

Crime, Hostility, Wife Battering, and the Heart: On the Meehan et al. (2001) Failure to Replicate the Gottman et al. (1995) Typology

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Comments on the J. C. Meehan, A. Holtzworth-Munroe, and K. Herron (2001) failure to replicate the J. M. Gottman et al. (1995) results of 2 different types of batterers, defined by heart rate reactivity: Type 1 men lowered their heart rate from baseline to the high-conflict marital discussion, and Type 2 men increased their heart rate from baseline to the high-conflict marital discussion. Discussion is about criminality–psychopathy literature associated hypoarousal and hyporeactivity and the hostility–cardiovascular disease literature, which reports associated hyperreactivity and hostility related to cardiovascular disease. The Type 1–Type 2 distinction should be referred to these two venerable literatures. This article proposes the hypothesis that the Meehan et al. study failed to replicate Gottman et al. because it used a low-conflict marital discussion rather than the high-conflict discussion Gottman et al. used. This article reviews a study that did use a high-conflict marital task and found results generally supporting the Gottman et al. findings.

It would be helpful to investigate what Meehan, Holtzworth-Munroe, and Herron (2001) have called a “failure to replicate” the typology reported by Gottman et al. (1995) within the venerable historical context of research searching for biological correlates and theories that may underlie various aggressions, the domestic assault of women, psychopathy, criminality, and hostility in hypertensive men. The search for a biological basis for these aggressions has been conducted in the hope of generating a useful theory of aggression. In brief, there are research traditions that support an *underarousal* physiological theory of violence as well as research traditions that support an *overarousal* physiological theory of violence.

Research Supporting an Underarousal Physiological Theory of Violence

There is a clear and strong tradition that supports an underarousal theory. The most venera-

ble research tradition has been the study of criminality and psychopathy. Mednick (1977) has noted that most criminals have perpetrated at most one, two, or three minor offenses. However, there is a small group of criminals who have committed more than half of the offenses in Copenhagen, Denmark. Similar results have been reported for the city of Philadelphia by Wolfgang, Figlio, and Sellin (1972). It is this group of criminals who have been the subject of the closest biological investigation. There is growing evidence that criminality and psychopathy have some genetic basis (e.g., Bohman, Cloninger, Sigvardsson, & von Knorring, 1982; Schulsinger, 1977). The goal of these investigations was the derivation of a theory to explain the criminality. Following Lykken’s classic (1957) study that psychopaths do not learn to avoid using electric shock, Mednick proposed the theory that the inability of the psychopath and the criminal to learn through avoidance conditioning was based on reduced autonomic reactivity and slower autonomic recovery in response to the evocation of fear. Raine and Venables (1981) extended the theory to a bio-social theory. They found that among the lower social classes there was a positive correlation between conditionability and antisocial behavior

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(assessed by teacher and self-report), whereas the correlation was reversed among middle-class children. They argued that this effect might have been due to the significant correlation between lower social class and crime and wrote that "in a criminogenic environment where antisocial behavior patterns are the norm, good conditioners will condition into an antisocial way of life" (p. 273) and suggested that this supported Eysenck's (1977) general theory of crime and personality.

The main autonomic channel measured in this early research was electrodermal. Mednick's (1977) review showed that there was extensive evidence that supported this theory, including prospective research (Loeb & Mednick, 1977). The investigation of this hypothesis was extended to other physiological channels to include lower basal activity as well as lowered reactivity and slower recovery. Raine, Venables, and Williams (1990) collected central and autonomic measures of arousal at age 15 years and their ability to predict criminality at age 24. They found that the children who eventually became criminals initially had a significantly lower resting heart rate, skin conductance activity, and more slow-frequency electroencephalographic activity than noncriminals. They found that these differences were not mediated by social, demographic, or academic factors. This pattern of underarousal, reactivity, and recovery was supported by other investigations (e.g., Peterson, Matousek, Mednick, Volavka, & Pollock, 1982; Wadsworth, 1976).

The underarousal-reactivity-recovery theory also supported a sensation-seeking theory of crime and psychopathy proposed by a classic article by Quay (1965). In this theory, underarousal was considered an aversive state and related to the psychopath's boredom and inability to sustain attention, and the idea was that the psychopath sought out stimulation to increase arousal to a more optimal state. Sensation seeking and lowered serotonin levels have been related to the disinhibitory syndromes, such as psychopathy (Lidberg, Modin, Orelund, Tuck, & Gillner, 1985).

Research Supporting an Overarousal Physiological Theory of Violence

There is also another set of research traditions that has clearly supported an overarousal theory of aggression. Perhaps the most venerable tradition has been the study of the Type A person-

ality and cardiovascular disease and the testosterone level and aggression traditions. It is primarily in the study of the relationship between Type A personality pattern and cardiovascular disease that the emotion of anger and the pattern of interpersonal hostility have been implicated. The history of this research area is fascinating. It began in the 1950s with Friedman and Rosenman's (1959) operationalizing an old medical observation that a particular personality type they called *Type A* was a greater risk for cardiovascular disease and that this was a risk factor independent of other risk factors such as smoking and serum cholesterol levels. The Type A personality profile included ambition, competitiveness, expressed and experienced hostility, impatience, and a hurried lifestyle. The classification was made using coding systems of a structured psychiatric interview.

Subsequent research by Dembroski et al. (as cited in Siegman, 1994a) began dismantling the Type A construct and discovered that only expressed hostility (and not other factors, including the experience of hostility) was the toxic ingredient of the Type A construct (for a historical review, see Siegman, 1994b). Subsequent physiological research attempting to specify the mechanism of cardiovascular disease process has implicated heightened heart rate reactivity, blood pressure reactivity, catecholamine (e.g., adrenaline) secretion, and serotonin depletion. Kaplan, Botchin, and Manuck (1994), in an animal model of expressed aggression, found two pathways to coronary artery disease: dominant animals exposed to continual stressors (such as the large monkey catch glove, or introducing new animals that required renewed fighting to reestablish the dominance hierarchy) or physiologically highly reactive individuals regardless of status. Both types of animals were overtly highly aggressive. Applied to married couples' conflict interactions, Smith and Brown (1991) created an intensely argumentative and competitive condition for Type A people and their spouses and found that blood pressure increases accompanied the hostile interaction of hypertensive men.

Further specification of the psychological expressed hostility construct is also under way in this field of research. Smith (1994) has suggested that the Big Five personality dimensions (Costa & McCrae, 1987) further specify antagonistic hostility. Smith (1994) has suggested further that antagonism and neuroticism de-

scribe people who are "harsh, ill-tempered, demanding, angry, quarrelsome, intolerant, and irritable," (p. 35), antagonism and extraversion characterize people who are "domineering, combative, abrupt, and controlling" (p. 35), and people who are antagonistic and introverted can be described as "skeptical, aloof, unfriendly, and cynical" (p. 35).

Testosterone levels have been another physiological channel in which increased arousal is thought to be theoretically related to aggression. Archer (1994) has reviewed studies and meta-analyses of the relationship between testosterone levels and aggression, variously assessed. Using self-assessments of aggression with a questionnaire, Archer found the mean correlation with serum testosterone to be .15, whereas when peer or staff ratings of current aggression were used, the mean correlation was .38. In a meta-analysis by Dunbar and Adler (as cited by Archer), the overall weighted correlation for 24 studies was only .13. The correlations were significantly higher when salivary testosterone was used. In a much larger and more varied sample, Gray, Jackson, and McKinlay (1991) found that the correlation between questionnaire measures of aggression and serum testosterone was approximately .17, accounting for about 3% of the variance. In a behaviorally based rating of aggression used by Olweus (1986) for adolescent boys (which was related to peer ratings), the overall correlation was .28. Because it is well known that aggression increases testosterone levels, the direction of causation is unclear. Studies manipulating testosterone levels have produced mixed results. For example, in a controlled double-blind study in which testosterone levels were increased using infusions of gonadotropin-releasing hormone, McAdoo et al. (1978) found no significant differences in measures of aggression.

Combining the Two Traditions: The Gottman et al. (1995) Typology of Spouse Abuse

The Jacobson and Gottman (1999) study was the first to use an actual and highly conflictual laboratory marital interaction with physically violent men. The procedures were designed to emulate those developed by a Dutch marital researcher, Schaap (1982). Schaap had couples attempt to discuss and resolve two identified conflict areas in their marriage. This procedure

produced very high conflict discussions in Schapp's sample of Dutch couples. Jacobson and Gottman, in collaboration with Ann Ganley, a noted clinician in the area of spouse abuse, went to great lengths to guarantee the safety of the women in this study.

Gottman et al. (1995) reported that there were two types of highly violent wife batterers on the basis of a heart rate reactivity classification from a baseline to the highly conflictual marital interaction. There were clearly two kinds of men in this study during these high-conflict interactions: those whose heart rates were lowered below baseline and those whose heart rates increased. The *Type 1* men ("cobras"), who decreased their heart rates (and increased their vagal tone), were quite different in many ways from the *Type 2* men ("pit bulls"), who were cardiovascularly hyperreactive. Some of these differences were that *Type 1* men were violent outside the marriage to a wide variety of people in their lives, whereas *Type 2* men were not. *Type 1* men were significantly higher than *Type 2* men on the Antisocial scale of the Millon (1987) Clinical Multiaxial Inventory. *Type 1* men were significantly more likely to have threatened their wives with a knife or a gun than *Type 2* men. *Type 1* men encouraged independence in their wives, whereas *Type 2* men were likely to be highly jealous and threatened by their wives' independence. *Type 1* men were significantly more upset by their wives' demands and attempts at social control than *Type 2* men.

Furthermore, what may be more important, the *temporal* pattern of hostility, which consisted of belligerence, contempt, and defensiveness, was reversed in the two types of men over time. Figure 1 illustrates these two patterns. There were no mean differences in hostility averaged over the entire marital conflict discussion. However, the temporal patterns of hostility during the high-conflict marital interaction were reversed. *Type 1* men began with high levels of belligerence, domineering, contempt, and defensiveness (with accompanying lowered heart rate). It is a highly threatening and terrifying pattern, and the typical response by wives is their fear and submission, as well as their heightened cardiovascular arousal. This pattern of immediate and intense overt verbal aggression also has been described by Patterson (1982) as characteristic of delinquent boys. These boys' aggression toward peers is also

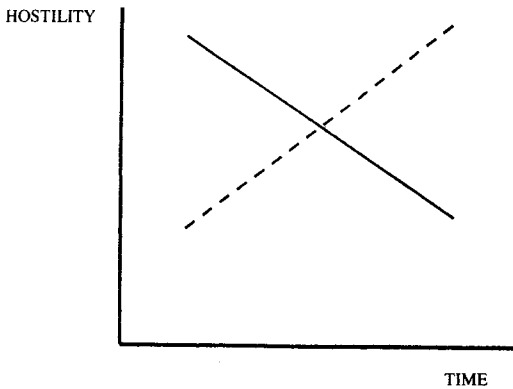


Figure 1. Temporal pattern of hostility in two types of violent men over a 15-min high-conflict marital interaction. Type 1 men (solid line) lowered their heart rates and Type 2 men (dotted line) increased their heart rates over a baseline condition.

sudden, immediate, and highly escalated. The pattern is reminiscent of the fight pattern described by Athens (1992) in his book on the creation of violent, dangerous criminals.

The temporal pattern of hostility in Type 2 men is more of a "slow burn," accompanied by an increased cardiovascular reactivity. Rushe (1995), in an unpublished dissertation based on these data, described the marital interaction as a power struggle. Thus, unlike the fear response of the wives of Type 1 men, this slow-burn pattern of escalating hostility by Type 2 abusive men was matched by their wives' escalating hostility during the high-conflict marital discussion.

In other words, the Gottman et al. (1995) Type 1–Type 2 findings brought together these two literatures: that on criminality–psychopathy and physiological hyporeactivity (physiological underresponding) and the Type A literature on overt anger–hostility and cardiovascular disease and physiological hyperreactivity. It suggests that there are two types of batterers, the hyperreactive men who are out of control with their anger–hostility and a second type who is not.

There were some potentially serious limitations to the Gottman et al. (1995) article. First, the sample sizes of the two types of men were small, and this fact alone cried out for a replication study. Second, the eyes-open preconversation baseline may have been flawed. Because it preceded the high-conflict discussion, it did not rule out the possibility that some men may

have been even more autonomically aroused in the baseline before the conversation and then simply returned closer to their actual baseline when the conversation began. Also, because the baseline was only 2 min long, it may have been too brief for a real accommodation to have occurred. Thus, Meehan et al. (2001) performed a valuable service in taking on a test of the Gottman et al. taxonomy.

However, perhaps the taxonomy that Gottman et al. (1995) discovered is fragile and depends on the procedures used to elicit the violent men's responses. Let us now consider the failure by Meehan et al. (2001) to replicate our findings. We suggest that this experiment may not be a failure to replicate the Gottman et al. findings because Meehan et al. did not precisely follow the Gottman et al. procedures of using a highly conflictual marital interaction. Instead, they used a milder marital interaction task. Meehan et al. (2001) wrote,

Assessors then, independently, informed both spouses of the areas they were considering asking the couple to discuss and assessed the participants' level of comfort with discussing these topics. If discomfort was expressed, then another topic was chosen in consultation with the spouse. (p. 397)

Indeed the severely violent men in the Meehan et al. study displayed less emotional aggression (contempt and belligerence) and more low-level negativity (defensiveness) in the marital interaction than did comparable men in the Gottman et al. (1995) study.

Does this choice of a lower conflict discussion make a difference? There is ample evidence in the field of hostility and cardiovascular disease that the expected relationship between expressed anger–hostility and cardiovascular reactivity (heart rate and blood pressure) is observed only when participants are deliberately angered by harassment and not observed under less intense conditions (Engebretson, Matthews, & Scheier, 1989; Siegman, 1994a; Siegman, Anderson, Herbst, Boyle, & Wilkinson, 1992; Suarez & Williams, 1990). In the field of the relationship between testosterone and aggression, it is also the case that low-provocation situations do not lead either to hostility or to testosterone secretion (Archer, 1994).

In another, as yet unpublished, study, Babcock, Yerington, and Green (2001) did follow the Gottman et al. (1995) procedures as well as using a standard anger-induction procedure. In their study, there were three samples, nonvio-

lent men (NV), low-level violent men (LLV), and severely violent men (SV). Babcock et al. included a longer, 4-min baseline. They found that the proportion of heart rate decelerators was "identical to that found by Gottman et al. (1995) in his severely violent sample." (Babcock et al., 2001, p. 22). Babcock et al. found that SV batterers had lower resting heart rates than LLV and NV men, suggesting a resting hypoarousal consistent with the literature on criminality and psychopathy (not found by Gottman et al.). In both the high-conflict couple interaction and the anger induction, autonomic hyperreactivity and sympathetic activation when angered were associated with psychopathy among LLV men, whereas hypoarousal and parasympathetic activation were related to psychopathy among SV men. Babcock et al. found that change in husbands' heart rate from baseline to the conflict discussion was significantly related to the women's report of their husbands' abusiveness. However, they found that increases in heart rate were related to sexual coercion, psychological aggression, and emotional-verbal abuse for all groups. Nonetheless, the heart rate reactivity responses and the psychopathy of the men was related oppositely in LLV and SV groups; the hyporeactive men in the SV group had higher levels of antisocial personality, whereas the hyperreactive men in the LLV group reported higher antisocial personality. There was no significant prediction in the NV group. Babcock et al. (2001) concluded the following:

In general, the current study supports the conclusions of the Gottman et al. (1995) study, with some notable caveats. Like Gottman, we found a subtype of batterers who exhibited a deceleration in heart rate from baseline. This subgroup represented approximately 20% of the severely violent sample. The severely violent batterers who evidenced a deceleration or minimal acceleration in heart rate reported the highest levels of psychopathy, antisociality, and trait anger, and were most likely to have injured their partners. . . . Among the low-level violent group the opposite was observed: Increased psychophysiological reactivity was related to antisociality, trait anger, and psychopathy. (p. 27)

Clearly, it will require more multimethod research to settle on a final classification scheme for batterers. This classification scheme is necessary before a biologically based theory is likely to be clinically useful. Probably some version combining the Gottman et al. (1995) and the Holtzworth-Munroe and Stuart (1994) typology of batterers as violent/antisocial, bor-

derline/dysphoric, and family-only batterers will eventually be supported by research. Babcock et al.'s (2001) study throws further light on the hyporeactive, severely violent, antisocial men and the hyperreactive low-level antisocial violent men. Babcock et al. did not find support for sympathetic nervous system arousal for severely violent borderline/dysphoric batterers.

It would also be helpful to investigate what triggers the violent episodes for these two types of men. Jacobson and Gottman (1999) suggested that it was intense jealousy for the Type 2 man and wife attempts at social control for the Type 1 man. The most reliable typology will emerge with a multimethod procedure that combines physiological assessment and self-report and includes detailed temporally specific behavioral measures of marital interaction in high-conflict discussions.

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