Commentary on Salvatore *et al.* (2017): Dyadic research can clarify non-shared environmental influences on alcohol use disorder and divorce

Research on the genetic and environmental influences on alcohol use disorder (AUD) and divorce (DIV) tends to focus on individuals. Theory and research that includes both partners can clarify the nature of genetic and environmental effects on AUD and the marital relationship and enhance prevention and treatment efforts.

In a large-scale study of twin and sibling papers in Sweden, Salvatore *et al.* [1] replicated a long line of previous work [2,3] showing a relationship between alcohol use disorder (AUD) and divorce (DIV). Although most of the covariance between AUD and DIV was attributable to genetic factors, almost half was accounted for by non-shared environmental factors, leading Salvatore *et al.* to suggest that 'one's partner may be a meaningful non-shared environment that contributes to the propensity to develop AUD or become divorced'. A similar conclusion about the partner as a source of non-shared environmental variance in marital outcomes was reached in previous studies of genetic influence on risk of divorce [4,5] and marital quality [6–8], and by a genetically informed study of alcohol use and marital conflict [9].

One implication of Salvatore *et al.*'s suggestion is that better understanding of the influence of non-shared environment on the covariation between AUD and DIV can be achieved by theory and research that incorporates both spouses [10]. For example, results from a study of Swedish twin women and their male partners showed large non-shared environment influences on both partners' marital quality, and on the overlap in wives' and husbands' marital quality [8]. The translation of findings from genetically informed studies indicating partner influence can be facilitated by theoretical frameworks from social psychology. Dyadic models have a long history in social psychology [11], and the recent evolution of relationship science has motivated the development of models that focus explicitly on the dyadic context of substance use. For example, the Actor–Partner Interdependence Model (APIM) provides a conceptual and statistical framework for examining dyadic relationships by distinguishing actor effects (i.e. the effect of a person's score on some predictor variable with the same person's score on an outcome variable) and partner effects (i.e. the effect of a person's score on some predictor variable with their partner's score on an outcome variable) [12,13]. This dyadic model is ideally suited to address questions about 'partner effects' as a 'non-shared environment' with implications for AUD and

DIV. For example, we used the APIM to test hypotheses about the longitudinal associations between husbands' and wives' AUD, marital interactions and marital adjustment. Husbands' AUD predicted a lower ratio of positive to negative behaviors among wives 3 years later but was not associated with their own marital behavior, nor was it associated with their own or their wives' marital adjustment 9 years later. By contrast, wives' AUD and P/N ratio were associated independently with their own and their husbands' marital adjustment. These findings suggested that marital adjustment in ALC couples may be driven more by the wives' than the husbands' AUD and marital behaviors [14].

Salvatore *et al.* also acknowledged remaining questions about 'the specific factors and mechanisms that contribute to these latent genetic and environmental correlations'. Recent extensions of the APIM focusing on cognitive and behavioral mediators of associations between alcohol use and marital outcomes have been advanced [15], and the availability of large dyadic data sets [16] that include genetic and substance use data offers the opportunity to test dyadic hypotheses about genetic and environmental influences on alcohol and marital outcomes. In addition, a recently advanced social-attributional model of alcohol reinforcement [17] suggests possible mechanisms for the effects of relationship processes on alcohol use. This model predicts that the degree of reinforcement from alcohol varies as a function of social context. In a large-scale laboratory study of marital interactions, alcohol consumption reduced negative behaviors, reduced negative reciprocity and increased self-reported reward selectively among couples who were dissatisfied with their relationships [18]. These results indicate acute alcohol reinforcement as one mechanism explaining prospective links between marital distress and alcohol problems.

In summary, Salvatore *et al.*'s conclusions about relationship partners as important sources of non-shared variance, and their questions about specific mechanisms underlying associations between AUD and DIV, are amenable to social psychological theory and research on partner effects and potential mediators of the bidirectional relationships between social interaction and substance use. As noted by others [19], we believe that continued collaboration between scientists studying genetics and social behavior will advance our understanding of the developmental dynamics of alcohol involvement and marriage and maximize the impact of prevention and treatment efforts.

Declaration of interests

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