
Intellectual functioning	44.38 (11.61)	40.65 (13.94)	45	1.00	0.324
Years of education	10 (2.02)	9.09 (3.00)	45	1.23	0.226
Psychological					
State anger	10.13 (.61)	10.09 (.29)	45	0.27	0.788
Trait anger	16.13 (2.59)	20.43 (4.87)	45	-3.81	0.000
Depression	8.29 (7.47)	14.48 (10.14)	45	-2.39	0.021
Minimal range (0–9)	39.1%	62.5%			
Mild depression (10–16)	17.4%	20.8%			
Moderate depression (17–29)	34.8%	16.7%			
Severe depression (30–63)	8.7%	0.0%			
Impulsivity	64.13 (6.86)	69.22 (8.84)	45	-2.21	0.032
Marital satisfaction	109.42 (28.64)	66.26 (25.65)	45	5.43	0.000
Reactive aggression	4.81 (2.71)	7.15 (2.45)	39	-2.89	0.006
Proactive aggression	1.14 (1.68)	2.25 (3.07)	39	-1.44	0.158

–0.01 (S.D.=0.12); aggressive words 4.47 (S.D.=0.39). Prior to the experiment, participants were given 20 practice trials to familiarize them with the task.

2.4. Attentional bias to affectively neutral stimuli

The Cognitive Stroop Task (Chinese version) was used to assess whether batterers had a deficit on a non-affective cognitive control task. Participants are required to name the color of dots, words and color words. Full task details are given in Lee and Chan (2000).

3. Results

3.1. Affective and non-affective Stroop tasks

A repeated measures multivariate analysis of variance demonstrated a significant group by condition (neutral vs. affect) interaction on the emotional Stroop task, $F(1,45) = 5.39$, $P = 0.025$, $\eta^2 = 0.11$. (see Fig. 1a). Compared with controls, batterers were relatively slower in responding to negative affect stimuli than to neutral stimuli. There was also a main effect of group, $F(1,45) = 10.70$, $P = 0.002$, $\eta^2 = 0.11$, indicating that batterers had overall slower reaction times. On the non-affective cognitive Stroop task, there was no significant group by condition (word vs. color word) interaction, $F(1,44) = 1.55$, $P = 0.22$, $\eta^2 = 0.034$. (see Fig. 1b).

Depression has been associated with bias towards negative affect words (Murphy et al., 1999), and the batterers in the current study had significantly higher depression scores than controls. The batterers also had significantly longer reaction times than the controls in all conditions. To assess whether the increased depression and the longer reaction time of the batterers accounted for the negative affect bias, the above analysis was repeated after entering depression (BDI-2) and average reaction time as covariates. The group by condition interaction remained significant, $F(1,43) = 5.70$, $P = 0.02$, $\eta^2 = 0.12$.

3.2. Reactive and proactive aggression

Batterers were significantly higher on reactive aggression than controls ($P = 0.006$, Cohen's $d = 0.91$), but not on proactive aggression ($P = 0.16$, $d = 0.46$ – see Table 1). Consistent with prior studies, scores

on reactive and proactive aggression scales significantly overlapped ($r = 0.57$, $P < 0.001$). Consequently, to provide a more rigorous test of the hypothesis that batterers have a predominantly reactively but not proactively aggressive personality, residualized measures of proactive and reactive aggression were created to assess “pure” proactive aggression independent of reactive aggression, and of “pure” reactive aggression independent of proactive aggression. Reactive aggression was regressed on proactive scores and Pearson standardized residuals (with a mean of 0 and S.D. of 1) were saved to index purely proactive aggression. Similarly, the standardized residuals of proactive aggression on reactive aggression were saved to index purely reactive aggression.

Scores on “pure” reactive aggression were significantly higher in batterers ($M = 0.355$, S.D. = 0.867) than controls ($M = -0.338$, S.D. = 0.993), $t = 2.37$, $df = 39$, $P = 0.023$, $d = 0.75$. In contrast, scores on proactive aggression were almost identical, with batterers ($M = -0.020$, S.D. = 0.726) scoring very fractionally lower than controls ($M = 0.019$, S.D. = 1.223), $t = 0.125$, $df = 39$, $P = 0.901$, $d = -0.04$.

3.3. Group classification

In a logistic regression (using the Wald χ^2 and the Nagelkerke statistic for variance estimation) in which batterers were compared with controls on the two measures of affect attentional biases (the affect – neutral Stroop RTs) and pure reactive aggression, the latter two measures predicted 35.2% of the variance in group membership ($\chi^2 = 12.54$, $P < 0.001$), and predicted group membership with an accuracy of 75.6%, with a false positive rate of 19.0%.

4. Discussion

In comparison with controls, batterers showed relatively longer reaction times in naming the color of negative affect aggressive words than in naming affectively neutral words. Results remained significant after controlling for potential confounds (depression and average reaction time). This information-processing deficit in batterers was specific to negative affect stimuli, and did not generalize to a non-affective task. Batterers were significantly higher than controls on reactive but not proactive aggression. To our knowledge, this is the first demonstration of a selective cognitive bias to negative affect stimuli in spouse abusers, and the first empirical test of differential relationships on trait reactive and proactive forms of aggression.

Batterers' longer reaction times to negative affect stimuli indicates they were less able than controls to inhibit the distracting emotional characteristics of stimuli, resulting in impaired cognitive performance. This neurocognitive characteristic of batterers may in part contribute to their abusive behavior. George et al. (2006) have documented that batterers do not listen to reason and emotionally react out of proportion to the situation. Excessive attentional processing to visual (e.g. frown) or verbal (e.g. negative voice tone) affective stimuli could distract the batterer's attention from appropriate cognitive appraisal of the social context, contributing to the racing thoughts, irrational behavior, and escalating negative affect that characterize batterers (George et al., 2006). While this perspective may apply to the batterers in this study, who tended to be reactively but not proactively aggressive (see Table 1), it remains to be seen whether it applies to all batterer sub-types.

While impulsive sub-types of batterers have long been hypothesized (e.g. Holtzworth-Munroe and Stuart (1994), no prior study to our knowledge has assessed the more specific hypothesis as to whether batterers as a group are predominantly reactive aggressive at a general trait level, as opposed to being proactively aggressive. Findings supported this hypothesis, with a large effect size indicating significantly higher raw reactive aggression scores in batterers, with no significant differences in proactive aggression. More conservative analyses using statistically independent residualized proactive and

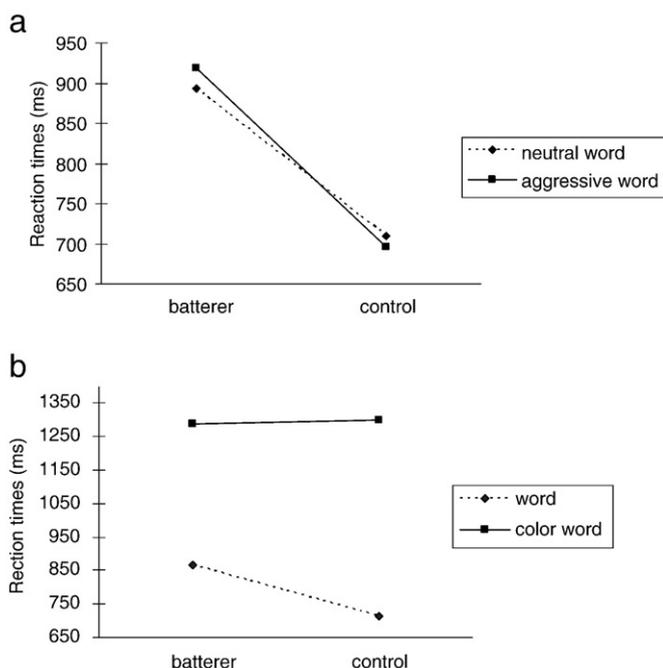


Fig. 1. Average reaction times to aggressive and neutral words on the emotional Stroop task for the batterers and controls (a) and to word and color word on the cognitive Stroop task for the batterers and controls (b).

reactive aggression scores more clearly demonstrated this differentiation, with a large effect size for reactive aggression (higher scores in batterers) and a non-significant *negative* effect size for proactive aggression (slightly lower proactive scores in batterers).

These findings on reactive aggression are broadly consistent with one prior study that categorized prior acts of spouse abuse in 60 community-recruited spouse abusers, finding a predominance of reactive (62%) compared with proactive (38%) spouse abuse. Similarly, prior typology research has identified two out of three subgroups of spouse abusers (the generally violent/antisocial subgroup and the borderline-dysphoric subgroup) to be moderately and highly impulsive, respectively (Holtzworth-Munroe et al., 2000), a personality trait with strong links to reactive forms of aggression. The current study departs from the prior literature in finding that the batterer group as a whole is predominantly reactively aggressive. We caution, however, that subgroups of batterers clearly exist (Holtzworth-Munroe et al., 2000) and that others have observed some batterer subgroups to show patterns of proactive aggression (Babcock et al., 2003). At the same time the evidence for higher total psychopathy scores (indirectly reflecting proactive aggression) in spouse abusers is not strong, with at least two studies failing to find an overall association (Huss and Langhinrichsen-Rohling, 2006; Swogger et al., 2007). Current findings give rise to the hypothesis that a significant proportion of the abusive aggression in spouse abusers (and perhaps even the majority) is reactively aggressive in nature.

Findings of this study need to be replicated and extended, particularly because the interaction effect size for the emotional Stroop is modest, explaining 11% of the variance. At the same time, when combined with reactive aggression, the combination of these simple personality and neurocognitive variables explained 35.2% of the variance in group membership and predicted group membership with an accuracy of 75.6%. The false positive rate was relatively small at 19.0%. Findings are consequently not trivial.

If confirmed, findings have potential clinical implications for intervention, prediction, and conceptualization of spouse abuse. A meta-analysis has concluded that treatment programs for spouse abusers have a minimal impact on reducing recidivism, with the five experimental studies to date showing an effect size of $d = 0.09$ (victim report outcome) and $d = 0.12$ (police records) (Babcock et al., 2004). The most common intervention is a psycho-educational approach which assumes that spouse abuse is a result of society sanctioning men's use of power and control over women (Babcock et al., 2004). One implication of the evidence for a neurocognitive abnormality focused on an affective response bias would be the desirability of incorporating into a treatment program an information-processing perspective. This could highlight the cognitive bias in abusers identified here, identify and alert both spouses to the specific mild negative affect stimuli and contexts that trigger a reactive rage attack, provide tension-reduction strategies (e.g. relaxation) to reduce the build-up of arousal and emotional impact to the specific stimuli and enhance emotion regulation, and recognize the contributory roles of both partners in confrontational situations. Such an approach may be more effective in reducing spouse abuse (either alone or in conjunction with pharmacological manipulations) to reduce emotional reactivity to provocative affective stimuli (George et al., 2006). Regarding conceptualization and prediction, findings from the discriminant function analysis more broadly suggest that measures of reactive aggression and neurocognition should be entered as predictors in future longitudinal studies of risk for spouse abuse, and also tentatively suggest a different perspective on the etiology of spouse abuse that could be empirically tested in further investigations of this V-coded condition in DSM-IV-TR.

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References

- Babcock, J.C., Miller, S.A., Siard, C., 2003. Toward a typology of abusive women: differences between partner-only and generally violent women in the use of violence. *Psychology of Women Quarterly* 27, 153–161.
- Babcock, J.C., Green, C.E., Robie, C., 2004. Does batterers' treatment work? A meta-analytic review of domestic violence treatment. *Clinical Psychology Review* 23, 1023–1053.
- Babcock, J.C., Green, C.E., Webb, S.A., 2008. Decoding deficits of different types of batterers during presentation of facial affect slides. *Journal of Family Violence* 23, 295–302.
- Barratt, E.S., 1994. Impulsiveness and aggression. In: Mohanan, J., Steadman, H.J. (Eds.), *Violence and Mental Disorder*. University of Chicago Press, Chicago, IL, pp. 61–79.
- Beck, A.T., Steer, R., 1987. *Beck Depression Inventory Manual*. Harcourt Brace Jovanovich, San Antonio, TX.
- Beijing Linguistic Institute, 1986. *Contemporary Chinese Word Frequency Dictionary*. Beijing Linguistic Institute Publisher, Beijing.
- Chase, K.A., O'Leary, K.D., Heyman, R.E., 2001. Categorizing partner-violent men within the reactive-proactive typology model. *Journal of Consulting and Clinical Psychology* 69, 567–572.
- Dutton, D.G., 1998. *The Abusive Personality – Violence and Control in Intimate Relationships*. Guilford Press, New York.
- Eckhardt, C.L., Cohen, D.J., 1997. Attention to anger-relevant and irrelevant stimuli following naturalistic insult. *Personality and Individual Differences* 23 (4), 619–629.
- Eckhardt, C.L., Barbour, K.A., Davison, G.C., 1998. Articulated thoughts of maritally violent and nonviolent men during anger arousal. *Journal of Consulting and Clinical Psychology* 66, 259–269.
- George, D.T., Rawlings, R.R., Williams, W.A., Phillips, M.J., Fong, G., Kerich, M., Momenan, R., Umhau, J.C., Hommer, D., 2004. A select group of perpetrators of domestic violence: evidence of decreased metabolism in the right hypothalamus and reduced relationships between cortical-subcortical brain structures in positron emission tomography. *Psychiatry Research: Neuroimaging* 130, 11–25.
- George, D.T., Phillips, M.J., Doty, L., Umhau, J.C., Rawlings, R.R., 2006. A model linking biology, behavior and psychiatric diagnoses in perpetrators of domestic violence. *Medical Hypotheses* 67, 345–353.
- Holtzworth-Munroe, A., Stuart, G.L., 1994. Typologies of male batterers: three subtypes and the differences among them. *Psychological Bulletin* 116, 476–497.
- Holtzworth-Munroe, A., Meehan, J.C., Herron, K., Rehman, U., Stuart, G.L., 2000. Testing the Holtzworth-Munroe and Stuart (1994) batterer typology. *Journal of Consulting and Clinical Psychology* 68, 1000–1019.
- Huss, M.T., Langhinrichsen-Rohling, L., 2006. Assessing the generalization of psychopathy in a clinical sample of domestic violence perpetrators. *Law and Human Behavior* 30 (5), 571–586.
- Jansen, A., Nederkoorn, C., Mulken, S., 2005. Selective visual attention for ugly and beautiful body parts in eating disorders. *Behavior Research and Therapy* 43 (2), 183–196.
- Lee, T.M.C., Chan, C.C.H., 2000. Are Trail Making and Color Trails Tests of equivalent constructs? *Journal of Clinical and Experimental Neuropsychology* 22, 529–534.
- Lee, T.M.C., Chan, S.C., Raine, A., 2008. Strong limbic and weak frontal activation to aggressive stimuli in spouse abusers. *Molecular Psychiatry* 13, 655–656.
- Lee, T.M.C., Chan, S.C., Raine, A., 2009. Hyper-responsivity to threat stimuli in domestic violence offenders: A functional magnetic resonance imaging study. *Journal of Clinical Psychiatry* 70, 36–45.
- Locke, H.J., Wallace, K.M., 1959. Short-term marital adjustment and prediction tests: their reliability and validity. *Journal of Marriage and Family Living* 21, 251–255.
- Murphy, F.C., Sahakian, B.J., Rubinsztein, J.S., Michael, A., Rogers, R.D., Robbins, T.W., Paykel, E.S., 1999. Emotional bias and inhibitory control processes in mania and depression. *Psychological Medicine* 29, 1307–1321.
- Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., Stouthamer-Loeber, M., Liu, J., 2006. The Reactive-Proactive Aggression Questionnaire: differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behavior* 32, 159–171.
- Raven, J.C., 1965. *Advanced Progressive Matrices, set I and II*. H.K. Lewis, London.
- Riggs, D.S., Caulfield, M.B., Street, A.E., 2000. Risk for domestic violence: factors associated with perception and victimization. *Journal of Clinical Psychology* 56, 1289–1316.
- Spielberger, C.D., 1988. *Manual for the State Trait Anger Expression Inventory*. PAR, Odessa, FL.
- Straus, M.A., Hamby, S.L., Boney-McCoy, S., Sugarman, D.B., 1996. The revised conflict tactics scales (CTS2). *Journal of Family Issues* 17, 283–316.
- Swogger, M.T., Walsh, Z., Kosson, D.S., 2007. Domestic violence and psychopathic traits: distinguishing the antisocial batterer from other antisocial offenders. *Aggressive Behavior* 33, 253–260.
- Teichner, G., Golden, C.J., Van Hasselt, V.B., Peterson, A., 2001. Assessment of cognitive functioning in men who batter. *International Journal of Neuroscience* 111, 241–253.
- Williams, J.M.G., Mathews, A., Macleod, C., 1996. The emotional Stroop task and psychopathology. *Psychological Bulletin* 120 (1), 3–24.