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Further Investigation of Genetics and Intimate Partner Violence

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Abstract

We thank Drs. Abbey, Bennett, DeWall, and Way for making truly outstanding points in their thoughtful commentaries. We agree with the feedback and advice from all of these distinguished scientists. Future work on genetics and intimate partner violence (IPV) should, when possible, include a larger number of genetic variants, closely examine gene by environment interactions, and study potential mechanisms explaining the connection between genetics and IPV. As with any research, but particularly with respect to studies on a controversial topic such as genetic correlates of IPV, extreme caution should be taken prior to generalizing results or deriving any practical applications from the data. Clearly, replication and extension of the findings in other populations is essential. Ultimately, we believe that it is worth pursuing this line of work given the possible contributions it may make to understand the etiology, prevention, and treatment of IPV in the future. Finding solutions to IPV will require the collaboration of a diverse group of constituents from many disciplines.

Keywords

Genetics; Intimate Partner Violence; Batterer Intervention; Multidisciplinary

We are deeply grateful to Drs. Abbey, Bennett, DeWall, and Way for their very thoughtful and insightful commentaries on our article published in this issue (Stuart et al., 2014). We also thank Dr. Renzetti for providing us with the opportunity to engage in dialogue regarding a social problem that is very important to all of us. We believe that grappling with these issues together, building on the suggestions of each of these distinguished scientists, will ultimately contribute to a greater understanding of intimate partner violence (IPV) and lead to more effective means of preventing and treating it.

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One of our primary career goals is to help find solutions to the global problem of IPV. We aim to make incremental steps toward this goal by conducting research on a broad spectrum of factors that are relevant to the etiology, classification, assessment, prevention, maintenance and treatment of IPV. We believe that conducting research on the role of genetic factors (as well as other possible biological correlates of violence, such as cortisol, brain functioning, etc.) is a potentially promising area in which to focus some research attention. Clearly, given the questionable efficacy of batterer intervention programs in the reduction of violence recidivism for at least some participants (Babcock, Robie, & Green, 2005; Feder & Wilson, 2005), more work needs to be done to prevent IPV. We believe that the examination of genetic factors related to IPV, with research ultimately attempting to match perpetrators to treatments, may carry some promise as a method to increase the efficacy of intervention programs.

DeWall and Way (2014) highlight one enormous problem in genetics research: a failure to replicate single gene association studies. In addition, the authors note that genetic risk scores with more than 2 polymorphisms would likely increase statistical power, and they also suggest selecting genes on the basis of their connection to specific neural pathways. We completely agree with all of these points. In our initial study published here, we selected two promising candidate genes from the literature on the basis of their robust associations with aggression. Although we were constrained by a limited budget to conduct this genetics research, our hope is that this study will spur future research on genetics and IPV by demonstrating the relationship between these two candidate genes and the perpetration of aggression. In our future work, we intend to expand significantly beyond our 2 gene cumulative genetic score by examining a larger set of genes in biologically relevant pathways. We also intend to replicate our findings across multiple samples (e.g., men arrested for domestic violence; community samples). We believe that this approach will lend more statistical power and greater utility in understanding the connection between genetics and IPV perpetration.

DeWall and Way (2014) also emphasize the importance of going beyond simple genetic association studies, as we have done in the current investigation, and to extend such research to the more critical genetic-environment interactions. Indeed, they and Dr. Abbey (2014, this issue) note that environmental factors moderate the impact of genetics on risky behaviors and psychopathology (e.g., Caspi, Hariri, Holmes, Uher, & Moffitt, 2010; Caspi & Moffitt, 2006), and must be taken into account when conducting this type of research. We agree that the work we have presented in this volume is limited in that we did not examine how our results may have been moderated by environmental factors. It is important to acknowledge that our results have little to no practical application at this time. We view our study as a conversation starter that illustrates the first step in a long program of research on genetic and epigenetic influences on IPV. In the long run, we plan to examine moderating factors of the genetic-IPV relationship, such as the influence of family of origin violence exposure, anger, hostility, substance use, relationship discord, psychopathology, and personality. Practical applications of our findings will be extremely limited until we, and others, have replicated these results in new samples, including replication of any potential environmental moderators. Moreover, the work that DeWall and Way cite regarding differential susceptibility (Belsky & Pluess, 2009) further highlights the complexity of these

relationships, and calls for both more work to be conducted, and more caution to be taken, when conducting research in this area.

Drs. Abbey, Bennett (2014, this issue), DeWall, and Way all noted that we must be mindful of both the appropriateness of our sample and generalizability of the work, given that our participants were hazardous drinking men in batterer intervention programs with relatively low incomes and education. We certainly agree that, as with any study, one must be attentive to the sample being investigated and the extent to which it is representative of the full population. While we fully acknowledge that our results do not generalize to all batterers arrested for domestic violence, or other non-arrested populations of violent men, we think it should be noted that approximately 50%–67% of arrested batterers meet criteria for hazardous drinking (e.g., Gondolf, 1999; Stuart, Moore, Kahler, & Ramsey, 2003; Stuart et al., 2006) and that an intervention focused on reducing alcohol use among men in batterer intervention programs resulted in reduced aggression for the short term (Stuart et al., 2013). Thus, hazardous drinking men who perpetrate IPV are clearly an important population to study.

Dr. Abbey (2014) suggested that alcohol should be used as an explanatory rather than a control variable in this type of work, and she noted that it would be helpful to readers if we discussed the literature on specific genetic variants that are linked to the co-occurrence of violence and alcohol misuse and whether these genes have a synergistic effect on subsequent partner aggression. These are excellent questions that demand further investigation. To date, no other investigators have studied the role that specific candidate genes play in IPV perpetration. To our knowledge, there is very little literature that examines the possible role of specific candidate genes in alcohol and violence concurrently in any type of sample. In a longitudinal study of Finnish violent alcoholics, Tikkanen et al. (2009) found that increased quantity of annual alcohol consumption predicted increased violence recidivism among men with the high activity MAOA genotype. The examination of alcohol as an explanatory variable in the genetics-IPV relation will be a key question for future longitudinal research to examine.

Dr. Abbey astutely pointed out that it is currently unclear whether there is specificity of genetic polymorphisms predictive of different forms of violence. We found that the same cumulative genetic score was associated with physical violence, psychological aggression, and injuries caused to partners. Future work will need to examine whether sexual aggression is predicted by a similar gene set, particularly when the cumulative genetic score has been expanded to include more polymorphisms. It is certainly possible that there are multiple neurodevelopmental pathways leading to different forms of aggression, and researchers will need to examine this question.

Dr. Abbey suggested that we should consider using fewer statistical controls when examining the genetics-IPV relationship, although Dr. Bennett recommended that we use more. However, all commentators highlighted the need for future research to utilize larger samples with greater variability in drinking (including nondrinkers), gathering data from relationship partners, and examining potential gender differences. These are all outstanding suggestions that highlight the innumerable areas for future research on genetics and IPV.

Dr. Bennett (and the other scientists) highlighted the need to learn more about mechanisms explaining the association between genetics and violence, eloquently noting that, “a pyramid of behavioral sequels could be set in motion by an individual’s genetic makeup” (p. xx). Due to the wide variety of possible mechanisms and the potentially small associated effect sizes, he wondered how genetically informed interventions would lead to improved outcomes. This is an excellent question. Although our findings cannot help to inform interventions at this point, our data may be the first step in this direction. One example of the potential to utilize genetic information to improve psychosocial intervention outcomes for certain subgroups (i.e., the field of so-called “therapygenetics”, Beevers & McGeary, 2012) can be found in the alcohol field. In Project MATCH (Matching Alcohol Treatments to Client Heterogeneity), Bauer et al. (2007) found that the *GABRA2* gene moderates the effects of Motivational Enhancement Therapy. Participants with the high-risk genotype of *GABRA2* who received Motivational Enhancement Therapy reported significantly fewer days abstinent from alcohol and significantly greater heavy drinking than participants with the low-risk genotype. Researchers in the future should examine whether individuals with low-risk *GABRA2* genotypes continue to have superior outcomes with Motivational Enhancement Therapy. If the findings are replicated in new samples, it may be worthwhile to attempt to match individuals with the low-risk *GABRA2* genotype (and/or dysfunction in the neurobiological system of which *GABRA2* is a part) to motivational interventions. Research on intervention effects for IPV could use this research as an example of how to determine whether specific genes moderate treatment outcomes, which could eventually lead to genetically informed treatment matching.

Given all of the unanswered questions in the field of genetics and IPV, and the very preliminary data that we presented in a small sample of hazardous drinking men arrested for domestic violence, we believe that we are far away from deriving *any* practical applications of our work, other than that these findings scream for replication and extension. However, in the long term, we hope that there will eventually be practical applications of this line of work, particularly if these applications speak to ways of improving IPV treatment outcomes. In a preliminary examination of whether men with certain genetic profiles respond differently to violence intervention, which could help to inform future research on matching individuals to treatment, we are in the process of studying whether the cumulative genetic score that we presented in this issue moderated the effects of alcohol treatment and batterer intervention. Specifically, the men in our genetic study participated in a randomized controlled trial that examined whether the addition of a brief motivational intervention targeting substance use also improved batterer intervention outcomes (see Stuart et al., 2013). In the future we also plan to examine whether a more extensive set of genes that are thought to influence biologically relevant neuropathways will be associated with treatment response. This work will need to account for variability in the environmental treatments provided, as well as a large set of potential moderators of the intervention effects. We concur with Dr. Bennett’s points regarding the importance of studying whether genetics may ultimately be useful in tailoring batterer programs, whether it is specific to particular subtypes of violent men (e.g., Holtzworth-Munroe & Stuart, 1994; Holtzworth-Munroe et al., 2000; Johnson, 1995; Johnson & Leone, 2005) or the highest risk offenders.

Although scientists frequently do not consider the social context into which their findings may fall, nor the potential reaction of constituent groups of scientific consumers, Dr. Bennett notes that several groups are likely to have strong reactions to this line of work. It is therefore critical to reiterate what we stated in our paper: “genetic variants do not *cause* aggression or IPV; rather, certain genetic variants may increase the risk or probability of violence through their impact on other factors (e.g., predisposition to poor emotion regulation, impulsivity)” (p. xx). When we conduct this research, we intend to be extremely cautious in how we interpret the findings and in what we suggest the implications of the work may be. We acknowledge that, at this point, there are no practical applications of this work, and we do not suggest that resources should be devoted toward or away from any batterer or victim services in light of our findings. However, we believe it is possible that *eventually*, after a long series of very carefully crafted scientific studies, replicated across multiple research laboratories using diverse populations, genetically informed IPV studies may help to improve existing treatment programs. Improving treatment outcomes and reducing violence is in everyone’s best interest.

At this time, we simply want to emphasize the point that studies on genetics and IPV should be conducted in pursuit of advancing our understanding of the etiology, treatment, and prevention of violence. There is room for everyone at the table -- feminists, victim advocates, batterer intervention program providers, scientists, and others. The world is complicated, and violence is clearly a biopsychosocial problem that will require cooperation among all constituents willing to search for and implement interdisciplinary solutions.

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