Published in final edited form as:

Drug Alcohol Rev. 2017 January ; 36(1): 80–87. doi:10.1111/dar.12462.

Stability of Alcohol Use and Teen Dating Violence for Female Youth: A Latent Transition Analysis

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Abstract

Introduction and Aims—Alcohol use is one of the most widely accepted and studied risk factors for teen dating violence (TDV). Too little research has explored longitudinally if it is true that an adolescent's alcohol use and TDV involvement simultaneously occur. In the current study we examined whether there were latent status based on past-year TDV and alcohol use and whether female adolescents changed their statuses of TDV and alcohol use over time.

Methods—The sample consisted of 583 female youth in seven public high schools in Texas. Three waves of longitudinal data collected from 2011 to 2013 were utilised in this study. Participants completed self-report assessments of alcohol use (past year alcohol use, number of drinks in the past month, and episodic heavy drinking within the past month) and psychological and physical TDV victimisation and perpetration. Latent Transition Analysis was used to examine if the latent status based on TDV and alcohol use changed over time.

Results—Five separate latent statuses were identified: (i) No violence, no alcohol; (ii) Alcohol; (iii) Psychological violence, no alcohol; (iv) Psychological violence, alcohol; and (v) Physical and psychological violence, alcohol. Latent Transition Analysis indicated that adolescents generally remained in the same subgroup across time.

Discussion—This study provides evidence on the co-occurrence of alcohol use and teen dating violence, and whether teens' status based on dating violence and alcohol use are stable over time. Findings from the current study highlight the importance of targeting both TDV and substance use in intervention and prevention programs.

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The authors declare that they have no conflict of interest.

Keywords

Teen dating violence; alcohol use; latent transition analysis

Introduction

Teen dating violence (TDV) is associated with numerous negative consequences, including poor health, substance use, unhealthy weight control behaviours, and risky sexual behaviours [1,2]. In the current manuscript, we focus on physical and psychological TDV. Depending on methodology, research generally finds that between 20% and 35% of adolescents are victims of psychological TDV and between 10% and 25% are victims of physical TDV [3,4]. It is further estimated that about 20% of high school students report perpetrating physical TDV [5]. Despite the prevalence of and significant consequences associated with TDV, limited longitudinal research has elucidated the etiological factors predicting TDV [2,6]. Among adult and college populations, one of the most widely studied risk factors for and consequences of dating violence is substance use [6,7]. Thus, there is a critical need for examining these variables longitudinally [2,6]. While TDV victimisation and perpetration are significant problems that affect both males and females, the present study focuses on female experiences given accumulating evidence that females perpetrate TDV at a similar or greater rate than boys [2,5,8], and that the relationship between substance use and TDV may be more pronounced for females compared to males [9–11].

Several theoretical models have been proposed to account for the relationship between substance use and TDV [2]. The proximal-effects model suggests that the causal relationship between substance use and TDV may be the result of the acute effects of alcohol intoxication and drug use. Thus, one explanation for how alcohol consumption may cause violence is that a person who is becoming intoxicated and experiencing the pharmacologic effects of alcohol [12] may misperceive aggressive threats and react aggressively [6]. The proximal-effects model provides another theoretical rationale for the causal relationship between alcohol use and violence victimisation [13]. Specifically, the acute effect of alcohol inhibits cognitive and physical functioning, which may result in a decreased perception of risk and ultimately to an increased risk for TDV victimisation [14]. This latter interpretation does not imply or indicate that victims who are under the influence of alcohol are to blame for violence, but may indicate heightened vulnerability. Developmental models also provide possible explanations for the alcohol use/TDV link. Alcohol use during adolescence is posited to hinder the development of effective interpersonal and communication skills, potentially resulting in unhealthy relationships and the utilisation of maladaptive relationship behaviours [15–17]. Moreover, adolescent substance use may increase the likelihood for involvement in deviant peer affiliation that reinforce or are conducive to TDV [17,18]. Finally, Jessor's [19] problem behaviour theory posits that certain behaviours (e.g. alcohol use, TDV) co-occur because of an underlying "syndrome" of problem behaviour [20].

In addition to theoretical models, the empirical link between alcohol use and TDV has been supported by numerous cross-sectional studies.[5, 21]. However, this research is limited in that it cannot explain *how* the alcohol-TDV may co-occur and change over time. In a recent

meta-analysis (23 cross sectional studies; 5 longitudinal studies) examining longitudinal and cross-sectional associations between alcohol use and TDV victimisation and/or perpetration, Rothman and colleagues [6] found a significant relationship between three dimensions of alcohol use (e.g. frequency of drinking, problem drinking, episodic heavy drinking [EHD]) and TDV perpetration. Using measures of association from both the longitudinal and cross-sectional studies, the overall fixed effects of alcohol on TDV perpetration was 1.23 (95% confidence interval 1.16–1.31), and the overall random effect was 1.70 (95% confidence interval 1.39–2.08). A growing number of longitudinal studies have attempted to examine the complex relationship between alcohol use and TDV. For example, Foshee *et al* examined the longitudinal relationship between baseline alcohol use and future TDV perpetration and found a significant temporal relationship among female high school students [9]. Similarly, in an ethnically diverse sample of high school students, Temple et al [2] supported the longitudinal relationship between TDV and substance use by finding that alcohol use at baseline predicted physical TDV perpetration the following year, even after controlling for baseline violence.

In an effort to further understand the relationship between alcohol use and TDV, a few studies have examined the longitudinal relationship between different types (e.g. psychological abuse, physical violence) and trajectories of TDV and alcohol use [1, 22]. Using a nationally representative sample, Exner-Cortens *et al.* [1] found that psychological TDV victimisation for females (12–18 years old) predicted EHD during young adulthood (18–25 years old), whereas experiences with both physical and psychological TDV victimisation for females was not significantly related to adulthood EHD controlling for previous alcohol use. Similarly, among rural adolescents, Foshee and colleagues [22] found that psychological victimisation was longitudinally related to alcohol use while physical victimisation was not. Findings from both studies suggest the temporal relationship between TDV and alcohol use may differ based on TDV type. Given the co-occurrence or mutuality of TDV [23] and complexity of association between TDV and alcohol use [1], we will examine the relationship between alcohol use and TDV perpetration and victimisation simultaneously and longitudinally. This approach, which allows us to examine how females may change their involvement in alcohol and TDV *over time*, is a natural extension of existing literature that considered substance use [21] and TDV [23] subgroups separately using cross-sectional data.

The present study will address two research questions: (i) whether there are distinct homogenous female subgroups based on past-year DV and recent/current alcohol use; and (ii) whether female adolescents in these subgroups change their latent TDV and alcohol use statuses over time.

Methods

Participants

Five hundred and eighty-three female adolescents ($M_{\text{age}} = 15.1$, $SD_{\text{age}} = 0.78$) in seven Texas public high schools participated in this study, which was approved by the last author's Institutional Review Board. At baseline, participants were Hispanic (32%), White (30%),

African American (26%) and other (12%); and were in 9th (n=437), 10th (n=140) and 11th grade (n=6).

Procedure

Surveys were conducted annually in spring 2010 (Wave1), spring 2011 (Wave2), spring 2012 (Wave3), and spring 2013 (Wave4). To increase validity, we emphasised privacy by asking participants to not write any identifiable information on surveys, having teachers and school-administrators leave the room during administration, and by informing participants that their responses were protected by a federal certificate of confidentiality. At each wave, participants received a \$10 gift card to a local retailer. The retention rate for each wave, relative to baseline, was 93% at wave 2, 86% at wave 3, and 75% at wave 4. At wave 4, participants who graduated from or who were no longer in high school (27%) completed the survey online.

Measures

Physical and Psychological Dating Violence Perpetration and Victimization (Waves 2, 3 and 4). The Conflict in Adolescent Dating Relationships Inventory [24] measured physical and psychological TDV perpetration and victimisation at each wave. Students responded to 50 items regarding her current or most recent dating partner's aggressive behaviour (victimisation: 25 items) and her own aggressive behaviour (perpetration: 25 items) during a conflict or argument in the past year. Because the reference period for the Wave 1 questionnaire was about lifetime experiences with TDV (as opposed to past year), reports of abuse at Wave 1 were not included in analyses. The current study is limited to reports of physical violence (8 items; e.g. "I (he/she) kicked, hit or punched him (me)") and psychological abuse (20 items; e.g. "He (I) ridiculed or made fun of me (him/her) in front of others"). We created one binary TDV variable to represent physical TDV victimisation (perpetration): a positive endorsement on one or more items indicated that the participant experienced physical TDV victimisation (perpetration). We also created one binary TDV variable to represent psychological TDV victimisation and/or perpetration: individuals who endorsed 4 or more items of 10 were classified as having experienced psychological TDV victimisation and/or perpetration. Those who reported only a few minor acts of psychological victimisation or perpetration were classified as non-victims and non-perpetrators, because rare, non-severe forms of psychological TDV could occur in what might otherwise be considered non-abusive relationships [25]. Thus, we had a total of four TDV indicators at each wave: Psychological perpetration (The alpha coefficient at W2:.80, W3:.80, W4:.84) and victimisation (The alpha coefficient at W2:.80, W3:.82, W4:.85); and physical perpetration (The alpha coefficient at W2:.78, W3:.80, W4:.77) and victimisation (The alpha coefficient at W2:.73, W3:.80, W4:.79).

Past year alcohol use (Waves 2, 3 and 4) was measured with the following yes/no question: "Since your last survey (about 1 year ago), did you use alcohol (more than just a few sips)?"

Past month alcohol use (Waves 2, 3 and 4) was measured with the following question: "On average, how many drinks do you have per drinking occasion? (please keep in mind that a

beer, glass of wine, and shot of liquor each equal 1 drink).” One or more alcohol drinks in the past 30 days indicated a positive endorsement of past month alcohol use.

Past month EHD (Waves 2, 3 and 4) was measured with the following item: “Binge drinking is defined as 4 or more drinks for girls. In the past month, how many days would you say you participated in binge drinking.” A positive endorsement on at least one day among 30 days indicated that the participant engaged in this behaviour.

Analytical plan

Mplus 7.11 [26] was used to conduct Latent Transition Analysis (LTA), which is an extended version of Latent Class Analysis (LCA) for longitudinal data [27]. LCA can identify distinct and mutually exclusive subgroups having similar patterns of response to observed categorical variables by estimating item-response probability and prevalence [27]. LTA provides item-response probability and prevalence, as well as transition probability, which shows membership change conditional on an individual’s latent status in a previous wave [27]. We used LCA to determine the number of latent TDV and recent (e.g. past-year) and current (e.g. monthly) alcohol use statuses for each wave. Finally, we used LTA to determine if the individuals’ membership in latent statuses changed over time. Thus, item-response probabilities, prevalence and transition probabilities are based on our final LTA model. We employed full information maximum likelihood [28] to handle missing data. Physical TDV victimisation and perpetration, psychological TDV victimisation and perpetration, past-year and past-month alcohol use, and past-month EHD were included in the LCA and LTA models. We selected the optimal number of latent statuses at each wave based on three criteria: (i) the Bayesian Information Criterion (BIC); (ii) the adjusted Lo-Mendell-Rubin likelihood ratio test (LMR) [29]; and (iii) theoretical interpretation. Smaller BIC values and significant LMR test, whether k status is better than $k-1$ at $P < 0.05$, indicate a better model fit [30–32]. Because the latent statuses can be different in each wave, a model with measurement invariance across the three waves (e.g. model with restricted item-response probability across waves, $BIC = 8524.73$) and another model with measurement variance (e.g. model with unrestricted item-response probability across waves, $BIC = 23072.23$) were examined and compared. The comparison showed that an assumption for measurement invariance across three waves could be held. Because age and ethnicity did not significantly predict class membership, we did not investigate these variables further.

Results

Descriptive statistics

The number of female youth who reported past-year TDV, past-year alcohol use, EHD and past month alcohol use is shown in Table 1. The rate of TDV and the rate of alcohol use varied.

Latent TDV and alcohol-user status

Because a five-status solution provided the best model-fit across waves in the LCA (see Table 2), five latent statuses were identified in LTA: (i) No violence, no alcohol (NV,NA); (ii) Alcohol (A); (iii) Psychological violence, no alcohol (PV,NA); (iv) Psychological

violence, alcohol (PV,A); and (v) Psychological and physical violence, alcohol (PPV,A) (see Table 3).

At Wave 2 and 3, the largest status (28.5%) was NV,NA as these youth had a low likelihood of any type of TDV or alcohol use. The second largest status (23.6%) was A as these youth had a high likelihood of drinking alcohol (Item-probabilities for past-year alcohol use: 1.00; monthly alcohol use: 0.99). However, the largest and second largest status switched at Wave 4 such that the largest status was A and second largest status was NV NA. The third largest latent status (18.5%) was PV,A as members in this status had a high probability of experiencing psychological TDV (item-probabilities for perpetration: 0.99; victimisation: 0.77) and drinking alcohol (past-year: 1.00; monthly use: 0.97). The fourth latent status (15.1%) was the PV,NA status as members in this status had a high probability of experiencing psychological TDV (perpetration: 0.91; victimisation: 0.84) but a lower probability of drinking alcohol (past-year: 0.06; EHD: 0.00; monthly use: 0.00). The fifth latent status (14.2%) was PPV,A as members in this status had high probabilities on all TDV (psychological perpetration/victimisation: .87/.88; physical perpetration/victimisation: 0.88/0.86) and alcohol use items (past-year: 1.00, EHD: 0.49; monthly use: 0.97). At Wave2, the fourth largest status was PV,NA whereas at Waves 3 and 4, the fourth largest status became PPV,A indicating higher rates of alcohol use with age.

Latent transition probability

The transition probabilities to remain a certain status in the following year are shown in the bold-font diagonals whereas the transition probabilities from a specific status to another status the following year appear in the off-diagonal numbers in the column in Table 4.

Wave2 to Wave3—Youth in all statuses had high probability to remain in the same status. If youth in the NV,NA status did transition, they were most likely to move to the A status (0.19). Youth in the PV,NA status were most likely to transition to the NV,NA status (0.25). Importantly, if youth in the A transitioned to a different status, they were more likely to move to PV,A (0.18) and if youth in the PV,A moved to different status, they were more likely to move to A (0.18). If PPV, A transitioned, they were more likely to move to A (0.19) or PV,NA (0.17).

Wave3 to Wave4—The patterns of transitioning or remaining in a certain status were similar to the ones from Wave2 to Wave3 although probabilities in statuses changed. For example, remaining probabilities for NV,NA (0.62) and PVV,A (0.55) slightly decreased whereas the remaining probabilities for A (0.62) and PV,A (0.55) slightly increased. Interestingly, if youth in PPV,A transitioned, they were more likely to transition to either A (0.19) or PV,A (.16). In contrast, if youth in A transitioned, they were more likely to transition to PV,A (0.25). If PV,A transitioned, they were more likely to transition to A (0.26). Finally, PV,NA (0.27) showed the lowest remaining probabilities across statuses. Youth in PV,NA transitioned to A (0.20) followed by PPV,A (0.19), NV,NA (0.18), and PV,A (0.15).

Discussion

This is the first known study to examine the longitudinal relationship between alcohol use and TDV utilising latent transition analysis. Findings extend the limited previous literature that focused on identifying substance use [21] and TDV subgroups [23], independently and subsequently examining the relationship between these subgroups and other variables (e.g. comparing the relationship between different TDV subgroups and alcohol use) [23]. By examining alcohol use and TDV simultaneously, we examined how these behaviours co-occur – beyond simple correlations.

LTA results demonstrated the complex relationship between alcohol use and TDV. The smallest TDV and alcohol use status was the PV,NA at Waves 3 and 4, indicating that violence rarely occurs among girls who also do not use alcohol. In addition, a third of female youth were members of either the PV,A status or PPV,A status across all waves, which provides further evidence of the link between alcohol and violence. Nevertheless, 23.1% (Wave 2) to 30.5% (Wave 4) of female youth who drank alcohol were not involved in TDV (i.e. A), suggesting that alcohol is not a necessary or sufficient predictor of TDV [33,34].

Female adolescents mostly remained in the same statuses across all time points. That is, female youth in the PV,A and PPV,A statuses continuously engaged in both alcohol use and TDV across waves. However, an important finding emerged such that when female youth in the A status did transition, they were most likely to transition to a PV,A status across waves. Thus, it appears that once females initiated alcohol use or experienced TDV, they were less likely to move to a violence-or alcohol- free status, and were more likely to move to risky statuses (e.g. A, PV,A or PPV,A). These findings are consistent with previous literature, which have found a significant relationship between TDV and alcohol use among females [1, 22]. Thus, findings from the current study in conjunction with findings from previous studies [1, 2, 22] indicate that the relationship between TDV and substance use is particularly salient for females.

Theoretical models provide explanations for the findings. As posited by the developmental theoretical mode, difficulties with communication and interpersonal skills resulting from adolescent alcohol use might have a profound negative influence on romantic relationships and ultimately result in TDV [15–17]. For example, adolescents who have not developed adaptive communication and interpersonal skills might have difficulties regulating emotions in romantic relationships, particularly when they drink, which might lead to TDV. Deficits in interpersonal and communication skills are likely to remain stable across time, thus the link between alcohol use and TDV may remain stable or increase over time.

Second, the finding supporting the potential for alcohol use to predict TDV supports the proximal-effects model. It is possible that adolescents who consume alcohol might be more affected by the psychopharmacological effects (e.g. reduced inhibitions and decreased information processing) of alcohol, thus making them more prone to aggressive behaviours. The perpetration of aggressive behaviours is likely to similarly occur in both intimate (e.g., TDV) and interpersonal relationships (e.g. bullying, peer violence), as peer and dating

violence are strongly related and often overlap [35]. Thus, the findings from the current study are consistent with Jessor's [19] problem behaviour and problem syndrome theories, which posit that problem behaviours often co-occur because of an underlying syndrome marked by unconventional behaviours and ideals and deviation from social norms [17].

Finally, as with adult and college populations, TDV perpetration and victimisation co-occurred. However, different theoretical models have been proposed to account for the possible differential influence of alcohol use on TDV perpetration and victimisation. For example, according to the proximal-effects model, it is possible that the actuate effects of alcohol hamper cognitive and physical functioning resulting in a reduced ability to perceive risk, and ultimately to an increased risk for TDV victimisation. In contrast, alcohol use might lead to an increased risk for TDV perpetration as a result of the perpetrator's reduced ability to restrain cognitions and behaviours, which has been termed "disinhibition" [17,36]. As proposed by Rothamn and colleagues [6], this alcohol related disinhibition might be more pronounced for adolescents, as their cognitive capacities and control is less developed relative to adults.

In conjunction with previous research [2], findings from this study highlight the need for integrated intervention and prevention programs that target both TDV and substance use. Programs such as the *Fourth R* [37], which targets the shared risk and protective factors of both TDV and substance use may hold the most promise. Furthermore, targeted and tailored prevention programs should be developed. For example, Screening adolescents for a history of alcohol use and TDV might be an important initial step in the initiation of prevention and intervention efforts [1]. Indeed, preliminary evidence suggests that screening, providing a brief intervention, and a referral to treatment model might be effective for use with adolescent samples [38]. Although prevalence of PPV,A was small, this group could have severe negative consequences from TDV and alcohol use and warrants increased attention.

While the longitudinal examination of the co-occurrence of TDV and alcohol use is a major contribution to the literature, findings should be interpreted in light of several limitations. First, the current study used a female school-based sample from a particular region, which limits generalisability and introduces possibility of a clustering effect. Future research should utilise latent transition analysis to examine the longitudinal latent alcohol use and TDV statuses in male adolescents and in national samples. Second, we focused on specific types of TDV (physical and psychological) and substance use (alcohol). Future work should consider different types/severity/intensity of substance use and TDV (e.g. sexual TDV). While guided by theory, previous research, and logic [39,40], we categorised psychological abuse somewhat arbitrarily, which may have influenced the identification for subgroups in LCA. In addition, because the relationship between alcohol use and TDV can be complicated due to mediators or moderators (e.g. sexual orientation, family alcohol or violence history) or different relationship characteristic (e.g. jealousy), future studies should be more inclusive to understand the complexity of the interrelationship of alcohol use and TDV. Furthermore, although a few females (10% of sample) had not dated by wave2, they could have dated and thus experienced TDV at wave3 or 4. Consequently, we felt it necessary to retain these students, which means that some of our findings may have been influenced by non-daters. Finally, future research would benefit by utilising collateral

reports (e.g. partner report) to help elucidate the relationship between substance use and TDV.

Conclusions

Latent transition analysis found support for the transition from the alcohol use status to the alcohol use plus violence status indicating a relationship between alcohol use and TDV. Overall, findings support that prevention efforts should focus on both alcohol use and TDV.

Acknowledgments

This research was supported by Award Number K23HD059916 (PI: Temple) from the Eunice Kennedy Shriver National Institute of Child Health & Human Development and 2012-WG-BX-0005 (PI: Temple) from the National Institute of Justice. The content is solely the responsibility of the authors and does not necessarily represent the official views of National Institute of Child Health & Human Development or National Institute of Justice. This work would not have been possible without the permission and assistance of the schools and school districts.

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Table 1

The number of adolescent girls who experienced past-year dating violence and consumed alcohol

Variables		2011(Wave2)	2012(Wave3)	2013(Wave4)
Psychological dating violence perpetration	NO	240(50%)	225(51%)	225(55%)
	YES	241(50%)	216(49%)	182(43%)
Psychological dating violence victimisation	NO	250(52%)	238(54%)	222(55%)
	YES	231(48%)	203(46%)	185(45%)
Physical dating violence perpetration	NO	351(73%)	333(76%)	320(79%)
	YES	130(27%)	108(24%)	87(21%)
Physical dating violence victimisation	NO	377(78%)	347(79%)	333(82%)
	YES	104(22%)	94(21%)	74(18%)
Past-year alcohol use	NO	228(43%)	200(40%)	145(33%)
	YES	309(57%)	297(60%)	300(67%)
Episodic heavy drinking in the past month	NO	444(84%)	376(77%)	319(72%)
	YES	85(16%)	114(23%)	123 (28%)
Monthly alcohol use	NO	248(47%)	218(44%)	151(34%)
	YES	283(53%)	272(55%)	289(66%)

Table 2

Latent Class Analysis fit index each wave

2011 (Wave 2)	Model	AIC	BIC	Adjust BIC	LRT	Entropy
1-Status solution		4342.81	4372.83	4.50.61	N/A	N/A
2-Status solution		3623.38	3687.73	3640.11	721.09 ***	0.99
3-Status solution		3370.33	34689.00	3496.00	268.81 ***	0.93
4-Status solution		3199.20	3332.18	3233.77	183.49 ***	0.86
5-Status solution		3149.48	3316.78	3192.98	64.43 ***	0.89
6-Status solution		3126.69	3328.30	3179.11	38.04	0.89
2012 (Wave 3)						
1-Status solution		4056.56	4086.05	4063.83	N/A	N/A
2-Status solution		3341.68	3404.87	3357.26	716.46. ***	0.99
3-Status solution		3107.86	3204.78	3131.74	244.90 ***	0.90
4-Status solution		2979.75	3110.34	3011.95	141.26 ***	0.86
5-Status solution		2933.52	3097.81	2974.02	61.01 **	0.88
6-Status solution		2923.75	3121.75	2972.56	25.26 ***	0.89
2013 (Wave 4)						
1-Status solution		3473.49	3502.21	3480.00	N/A	N/A
2-Status solution		2936.94	2998.48	2950.88	658.86 ***	0.99
3-Status solution		2710.33	2804.69	2731.70	237.74 ***	0.90
4-Status solution		2622.17	2749.35	2650.96	102.07 ***	0.89
5-Status solution		2587.49	2747.49	2623.72	49.66 ***	0.93
6-Status solution		2588.53	2781.35	2632.20	14.65	0.94

Note.

* $P < 0.05$ *** $P < 0.001$.

After 6 status, the model did not converge.

Table 3
Prevalence of latent status membership and item-response probabilities in Latent Transition Analysis

	No violence, no alcohol	Alcohol	Psychological violence, no alcohol	Psychological violence, alcohol	Psychological and physical violence, alcohol
Prevalence of statuses					
2011(W2)	n=157 (28.5%)	n=127 (23.1%)	n=87 (15.8%)	n=101 (18.4%)	n=78 (14.2%)
2012(W3)	n=170 (30.9%)	n=134 (24.4%)	n=67 (12.2%)	n=93 (16.9%)	n=86 (15.6%)
2013(W4)	n=145 (26.4%)	n=168 (30.5%)	n=43 (7.8%)	n=120 (21.8%)	n=74 (13.5%)
Psychological perpetration					
1=NO	0.94	1.00	0.09	0.01	0.13
2=YES	0.06	0.00	0.91	0.99	0.87
Psychological victimisation					
1=NO	0.94	0.86	0.16	0.23	0.12
2=YES	0.06	0.14	0.84	0.77	0.88
Physical perpetration					
1=NO	0.98	0.95	0.62	0.84	0.12
2=YES	0.02	0.05	0.38	0.16	0.88
Physical victimisation					
1=NO	0.99	0.96	0.65	0.97	0.14
2=YES	0.01	0.04	0.35	0.03	0.86
Past-year alcohol use					
1=NO	0.97	0.00	0.94	0.00	0.00
2=YES	0.03	1.00	0.06	1.00	1.00
Episodic heavy drinking in the past month					
1=NO	1.00	0.68	1.00	0.64	0.51
2=YES	0.00	0.32	0.00	0.36	0.49
Monthly alcohol use					
1=NO	1.00	0.01	1.00	0.03	0.03
2=YES	0.00	0.99	0.00	0.97	0.97

Note: Bold numbers represent moderate to high probabilities.

Table 4

Transition probabilities across waves

	No violence, no alcohol	Alcohol	Psychological violence, no alcohol	Psychological violence, alcohol	Psychological and physical violence, alcohol
2011(W2)→2012(W3)					
No violence, no alcohol	0.65	0.19	0.09	0.04	0.03
Alcohol	0.16	0.51	0.04	0.18	0.11
Psychological violence, no alcohol	0.25	0.06	0.47	0.07	0.15
Psychological violence, alcohol	0.10	0.18	0.07	0.52	0.12
Psychological and physical violence, alcohol	0.03	0.19	0.17	0.04	0.57
2012(W3)→2013(W4)					
No violence, no alcohol	0.62	0.22	0.08	0.08	0.00
Alcohol	0.07	0.62	0.02	0.25	0.03
Psychological violence, no alcohol	0.18	0.20	0.27	0.15	0.19
Psychological violence, alcohol	0.04	0.26	0.08	0.55	0.07
Psychological and physical violence, alcohol	0.05	0.16	0.09	0.16	0.55

Note. Item-response probabilities were constrained to be equal at all three years. Bold numbers represent the probability of membership in the same latent status at two consecutive years.