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Alcohol misuse and relationship breakdown: Findings from a longitudinal birth cohort

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Alcohol misuse and relationship breakdown: Findings from a longitudinal birth cohort

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Abstract

Purpose: This study examined the associations between measures of alcohol abuse/dependence (AAD) and relationship dissolution from ages 19-30 in a New Zealand birth cohort.

Methods: The outcome measure was self-reported breakdown of a marital/cohabiting relationship during each year from age 20-21 to age 29-30. The study also used contemporaneous and one-year lagged measures of AAD symptoms; and time-dynamic covariate factors including life stress, other substance use, mental health status, peer and partner substance use and offending, unemployment, exposure to intimate partner violence, and prior relationship breakdown. Data were analysed using conditional fixed effects regression modelling augmented by time-dynamic covariate factors to control for confounding.

Results: Those with three or more AAD symptoms had unadjusted odds of relationship breakdown that were 2.17 to 2.23 times higher than those with no symptoms, but these associations did not differ by gender. Adjustment of the associations for both unobserved fixed effects and time-dynamic covariate factors reduced the magnitude of the associations, with those with three or more AAD symptoms having rates of relationship breakdown that were 1.57 to 1.66 times higher than those with no symptoms.

Conclusions: The results suggest a causal association between alcohol misuse and relationship breakdown, with estimates suggesting that alcohol use disorder accounted for 4.5% to 4.6% of marital/cohabiting relationship dissolution in the cohort.

Keywords: alcohol abuse/dependence, relationship dissolution, longitudinal study, non-observed confounding

1. Introduction

In recent decades there has been increasing interest in the effects of alcohol misuse on a range of life outcomes in adulthood, including the risk of relationship and family dissolution (Leonard and Rothbard, 1999; Marshal, 2003). A number of studies have shown that alcohol misuse is associated with increased risks of relationship problems and breakdown. For example, Collins et al (2007), using longitudinal data, found that more frequent alcohol intoxication at Waves 1 and 2 predicted increased risk of divorce at Wave 3. Also, Ramisetty-Mikler and Caetano (2005), using data from a five-year follow-up to a US household survey, found that female alcohol problems and male heavy drinking at baseline predicted relationship separation/divorce at follow-up. Waldron et al (2011), using twin data, found that alcohol use disorder predicted delayed marriage and early separation. A further study by Breslau et al (2011), using data from a range of surveys, found that individuals with a lifetime history of alcohol abuse had odds of divorce that were 1.8 times higher than those without a history of alcohol abuse.

An issue arising from these studies, however, is the extent to which alcohol misuse plays a direct causal role in increasing relationship instability and breakdown. It could be argued that the linkages between alcohol misuse and relationship instability reflect the influence of third or confounding factors which increase the risk of both alcohol misuse and relationship breakdown (Richards et al., 1997). Alternatively, exposure to relationship problems may increase the risk of alcohol misuse as individuals attempt to deal with the stress associated with relationship dissolution (Keyes et al., 2011; Overbeek et al., 2006; Prescott and Kendler, 2001; Veenstra et al., 2006).

One approach to the possible causal effects of alcohol misuse on relationship breakdown is to employ methods that account for the effects of non-observed confounding factors, such as fixed effects regression models, which can be employed in longitudinal studies (Cameron and Trivedi, 1998; Greene, 1990). Fixed effects models make it possible to take into account non-observed factors that have a *fixed* effect on the associations between alcohol misuse and relationship outcomes. The factors that may potentially be subsumed by the fixed effects term in studies on

alcohol and relationships are individual, family, social, and related factors that are fixed at the point of adolescence and which have a fixed effect on later alcohol misuse and relationship dissolution. However, the model does not address the issue of confounders that may vary over time, such as sources of life and relationship stress. To control for such confounding, the fixed effects model needs to be augmented by observed time-dynamic confounding factors. In addition, models may be fitted in such a way as to account for possible reverse causality in the associations between alcohol misuse and relationship breakdown through use of lagged measures of alcohol misuse in predicting later relationship breakdown (Fergusson et al., 2006).

A further issue is the extent to which the linkages between alcohol use and relationship outcomes may differ according to gender (Keyes et al., 2011; Perreira and Sloan, 2001; Ramisetty-Mikler and Caetano, 2005). For example, Ramisetty-Mikler and Caetano (2005) found evidence of gender differences in the extent to which alcohol problems were related to relationship dissolution, with female alcohol problems and male heavy drinking (1-3 per month) being associated with increased risk of relationship dissolution, and the opposite pattern (male alcohol problems and female heavy drinking) being associated with lower risk of dissolution. Also, in a review of the literature, Keyes et al (2011) suggested that associations between a range of stressful life events and alcohol consumption differ according to gender, although the evidence was mixed. For several smaller studies, Keyes et al reported that the linkages between stressful life events and alcohol consumption were stronger for women, whereas the associations were stronger for men in two larger studies. These inconclusive results concerning the linkages between gender and the effects of alcohol misuse suggests the importance of comparing the effects of alcohol misuse on relationship outcomes for males and females.

Against this background, the present study reports the results of a longitudinal study of the relationships between alcohol misuse (alcohol abuse/dependence symptoms) and relationship dissolution in a birth cohort of young people studied to age 30. The aims of this analysis were to: a) estimate the associations between measures of alcohol misuse and both contemporaneously-

measured and a lagged measure of relationship breakdown; b) examine whether the associations between alcohol misuse and relationship breakdown differed according to gender; and c) control the associations between measures of alcohol misuse and relationship breakdown for both non-observed fixed and time-dynamic confounding factors in order to examine the causal role of alcohol misuse in relationship dissolution.

2. Methods

2.1 Participants

The data were gathered during the course of the Christchurch Health and Development Study (CHDS). In this study a birth cohort of 1265 children (635 males, 630 females) born in the Christchurch (New Zealand) urban region in mid-1977 has been studied at birth, 4 months, 1 year and annually to age 16 years, and again at ages 18, 21, 25 and 30 years (Fergusson and Horwood, 2001; Fergusson et al., 1989). All study information was collected on the basis of signed consent from study participants and all information is fully confidential. All aspects of the study have been approved by the Canterbury (NZ) Ethics Committee.

2.2 Alcohol abuse/dependence (AAD) symptoms, ages 19-30

At ages 21, 25 and 30 years, study participants were interviewed concerning alcohol use using components of the Composite International Diagnostic Interview (CIDI)(World Health Organization, 1993) to assess DSM-IV (American Psychiatric Association, 1994) symptom criteria for AAD. At each point of observation a scale score was constructed based on the number of symptom criteria for AAD that the individual met during each 12-month period within the observation period, with this score ranging from 0 for those meeting no criteria to a maximum of 11 for those meeting all criteria. For the purposes of the present study, a categorical measure of AAD symptoms was constructed in

which participants were classified using a three-point scale as to the number of symptoms reported during each year from age 19-20 to age 29-30. These categories were: 0 symptoms, 1-2 symptoms, and three or more symptoms. All individuals in the cohort who met DSM-IV criteria for alcohol dependence had at least three symptoms. Over the period 19-30 years, 88.4% of female cohort members were classified as having no symptoms, 8.5% as having 1-2 symptoms, and 3.1% as having 3 or more symptoms. For males, 78.2% were classified as having no symptoms, 14.3% as having 1-2 symptoms, and 7.5% as having three or more symptoms.

2.3 Relationship dissolution, ages 19-30

A measure of relationship dissolution was constructed using life events data provided for each year from age 19-20 to age 29-30, based on questions from the Feeling Bad Scale (Lewis et al., 1984). Participants were asked to indicate whether they had experienced the dissolution of a cohabiting/marital relationship during any 12-month period. Due to the nature of the questionnaire items, it was not possible to determine the percentage of relationships that were cohabiting, as opposed to marital relationships.

Cohort members were classified using a dichotomous measure as to whether they had experienced the dissolution of a cohabiting/marital relationship during each year from age 19-20 to age 29-30. By age 30, 48.6% of female cohort members and 38.4% of male cohort members reported at least one cohabiting relationship, and 7.7% of both female and male cohort members reported at least one relationship dissolution.

2.4 Time-dynamic covariate factors (ages 20-30)

A number of time-dynamic covariate factors were abstracted from the study database. More detailed descriptions may be found in the Online-only Supplement Part A.

2.4.1 Stressful life events. These were measured for each year from 20-21 years to 29-30 years using items from the Feeling Bad Scale (Lewis et al., 1984) and custom-written survey items.

2.4.2 Length of unemployment. This was measured from age 20-21 to age 29-30 by asking participants about their experience of unemployment in each year.

2.4.3 Major depression. Major depression was assessed via items from the CIDI (World Health Organization, 1993), matched against DSM criteria (American Psychiatric Association, 1987, 1994) to derive a dichotomous measures of major depressive disorder for each year from ages 20-21 to 29-30 years.

2.4.4 Partner substance use and offending. Partner substance use and offending were measured for the twelve month period prior to each assessment (ages 21; 25; and 30 years).

2.4.5 Intimate partner violence (IPV) victimization and perpetration. At age 21, 25 and 30 sample members were asked about the occurrence of physical IPV perpetration and victimization using a 22-item scale that used items from the Revised Conflict Tactics Scale (CTS2, Straus et al., 1996).

2.4.6 Dependent children. At age 30, cohort members were questioned regarding their parenthood history. Using this information, a dichotomous measure of whether cohort members were parents of dependent children at each year from ages 20-21 to ages 29-30 was constructed.

2.4.7 Cannabis and other illicit drug use. At each assessment at ages 21, 25, and 30, cohort members were questioned regarding their use of cannabis and other illicit drugs during each year since the previous assessment, resulting in measures of cannabis use and other illicit drug use for each year from age 20-21 to age 29-30 years.

2.5 Statistical analyses

2.5.1 Associations between AAD symptoms and relationship dissolution. The pooled association between the categorical measure of AAD symptoms during each year and the contemporaneous relationship breakdown measure was estimated via Generalized Estimating Equation methods (Liang and Zeger, 1986; Zeger and Liang, 1986). These methods fit a population-averaged logistic regression model in which relationship breakdown for each year was modelled as a function of the categorical measure of AAD symptoms during that year. These models were of the form:

$$f(Y_{it}) = B_0 + B_1 X_{it} \quad (\text{EQ1})$$

where $f(Y_{it})$ was the log odds of reporting the dissolution of a cohabiting relationship reported by the i th subject in a given interval t ($t = 20$ -21 years to 29-30 years, representing 10 intervals), and X_{it} represented the categorical measure of AAD symptoms during the interval t . From the fitted models, estimates of the odds ratio (OR) and 95% confidence intervals (CI) of AAD symptoms for relationship breakdown were calculated. In addition, these models were extended to include terms representing: a) time; and b) a time period x AAD symptoms interaction, in order to account for the possibility that rates of AAD symptoms varied over time.

An issue arising from this analysis that because the exposure (AAD symptoms) and outcome (relationship breakdown) were measured contemporaneously, it could be argued that the association between the two variables may be due to either: a) AAD leading to increased relationship instability; or b) relationship dissolution contributing to increased rates of AAD symptoms. In order to account for the possibility of a reverse causal process in which relationship stress and dissolution may have increased AAD symptoms, the model described above in EQ1 was altered to include a one year-lagged categorical measure of AAD symptoms in place of the contemporaneous measure of AAD symptoms. In this model, AAD symptoms at interval $t-1$ (from ages 19-20 to ages 28-29) were linked to relationship breakdown at interval t (from ages 20-21 to ages 29-30), while all other aspects of the model remained the same.

2.5.2 Testing for gender differences in the association between AAD symptoms and relationship dissolution. As noted above, it may be argued that there exist gender differences in the strength of association between alcohol misuse and relationship dissolution. To examine this issue, both the contemporaneous and lagged models described above were extended to include a gender x AAD symptoms interaction term.

2.5.3 Fixed effects model for covariate adjustment. To adjust the associations between AAD symptoms and relationship breakdown for both: a) non-observed fixed effects; and b) observed time-dynamic confounding factors, conditional fixed effects regression models were fitted to the joint data over the ten measurement intervals, in two steps. These models were of the form:

$$f(Y_{it}) = \alpha_i + B_1 X_{it} + \sum B_k Z_{ikt} \quad (\text{EQ2})$$

In this model α_i are individual specific terms that are assumed to reflect the effects of all fixed sources of variation in the outcome Y_{it} . The fixed effects α_i are assumed to be constant over time and to be correlated with other predictors in the model. In the second step of the analyses, the models were augmented by the terms Z_{ikt} , representing the set of observed time-dynamic covariates, entered simultaneously. A one year lagged measure of relationship breakdown was included as a time-dynamic covariate factor, in order to control for issues of possible reverse causality in which prior relationship breakdown contributed to AAD symptoms. All observed time-dynamic covariate factors were included in all fitted models.

As in the analyses described above, a further set of analyses was conducted in which the measure of AAD symptoms at interval t was substituted by a one year-lagged measure of AAD symptoms at interval $t-1$, and the analyses repeated.

2.5.4 Population attributable risk (PAR). Finally, estimates of the population attributable risk (PAR) for relationship breakdown were calculated using methods described by Coughlin et al (1994), after adjustment for both unobserved fixed effects and time-dynamic covariate factors. This calculation was performed for both the contemporaneous and lagged models of AAD symptoms.

2.6 Sample sizes

The present analyses were based on samples ranging from 987 to 1011, representing 78% to 80% of the original cohort of 1265 participants, for whom data were available concerning AAD and relationship breakdown at ages 19 to 30. Further information concerning analyses of sample loss can be found in Online-only Supplement Part B.

3. Results

3.1 Associations between alcohol abuse/dependence (AAD) symptoms and relationship breakdown, ages 19-30

Table 1 shows the cohort divided into three categories for alcohol abuse/dependence symptoms (no symptoms; 1-2 symptoms; 3 or more symptoms) measured for each year from 20-21 years to 29-30 years. For each year, the Table shows the percentage of cohort members who reported experiencing the dissolution of a cohabiting/marital relationship at some point during that 12-month period. The Table also reports on the population-averaged odds ratio (OR) and 95% confidence interval (CI) for the association between AAD symptoms and relationship breakdown pooled over the ten observation periods, derived from Generalized Estimating Equation (GEE) modelling. The Table shows that, in general, those individuals who had three or more AAD symptoms were the most likely to report a relationship breakdown. This was reflected in the pooled OR, which showed significant ($p < .0001$) associations between the measure of AAD symptoms and relationship breakdown over the period 20-30 years. There was however no evidence of a statistically significant age x AAD symptoms interaction.

INSERT TABLE 1 HERE

As noted in Methods (above), the analyses above were repeated using a one year-lagged measure of AAD symptoms to predict relationship breakdown in the following year. The results of these analyses showed a significant ($p < .0001$) association between lagged AAD symptoms and relationship breakdown over the period 19-30 years, with no evidence of a statistically significant age x AAD symptoms interaction (see online Supplementary Table 1).

3.2 Tests of gender interactions in the associations between AAD symptoms and relationship breakdown, ages 19-30

In order to examine whether the associations between AAD symptoms and relationship breakdown differed for females and males, the GEE models described above were extended to include a gender by AAD symptoms interaction term. Initial analyses indicated that there were no statistically significant gender differences in reporting relationship breakdown ($p > .90$), but that females reported significantly ($p < .0001$) lower levels of alcohol problems than males. The results of these analyses that tested the gender x AAD symptoms interaction showed that, for both contemporaneous and lagged models, there was no evidence of a statistically significant gender by AAD symptoms interaction, suggesting that the strength of association between AAD symptoms and relationship dissolution did not differ according to gender.

3.3 Adjustment of associations for non-observed fixed effects and observed time-dynamic covariate factors

A possible explanation for the associations observed in Table 1 is that both AAD symptoms and relationship breakdown may be accounted for by a range of social, personal or related factors that increase the risk of both AAD symptoms and relationship instability, and by reverse causal processes in which life and relationship stress contributed to later AAD symptoms. In order to examine this issue, the associations between AAD symptoms and relationship breakdown were adjusted over two

steps. In the first step, a conditional fixed effects model was fitted to the data in order to account for all non-observed fixed sources of confounding (see Methods). In the second step, the fixed effects model was augmented by a series of time-dynamic covariate factors observed during the period 20-30 years including: life stress; unemployment; major depression; partner substance use; partner criminal offending; IPV perpetration and victimization; having dependent children; frequency of cannabis use; other illicit drug use; and prior relationship dissolution (see Methods). The results of these analyses are shown in Table 2, which shows the OR and 95% CI for relationship breakdown for the following models: a) unadjusted; b) adjusted for non-observed fixed effects; and c) adjusted for fixed effects and observed time-dynamic covariate factors. The Table shows:

1. Adjustment for non-observed fixed effects decreased somewhat the odds of being in a relationship during the period 20-30 years. After adjustment for fixed effects, those who had three or more AAD symptoms had odds of relationship breakdown that were 1.84 times (95% CI: 1.29-2.62) greater than those with no AAD symptoms.
2. The inclusion of time-dynamic covariate factors in the fixed effects models further reduced the magnitude of the estimated association between AAD symptoms and relationship status. After adjustment, those with three or more AAD symptoms had odds of relationship breakdown that were 1.66 times (95% CI: 1.13-2.45) those with no AAD symptoms.

INSERT TABLE 2 HERE

Again, the analyses were repeated using a one year-lagged measure of AAD symptoms in place of the measure of AAD symptoms, adjusted for both non-observed fixed effects and time-dynamic covariate factors. The results of these analyses showed a significant ($p < .001$) association between lagged AAD symptoms and relationship breakdown over the period 19-30 years after adjustment for non-observed fixed effects, and both fixed effects and observed covariate factors (see online Supplementary Table 2).

3.4 Population attributable risk (PAR)

As noted in Methods, estimates of the PAR for the role of AAD in relationship breakdown were calculated using methods described by Coughlin et al (Coughlin et al., 1994), after adjustment for fixed effects and time-dynamic confounding factors. These analyses showed that 4.6% of relationship breakdown could be accounted for by the presence of AAD using the contemporaneous measure of AAD, and 4.5% of relationship breakdown could be accounted for by the presence of AAD using the lagged measure of AAD.

4. Discussion

In this paper we have used data gathered over the course of a 30-year longitudinal study to examine the linkages between alcohol misuse and marital/cohabiting relationship dissolution during the period ages 19-30. The findings of this analysis and their implications are outlined below.

First, in agreement with a number of previous studies (Breslau et al., 2011; Collins et al., 2007; Ramisetty-Mikler and Caetano, 2005; Waldron et al., 2011), there were consistent bivariate associations between AAD symptoms and relationship breakdown. Those with three or more AAD symptoms had odds of relationship breakdown that were 2.23 times higher than those with no AAD symptoms. Similar results were found in a re-analysis employing one-year lagged AAD symptoms. In addition, there was little evidence to suggest that these effects differed by gender, with the analyses revealing no evidence of statistically significant interactions between gender and AAD symptoms in predicting relationship breakdown, indicating that the strength of association between AAD and relationship breakdown was similar for females and males.

Further analyses showed that, after controlling for a range of potential sources of confounding, including non-observed fixed confounding factors and time-dynamic covariate factors, including prior relationship breakdown, the associations between AAD symptoms and relationship breakdown remained statistically significant, with those reporting three or more AAD symptoms

having risks of relationship dissolution that were 1.66 times greater than individuals with no symptoms. Similar results were obtained using a one-year lagged measure of AAD symptoms.

The results of the present study suggest that the associations between AAD and relationship breakdown may be partially spurious and arise from observed and non-observed sources of confounding (Richards et al., 1997; Waldron et al., 2011). Specifically, control for confounding using fixed effects regression models and time-dynamic confounding factors, including life and relationship stress, reduced the associations between symptoms of AAD and relationship breakdown. However, even after such control significant associations remained between relationship dissolution and symptoms of AAD. These findings are consistent with the conclusion that alcohol misuse plays a causal role in increasing risks of relationship instability and dissolution. Estimates of the population attributable risk (PAR) suggest that alcohol misuse explained 4.5% to 4.6% of the dissolution of a marital/cohabiting relationship in the cohort. In general, the results of the study suggest that the adoption of laws and policies aimed at reducing alcohol consumption, and the use of treatments to address alcohol abuse and dependence issues amongst high-risk individuals, may contribute to a small reduction of the overall incidence of relationship instability and relationship dissolution in the population as a whole.

The results of the present study are also congruent with previous analyses of the present cohort (Boden et al., 2012) that demonstrated that alcohol misuse played a causal role in increasing the risk of physical intimate partner violence (IPV) perpetration. Collectively the results of these analyses suggest that alcohol misuse in the context of intimate partnerships contributes to both violence and relationship dissolution, and that interventions aimed at reducing alcohol consumption and problems with alcohol may play an important role in reducing domestic violence and increasing relationship stability.

An important finding of this analysis was that the associations between alcohol misuse and relationship breakdown did not differ according to gender. These findings are in contrast with studies that have suggested that the linkages between alcohol misuse and relationship instability

differ according to gender (Keyes et al., 2011; Perreira and Sloan, 2001; Ramisetty-Mikler and Caetano, 2005). One reason for this discrepancy may be that a number of studies have observed increasing levels of alcohol consumption and alcohol misuse amongst females in recent years (Gruza et al., 2008; Keyes et al., 2008; McPherson et al., 2004), which may be reflected in an increase in alcohol-related social and personal problems amongst females, including relationship instability. Furthermore, these findings suggest that public health interventions aimed at reducing alcohol misuse may be effective in reducing the risk of relationship instability for both males and females.

These conclusions need to be considered in the light of limitations of the study. These limitations include the fact that the study was based on a specific cohort studied in a specific social context; it may be possible that the associations between AAD symptoms and relationship outcomes may vary across cultures with differing patterns of alcohol consumption and relationship practices. Also, the associations observed in the present sample were observed at a relatively young age (up to 30 years), and the associations may vary for amongst older individuals or those with longer relationship histories. An additional limitation was that the present data were not able to differentiate between marital and cohabiting relationships. It may be possible that variations in relationship status (married v. cohabiting) may play an important role in the linkages between alcohol misuse and relationship instability. It should also be noted that the measures of AAD symptoms and relationship outcomes were obtained via self-report, and that sample loss over time was not entirely random, leading to errors of measurement that may compromise the estimation of model parameters. Also, the fixed effects models in the present analyses were unable to take into account sources of confounding that occurred prior to AAD symptom onset, and that varied across time, which could result in an overestimation of the associations between AAD symptoms and relationship breakdown after controlling for non-observed fixed effects. Also, although the analyses employed a measure of prior relationship breakdown to control for possible reverse causal relationships in which relationship breakdown increased the risk of AAD symptoms, further research

is necessary to elucidate possible reciprocal causal pathways between alcohol misuse and relationship instability.

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The Authors declare no conflict of interest.

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Table 1. Associations between contemporaneous AAD symptoms and relationship breakdown, ages 20 – 30.

% reporting breakdown of cohabiting/marital relationship	AAD symptoms			p ¹
	0	1-2	3+	
Age 20-21	4.9	8.7	11.9	
N	749	161	161	
Age 21-22	6.5	3.3	11.1	
n	811	120	72	
Age 22-23	8.7	15.7	15.2	
n	816	121	66	
Age 23-24	9.7	16.4	20.3	
n	834	110	59	
Age 24-25	8.5	15.4	23.0	
n	812	130	61	
Age 25-26	5.9	5.4	3.3	
n	864	93	30	
Age 26-27	6.4	10.3	6.7	
n	860	97	30	
Age 27-28	6.5	8.1	14.3	
n	853	99	35	
Age 28-29	6.3	6.0	21.9	
n	855	100	32	
Age 29-30	5.6	10.3	20.0	
n	855	97	35	
Population-averaged OR (95% CI)	1	1.49 (1.32-1.69)	2.23 (1.74-2.87)	<.0001

Test of age x AAD symptoms interaction: $X^2(1) = 1.01, p > .30$

Test of gender x AAD symptoms interaction: $X^2(1) = 0.12, p > .70$

¹Wald χ^2 from GEE model

Table 2. Associations between contemporaneous AAD symptoms and relationship breakdown (ages 20-30), adjusted for: a) non-observed fixed effects; and b) fixed effects and time-dynamic covariate factors.

Model	AAD symptoms			p ¹
	0	1-2	3+	
Unadjusted OR	1 --	1.49 (1.32-1.69)	2.23 (1.74-2.87)	<.0001
OR adjusted for non-observed fixed effects	1 --	1.36 (1.14-1.62)	1.84 (1.29-2.62)	<.01
OR adjusted for fixed effects and time-dynamic covariates ²	1 --	1.29 (1.06-1.57)	1.66 (1.13-2.45)	<.05

¹Wald χ^2 from GEE model

²Significant (p <.05) time-dynamic covariates included: life stress; major depression; illicit (non-cannabis) substance use; prior relationship breakdown.