
Article

Women's Self-Perceived Similarity to Their Mother and Associations with Patterns of Alcohol Misuse over 20 Years

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Abstract

Aims: This study examined transgenerational transmission of risk for female alcohol misuse. Women's perceived similarity to their mother/father in adulthood was examined in terms of its influence on the expected association between perceived maternal alcohol use and female offsprings' trajectories of alcohol misuse. We hypothesized that a daughter's self-perceived similarity to her mother, in instances where her mother was perceived to be a frequent- or problem-drinker, would be associated with an increase in the daughter's count of negative consequences from alcohol use and potential symptoms of alcohol dependence across adulthood.

Short summary: Women's perceived similarity to their mother/father was examined as a factor influencing associations between perceived parental alcohol use during childhood and patterns of alcohol misuse in adulthood. Women's self-perceived similarity to their frequent- or problem-drinking mothers increased the risk of negative consequences from drinking over time as well as potential symptoms of alcohol dependence over time.

Methods: Analyses utilized data from a survey of women ($N = 911$) who were followed over a 20-year period, beginning in 1981. Women, ages 21 or older and living in households in the contiguous USA, were eligible, and women who consumed four or more alcoholic drinks per week were oversampled. Model estimates were weighted to adjust for the oversampling of heavier drinking women and to reflect national demographics. Latent growth mixture models estimated regression parameters that captured variation in participants' alcohol misuse over time.

Results: Women who reported that their mother was a frequent- or problem-drinker and who perceived themselves to be similar to their mother, in general, showed increases in alcohol misuse. The same pattern of results was not shown for fathers.

Conclusions: Results support that interventions seeking to reduce female alcohol misuse should address the role of perceived similarity to heavy-drinking female role models or 'female-drinker' prototypes to reduce problem-drinking behavior among female drinkers.

INTRODUCTION

Among the almost 67% of adult women in the USA who report past-year alcohol use, 24% state that their typical consumption exceeds NIAAA's weekly recommended limit of seven or fewer drinks, placing them at risk for a potential alcohol use disorder (AUD) and other alcohol-related consequences (NIAAA, 2008; Esser *et al.*, 2014). Recent population-based studies indicate that women's reported alcohol consumption and frequency of experiencing negative alcohol-related consequences have increased in recent decades (Grant *et al.*, 2004; White *et al.*, 2015). Thus, a greater number of mothers are potentially exposing their children to alcohol misuse and associated consequences (White *et al.*, 2015). It is essential, given evolving cultural norms related to female alcohol use, to understand how the children of heavy-drinking women fare in terms of long-term patterns of alcohol misuse.

Previous work has shown that perceived maternal drinking behavior informs subjective norms (i.e. descriptive and injunctive norms) regarding alcohol use (Neighbors *et al.*, 2007), with more permissive parental norms being positively related to women's own reported alcohol use (e.g. Keefe, 1994; Maglica and Dorčić, 2016). The association between permissive alcohol norms and greater alcohol consumption may be strengthened by perceptions of similarity to heavy-drinker prototypes (Gerrard *et al.*, 2008). To date, empirical research has not explored fully the role of perceived similarity to a heavy-drinking female role model in exacerbating risk of female alcohol misuse. We sought to examine whether perceived maternal drinking behavior positively related to participants' prospective reports of alcohol misuse throughout adulthood, as reflected, in the current report, by negative consequences from drinking and potential symptoms of alcohol dependence. We also examined whether perceiving their mothers to be frequent- or problem-drinkers during their childhood increased risk of alcohol misuse among adult women who reported being more similar to their mothers.

Findings from previous studies support that the drinking behavior of adult offspring has been found to be reliably predicted by perceptions of parental alcohol use (Newcomb *et al.*, 1983; Wilks *et al.*, 1989). For example, studies have shown a positive association between mothers' alcohol misuse and heavy alcohol consumption in their female offspring (e.g. Lieb *et al.*, 2002). In particular, parental role modeling of alcohol use may relate more reliably to women's alcohol use than men's (Choquet *et al.*, 2008). Alcohol misuse among women, in particular, is more robustly predicted by childhood environments in which mothers, more so than fathers, are frequent or problem drinkers (Dawson, 2000; Grant *et al.*, 2001; Lieb *et al.*, 2002). Given findings suggesting that perceptions of mothers' alcohol consumption impacts daughters' risk of alcohol misuse, it is important to understand factors that link mothers' and daughters' drinking behaviors.

Women's perceived similarity to a significant female role model who drank heavily or frequently during their early childhood may influence their subsequent alcohol-related behavior in adulthood (Perry and Bussey, 1979; Blanton *et al.*, 1997; Gerrard *et al.*, 2002; Ravis *et al.*, 2006; Zimmermann and Sieverding, 2010; Lane *et al.*, 2011). Previous work (Fromme and Ruela, 1994) suggested that only when perceived similarity to mothers or fathers was high, on five dimensions unrelated to alcohol use (i.e. personality, religiosity, physical appearance, recreational interests, political views), were associations between perceived parental drinking behavior and young adult offspring's drinking behavior statistically significant. These authors suggested that perceived similarity to a parent who

drinks could increase offspring's willingness to engage in alcohol use.

Prototype willingness model

The prototype willingness model (PWM; Gerrard *et al.*, 2008) is a parallel-process theory that has sought to disambiguate reasoned motivation from reactive motivation to improve prediction of health-related behaviors, including alcohol misuse. The PWM extended expectancy-value models (e.g. Theory of Planned Behavior, Ajzen, 1991) by explicating heuristic or socially reactive motivating factors that increase willingness to engage in a specific behavior, such as alcohol misuse, in addition to reasoned factors that increase volitional intentions to engage in that behavior (Todd *et al.*, 2016).

In the PWM (Gibbons *et al.*, 1998), prototypes are usually evoked to characterize a representative person in a particular setting (e.g. 'female drinker'). Prototypes are defined as 'images of the type of person who engages in the target behavior' (Todd *et al.*, 2016, p. 2). Prototypes are typically assessed with regard to both general favorability ratings and perceptions of similarity to one's self-concept. As applied to alcohol use behavior, the PWM suggests that prototypes for alcohol use are not universally positive, but positive evaluations of and perceived similarity to a 'drinker prototype' may potentiate willingness to consume alcohol. The implication is that a greater willingness to engage in alcohol use, and risk of misuse, may be more likely among female participants who see themselves as similar to a female role model perceived to be a heavy drinker (Ravis *et al.*, 2006; see also Courtenay, 2000). In the current work, we view women's perceived similarity to a heavy-drinking female role model (i.e. their mother) as a proxy for perceived similarity to a 'female drinker.' Reactive pathways, delineated in the PWM, suggest that perceptions of similarity to female drinker prototypes exacerbate risk of alcohol misuse (Gerrard *et al.*, 2008).

Among women in particular, bivariate correlations shown in Zimmermann and Sieverding (2010) suggest that perceived similarity to a drinker prototype relates to both past and subsequent drinking behavior. Unfortunately, perceptions of similarity to a 'drinker prototype' were unreliably associated with women's alcohol consumption in multivariate models. The authors argue that gender differences in prototypes of the 'typical drinker' may have contributed to equivocal results among females. Specifically, because heavy drinking is more often regarded as a masculine behavior (Courtenay, 2000), and the prototype invoked in the study was not explicitly defined according to gender (i.e. 'Imagine now the typical person who consumes ... several (>3) glasses of alcohol ...'), the imagined prototype may have been that of a typical male drinker. To the extent an adult woman reports being more similar to her mother, who functioned as a gender-specific role model and frequently engaged in alcohol consumption or had drinking problem, we would hypothesize a stronger association between perceived maternal alcohol use and risk of alcohol misuse.

Current study and hypotheses

We conducted secondary analysis of data from an existing survey of US women ($N = 911$) who were followed over a 20-year period (Wilsnack *et al.*, 2006). We hypothesized that, among participants who identified their mother as a frequent- or problem-drinker during childhood, perceived similarity to their mothers, as adults, would be associated with an increase in their reported alcohol

consequences over a subsequent 20-year period. By contrast, among participants who identified their mothers as abstainers or occasional drinkers during their childhood, or who did not view themselves as similar, in general, to their frequent- or heavy-drinking mother, we expected normative declines in drinking across adulthood. That is, women's alcohol misuse typically peaks in young adulthood and steadily declines into middle and older adulthood (Wilsnack *et al.*, 2006; White *et al.*, 2015). Alternatively, we did not expect that similarity to fathers, even in cases where they were identified as frequent or heavy drinkers, would influence the association between participants' perceptions of paternal drinking and changes in her alcohol misuse over time. This last prediction is based on the logic that paternal figures would not commonly serve as gender-specific role models for women's drinking (c.f., Zimmermann and Sieverding, 2010).

METHODS

Participants

The National Study of Health and Life Experiences of Women (NSHLEW) was the first national, longitudinal survey study to focus on predictors and consequences of women's drinking and drinking-related problems across the adult lifespan. An initial US national probability sample was drawn by the National Opinion Research Center (NORC) in 1981. Women who were age 21 or older and living in households in the contiguous USA were eligible for enrollment. All eligible women who reported consuming four or more alcoholic drinks per week (moderate-to-heavy drinkers) were selected into the sample, whereas only one of every four who reported consuming less than four drinks or who abstained from drinking was selected. Interviews were conducted by highly trained female interviewers. The first wave included 498 moderate-to-heavy-drinking women and 413 lighter-drinking and non-drinking women (see Wilsnack *et al.* [2006] for further details). Ten years later, in 1991, survey staff re-interviewed 695 women from the 1981 cohort (86% of all 1981 participants who were living and not incapacitated). Twenty years after the baseline survey, in 2001, survey staff re-interviewed 483 of the original 1981 cohort (66% of 1981 participants who were living and not incapacitated). Previous analyses (Wilsnack *et al.*, 2006) of these data suggest that they can be used to inform typical patterns of alcohol use behaviors among women across the lifespan. Attrition analyses reported by the investigators showed that older women and those less educated were more likely lost in follow-up assessments. There were no differences on drinking outcomes between participants lost versus retained.

Measures

Perceptions of parental drinking

Perceptions of parents' drinking were measured at baseline (1981; i.e. Wave 1 of the NSHLEW study) with a single, subjective question about perceptions of mothers' and fathers' drinking, respectively, when the participant was growing up ('until age 14'). The questions were asked very early in the survey, assessing aspects of the participant's family of origin (e.g. family demographics) and upbringing (e.g. religious beliefs). Response categories were 1 (Never drank), 2 (Drank occasionally), 3 (Drank frequently), 4 (Had drinking problem). Given sparsity of some cells and to improve stability of model estimates, we collapsed response category 3 (Drank frequently) and 4 (Had drinking problem) for both mothers and fathers, resulting in two trichotomized variables representing perceived maternal and

perceived paternal drinking, respectively. In analyses examining perceived similarity to mothers, the father drinking variable was centered (with 'drank occasionally,' the most frequently endorsed category, as the zero point) and included as a covariate. In analyses examining perceived similarity to fathers, the same procedure was used but with the mother-drinking variable coded such that the zero point corresponded to mothers who 'drank occasionally.'

Perceived similarity to mother/father

Women's perception of similarity to their parents was assessed only once, at baseline, asking 'Thinking about yourself as an adult, would you say you are more like your father or more like your mother?' Response categories were 'more like my father' and 'more like my mother.' When participants volunteered alternative options, such as 'like neither' or 'some ways like both,' those responses were coded as well. This question was given toward the beginning of the survey—embedded in a series of questions about the participants' current general self-concept and directly following a section asking them to 'Describe Yourself.' A total of 71 respondents indicated that their mother was a frequent or problem drinker during their childhood. Of these women, 31 reported being more like their father and 28 reported being more like their mother, with only three reporting they were 'like neither' and nine reporting they were, in some ways, like both. In analyses examining perceived similarity to mothers, women who reported they were 'more like father' or 'like neither' were coded as -1; 'some ways like both' was coded as 0; 'more like mother' was coded as 1. In analyses of perceived similarity to fathers, women who reported they were 'more like mother' or 'like neither' were coded as -1; 'some ways like both' was coded as 0; 'more like father' was coded as 1 (Sensitivity analyses (available upon request) that recoded 'like neither' to missing replicated the current pattern and significance of findings.).

Alcohol misuse

Alcohol misuse was assessed at each 10-year assessment with a series of questions about past-12-month experiences of eight problem consequences (driving a car while 'high' from alcohol; drinking-related accidents in the home; harmful effects of drinking on housework/chores, or on job/career opportunities; drinking-related problems with partner or with children; and starting fights with partner or with people outside the family when drinking). As in Johnson *et al.* (2013), any level of endorsement of a particular negative consequence was coded as present (vs. absent) in the previous 12 months; the number of negative consequences endorsed was summed across the eight items.

Serving as a second indicator of alcohol misuse and to conceptually replicate analyses examining negative consequences, five potential symptoms of alcohol dependence (AD) were assessed. A series of questions at each data collection point, asked about potential symptoms of AD in the past-12-months (blackouts, rapid drinking, morning drinking, inability to stop drinking before becoming intoxicated and inability to stop or cut down on drinking over time). As with negative consequences, a count variable summed the number of potential symptoms endorsed as having occurred, to any extent, across the five items.

Covariates

All analyses controlled for two variables: participant age (continuous) and drinking status of the parent who was not the focus of the test of moderation (ordered categorical). Preliminary models also

included participant ethnicity and income but because neither was found to alter effects or conclusions, they were subsequently dropped from analyses.

Data analytic approach

Analyses were conducted in MPLUS v. 7.11 (Muthén and Muthén, 2017). We included a survey weight variable in analyses to adjust estimates for differences in selection probabilities, to take into account variations in nonresponse rates by sampling unit, and to correct for the oversampling of heavier drinking women (Wilsnack *et al.*, 2006). Application of survey weights ensures that estimates reflect, as closely as possible, national demographics (age, education, marital status and race/ethnicity).

Latent growth model of drinking outcomes

Women who were alcohol abstainers were included in all analyses, increasing the number of zero count-values in the data. Models with count outcomes typically employ Poisson regression. Poisson regression models can include overdispersion parameters (Min and Agresti, 2005), which take into account an overabundance, or inflation, of zero values (e.g. a large proportion of alcohol-abstainers). These types of regression models have been termed Zero-inflated Poisson or ZIP models. ZIP models are two-part models, wherein a single set of predictors is used to estimate (a) the occurrence of excessive zeros in count variables (e.g. women reporting zero negative consequences due to alcohol abstention) and (b) counts of consequences/symptoms among drinkers, who are expected to report non-zero count values (Atkins *et al.*, 2013). Because ZIP models allow for large numbers of zero count-values, they are useful in analyzing variables with highly skewed distributions, such as women's alcohol consumption, where a large number of women typically abstain (and, thus, would have *de facto* zero negative alcohol-related consequences; Liu, 2007).

ZIP regression models can be extended to longitudinal designs by estimating latent growth trajectories (Liu, 2007). Latent growth models estimate intercept (i.e. baseline) and slope (i.e. change) parameters that capture variation in participants' alcohol-misuse trajectories over time. Initially, an unconditional model, excluding covariates, is used to fit to a linear slope function. Latent growth models were used in the current study to estimate patterns of negative alcohol-related consequences among participants, from Wave 1 (1981) through Wave 3 (2001). The average level of baseline negative consequences, at Wave 1, is estimated as the intercept. The average, linear change over time in the count of negative consequences is indicated by the estimated slope parameter (Bollen and Curran, 2006). Although all model estimates are reported in tables, results in the text focus on prospective changes in negative alcohol-related consequences (i.e. slope parameters) over a 20-year period in adulthood, henceforth explicitly referred to as the 'estimated count of negative alcohol-related consequences.' All models were specified using full-information maximum likelihood estimation.

After latent growth parameters are fit to the data, covariates can be regressed on the latent growth factors to determine the relation between a given covariate and alcohol-misuse trajectories over time. The current models adjusted for age of the participant and perceived maternal and paternal drinking behavior during her childhood (trichotomized), both measured at baseline only, when estimating prospective trajectories of negative consequences from alcohol use. In analyses, self-perceived similarity to mothers, perceived maternal drinking behavior and the corresponding interaction between the

two were entered as predictors of latent growth intercept and slope factors. In separate analyses, self-perceived similarity to fathers, perceived paternal drinking status and the corresponding interaction between these two variables were entered as predictors of intercept and slope factors, respectively, in latent growth models (a three-way interaction, among perceived maternal drinking behavior, perceived paternal drinking behavior and similarity to mother/father was tested and found to be non-significant).

RESULTS

Descriptive statistics

Of the 911 women interviewed in the 1981 NSHLEW survey, 33 participants were excluded from current analyses because of missing data on the predictor variables. Models examining past-year alcohol consequences excluded four additional participants due to missing outcome data ($n = 874$); models examining past-year potential symptoms of AD excluded seven additional participants due to missing outcome data ($n = 871$). Therefore, a total of 874/871 participants (~96% of the 1981 Cohort) were included in the final analyses. Sample and descriptive statistics are provided in Table 1.

Table 1. Baseline^a descriptive statistics

Variable	M (SD)	n (%)
Age	42.69 (16.38) ^b	
Race/ethnicity		
Non-Hispanic White		742 (85%)
Non-Hispanic Black		92 (11%)
Hispanic		27 (3%)
Asian/pacific islander		4 (<1%)
American Indian/Alaskan native		4 (<1%)
Did not report		2 (<1%)
MO drinker status		
Abstainer		426 (49%)
Occasional drinker		374 (43%)
Frequent drinker		50 (6%)
Problem drinker		21 (2%)
FA drinker status		
Abstainer		200 (23%)
Occasional drinker		438 (50%)
Frequent drinker		137 (16%)
Problem drinker		96 (11%)
Similarity		
More like their mother		380 (44%)
More like their father		311 (36%)
Like neither		47 (5%)
Like both		133 (15%)
Alcohol-related consequences count		
1981	0.50 (1.00)	874
1991	0.24 (0.67)	686
2001	0.23 (0.69)	479
Potential AD symptom count		
1981	0.31 (0.74)	871
1991	0.14 (0.51)	683
2001	0.15 (0.57)	478

Note. ^aStatistics were culled from Wave 1 data, unless otherwise noted. MO = Mother, FA = Father. ^bAge range: 20–86 years old. (In the 1991 interview, two respondents reported that they were enrolled into the study in 1981 at age 20, despite the fact that age-eligibility criteria were set at 21). Median income at baseline was \$17,500–19,999.

Negative alcohol-related consequences

Similarity to mother

Standardized model estimates for negative alcohol-related consequences are contained in the left panel of Table 2. As predicted, perceived similarity to mother interacted with perceived maternal drinking to impact changes in estimated counts of negative alcohol-related consequences over 20 years. This interaction, depicted in Fig. 1, shows that women who perceived themselves to be more like their mother, in instances where the mother was perceived as a frequent- or problem-drinker, reported subsequent increases in expected counts of negative alcohol-related consequences over time. By contrast, all other participants reported normative reductions in the number of negative consequences into middle and older adulthood. (Sensitivity analyses (available upon request), which utilized truncated, count indicator variables in latent growth models (0, 1, 2, 3+ consequences), replicated primary findings, suggesting that outliers did not unduly influence the current results.)

Similarity to father

Unexpectedly, participants' perceived similarity to their father also interacted with perceived paternal drinking behavior to impact changes in estimated counts of negative alcohol-related consequences over 20 years, but not in a way that was consistent with hypotheses. The form of the interaction, shown in Fig. 2, did not mirror the interaction found when women perceived greater similarity to a frequent- or problem-drinking mother, nor in a way that was predicted from theory. Instead, results suggested that participants who reported an abstaining father during childhood and greater perceived similarity toward their father as an adult, showed the fastest declines in the expected count of negative consequences over time.

Replication with potential AD symptoms

Standardized model estimates for potential symptoms of AD are contained in the right panel of Table 2. Participants' perceived

Table 2. Zero-inflated model estimates predicting negative consequences and potential AD symptoms

		Negative consequences						Potential symptoms of AD					
		Zero inflation			Expected count			Zero inflation			Expected count		
		Estimate	SE	P	Estimate	SE	P	Estimate	SE	P	Estimate	SE	P
Similarity to MO													
Age	Baseline	0.001	0.072	0.000	-0.390	0.208	0.061	0.426	0.102	0.000	-0.663	0.196	0.001
	Δ Across 20 years	0.802	0.731	0.273	0.280	0.880	0.750	0.888	0.192	0.000	0.965	0.068	0.000
FA drinker status	Baseline	-0.250	0.075	0.001	0.204	0.163	0.211	-0.214	0.122	0.078	-0.173	0.199	0.384
	Δ Across 20 years	0.465	0.549	0.397	0.473	0.246	0.055	-0.027	0.328	0.935	0.187	0.275	0.498
MO drinker status	Baseline	0.284	0.081	0.000	-0.120	0.160	0.453	-0.231	0.089	0.874	0.175	0.148	0.237
	Δ Across 20 years	0.484	0.476	0.309	0.562	0.220	0.011	-0.056	0.356	0.874	0.000	0.190	0.998
Similarity to MO	Baseline	0.008	0.087	0.927	-0.098	0.128	0.441	-0.096	0.110	0.382	-0.282	0.173	0.102
	Δ Across 20 years	0.147	0.507	0.772	0.136	0.305	0.655	0.617	0.421	0.142	0.394	0.236	0.094
Similarity × MO drinker status	Baseline	-0.049	0.098	0.620	-0.033	0.168	0.843	-0.210	0.094	0.000	-0.030	0.179	0.867
	Δ Across 20 years	-0.077	0.573	0.894	0.538	0.191	0.005	0.366	0.444	0.410	0.467	0.197	0.018
Similarity to FA													
Age	Baseline	0.400	0.079	0.000	-0.352	0.318	0.269	0.376	0.119	0.002	-0.619	0.199	0.002
	Δ Across 20 years	0.672	0.834	0.420	0.201	0.802	0.802	0.597	0.299	0.046	0.839	0.218	0.000
MO drinker status	Baseline	-0.257	0.100	0.010	-0.073	0.251	0.772	-0.154	0.089	0.084	0.253	0.096	0.008
	Δ Across 20 years	0.531	0.527	0.313	0.624	0.307	0.042	-0.072	0.182	0.692	0.008	0.173	0.963
FA drinker status	Baseline	-0.255	0.088	0.004	-0.211	0.163	0.194	-0.230	0.109	0.035	-0.212	0.159	0.181
	Δ Across 20 years	0.434	0.538	0.432	0.274	0.371	0.461	0.017	0.288	0.953	0.195	0.290	0.501
Similarity to FA	Baseline	-0.045	0.074	0.543	0.060	0.136	0.658	0.189	0.105	0.070	0.492	0.153	0.001
	Δ Across 20 years	0.129	0.552	0.815	0.187	0.350	0.593	-0.805	0.220	0.000	-0.568	0.274	0.038
Similarity × FA drinker status	Baseline	0.062	0.084	0.460	0.124	0.138	0.368	0.105	0.091	0.249	0.143	0.146	0.330
	Δ Across 20 years	-0.202	0.507	0.691	-0.483	0.239	0.043	-0.075	0.264	0.776	-0.082	0.210	0.698

Note. Estimates with an association of $P < 0.05$ are in bold-face font. MO = Mother, FA = Father, Δ = Change. Standardized estimates are given as logits values. The 'Zero Inflation' part of the ZIP model is a logistic regression predicting log odds of a subpopulation of participants who are unable to report non-zero consequences, due to alcohol abstinence. The 'Expected Count' part of the model is a Poisson regression, estimating the number of expected consequences (i.e. natural log of the expected count) in a subpopulation of participants who are able to report scores of zero and above (i.e. not alcohol abstainers).

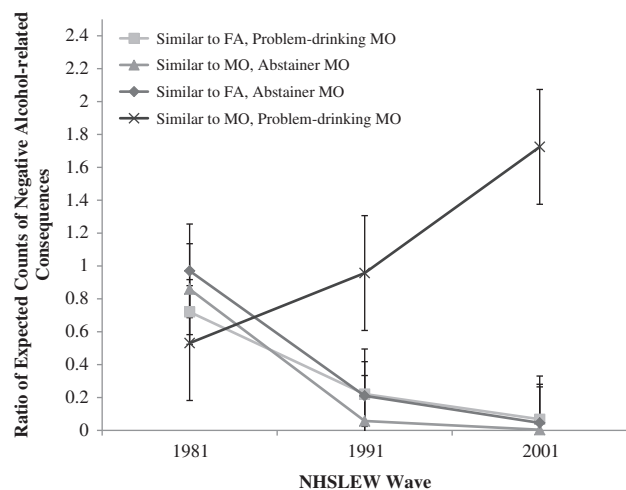


Fig. 1. Estimated trajectories of past-year negative alcohol-related consequences based on mother's perceived drinking status during participant's childhood. *Note.* Standardized model coefficients were used to create estimated trajectories. NSHLEW, National Study of Health and Life Experiences of Women; FA, Father; MO, Mother.

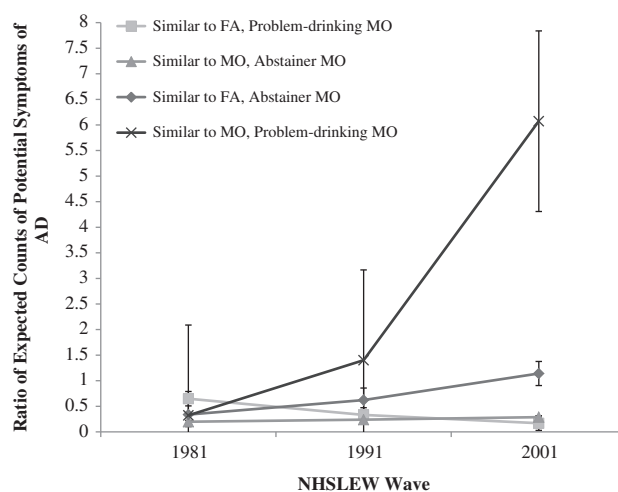


Fig. 3. Estimated trajectories of past-year alcohol dependence symptom count based on mother's perceived drinking status during participant's childhood and self-perceived resemblance to parents. *Note.* Standardized model coefficients were used to create estimated trajectories. AD, Alcohol Dependence; NSHLEW, National Study of Health and Life Experiences of Women; FA, Father; MO, Mother.

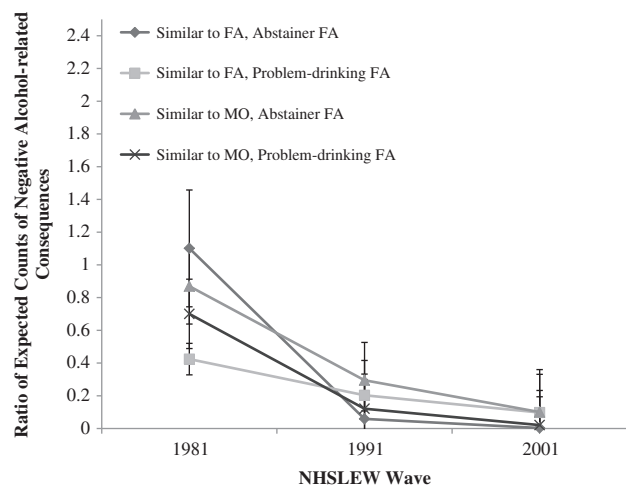


Fig. 2. Estimated trajectories of past-year negative alcohol-related consequences based on father's perceived drinking status during participant's childhood. *Note.* Standardized model coefficients were used to create estimated trajectories. NSHLEW, National Study of Health and Life Experiences of Women; FA, Father; MO, Mother.

similarity to mothers also interacted with perceived maternal drinking behavior to predict changes in estimated counts of potential symptoms of AD across 20 years (Fig. 3). The pattern of this interaction was similar to that shown for negative consequences in Fig. 1. By contrast, the interaction between self-perceived similarity to father and perceived fathers' drinking was unrelated to expected changes in potential symptoms of AD across adulthood.

DISCUSSION

Results were generally supportive of hypotheses in that women who perceived that their mothers were frequent- or problem-drinkers during childhood subsequently reported increases in their own

negative alcohol-related consequences across adulthood (Abrams and Niaura, 1987; Fromme and Ruela, 1994). Moreover, findings support the tenets of the PWM (Gerrard *et al.*, 2008; Gibbons *et al.*, 2009) and suggest that perceived patterns of maternal drinking during childhood (i.e. injunctive norms) and reported similarity to a heavy-drinking female role model (i.e. drinker prototypes), combined to influence subsequent reports of adult women's own negative alcohol-related consequences.

Findings are consistent with previous work suggesting that parental drinking behaviors inform individuals' injunctive norms for alcohol use (e.g. Peterson *et al.*, 1994) and subsequent risk of alcohol misuse (White *et al.*, 2000; Lieb *et al.*, 2002). Notably, alcohol norms have relevance for individuals' intentions and willingness to use alcohol (Maglica and Dorčić, 2016); among adult women, perceptions of frequent or problematic maternal alcohol use may facilitate their own intentional and reactive alcohol misuse. Perceived patterns of maternal drinking are believed to inform daughters' alcohol-related beliefs, including perceived norms and drinker prototypes (Gerrard *et al.*, 2008; Gibbons *et al.*, 2009), and may ultimately influence both intentional and reactive pathways to alcohol misuse.

Mother-daughter relationships function differently from father-daughter relationships (e.g. Leaper, 2002), so perhaps it is not surprising that women's perceptions of maternal alcohol use relate to their own alcohol misuse (Windle and Windle, 2012), particularly in instances where they perceive themselves as similar to their heavy-drinking mother. As supported in meta-analytic studies, both perceived similarity to and favorability of a drinker prototype appear to increase risk of alcohol misuse by increasing willingness to drink and subsequently affecting actual drinking behavior (Todd and Van Lettow, 2016; Todd *et al.*, 2016). Positive feelings toward a heavy-drinking mother also might exacerbate the relation between perceived maternal alcohol use and risky drinking behavior (Gerrard *et al.*, 2008). Because we did not measure perceived favorability of mothers or father in early childhood or adulthood, additional work is needed to explore whether, in families where mothers are frequent

or heavy drinkers, perceived favorability of one's mother also operates as an influencer of the association between perceived parental drinking and women's risk of alcohol misuse.

Findings were interpreted in light of the PWM, which is a general model meant to disambiguate reasoned motivation from reactive motivation, as informed by prototype perception, to improve prediction of health-related behaviors. Hypotheses in the current reported were contextualized in gendered terms, acknowledging that the predictors and correlates for women's and men's drinking are distinct (Stewart *et al.*, 2009). These findings are among the first to examine the influence of self-perceived similarity to a heavy-drinking female role model on patterns of women's alcohol misuse in adulthood. Unfortunately, current findings were unable to address whether similar effects would be found among adult men. Nevertheless, results replicated Fromme and Ruela (1994) in that perceived similarity to a parent influenced associations between perceived parental drinking histories and filial drinking outcomes. Given that Fromme and Ruela did not formally test gender interactions, their findings provided no opportunity to clarify whether a same-sex parent was more influential in filial drinking outcomes, as has been shown in some previous work with female participants (Dawson, 2000; Grant *et al.*, 2001; Lieb *et al.*, 2002). For example, Windle and Windle (2012) showed stronger effects for same-gender dyads, as opposed to opposite-gender dyads, in the intergenerational transmission of alcohol use behavior, providing preliminary support for the idea that same-gender effects may be more robust. Our findings suggest that perceived similarity to a heavy-drinking, female role model in adulthood may be a unique variable that exacerbates risk of women's alcohol misuse over time. Future work using the PWB might benefit from consideration of whether hypotheses involving prototype perceptions should be contextualized, based on the gender of the respondent and/or the gender of the drinking prototype.

Cognitive schemas regarding alcohol use begin to develop in early childhood—as early as age three—and commonly pertain to levels of consumption based on gender (Zucker *et al.*, 1995). Thus, beliefs, norms and schemas for female alcohol use behavior are likely informed by maternal alcohol consumption throughout early childhood as well as have influence on daughters' alcohol use behavior in adulthood. Ultimately, it would be informative to examine covariations in mothers' and daughters' alcohol-related schemas, knowledge, and beliefs about alcohol use, particularly female alcohol use, to refine transgenerational theoretical models.

Limitations

The study had a number of limitations that should be considered when evaluating the results. Although this was a prospective, longitudinal study that spanned 20 years, perceptions of parental drinking were based on retrospective survey data. That is, a subjective, single-item indicator of perceived parental drinking during the participants' childhood was assessed, and no objective markers of parental drinking were collected. Retrospective data have received criticism due to inherent limitations (e.g. Koriat *et al.*, 2000). For instance, retrospective reports are dependent on memory of the event(s), which includes perception of the event, attempts at reconstructing or making-meaning of the event, and cognitive processes involved in the selection, recall and rehearsal of information (Koriat *et al.*, 2000). Previous research, however, has demonstrated that adult participants' retrospective reports of most childhood experiences demonstrate moderate to good reliabilities over time (Hardt

et al., 2006). Further, parental substance abuse has demonstrated the highest reliability among the parental health outcomes assessed, including psychiatric diseases, prolonged parental physical illness, and chronic pain (Hardt *et al.*, 2006). Moreover, efforts to validate retrospective reports of alcohol-related behavior suggest that dimensional judgements (i.e. of degree) may prove more reliable than dichotomized judgements of whether a particular alcohol-related behavior was observed (Hasin *et al.*, 2015). Rather than using a formal diagnostic interview, we used a dimensional approach and calculated the number of past-year symptoms of potential AUD.

Given the wide age range of participants, it should be noted that some respondents were asked to recall their parents' drinking from several decades or more ago. Previous criticisms of retrospective reporting (Hardt *et al.*, 2010) have noted long intervals between an experience and the ostensible recall of that experience. Despite that some forgetting is likely to have occurred, previous research has documented similar long-term effects for adverse childhood experiences, using both prospective and retrospective reports (e.g. Hardt *et al.*, 2010). To adjust for known bias in recall and reporting, model estimates in the current study adjusted for participant age in all analyses. Ultimately, however, conclusions are derived from adult women's constructions of their childhood familial relationships and interpretations of past parental behaviors as they are recalled during the survey. Moreover, it should be noted that small sub-group sample sizes (e.g. those who perceived being more similar to a frequent or heavy-drinking mother) may influence the stability of predicted trajectories over time.

Memories of historical events can also be influenced by contextual factors (e.g. mood) at the time of recall. We emphasize that the question regarding parental alcohol use appeared early in the interview, in the context of other questions pertaining to early childhood experiences and demographic features. We highlight the inherent subjective nature of these data given previous work showing that perceptions of parental drinking patterns in adulthood can be explained, in part, by individual-difference factors, such as the amount of alcohol consumed by the reporter (Fromme and Ruela, 1994). Despite the potential for recall bias on the basis of contextual factors, research suggests that the potential influence of state-based correlates may be overestimated (Brewin *et al.*, 1993). That is, adults tend to underestimate the prevalence of negative childhood experiences; overestimation of these experiences is uncommon (Fergusson *et al.*, 2000). In spite of limitations, retrospective reporting is quite common in the examination of associations among childhood adversities and adult outcomes (see e.g. Choi *et al.*, 2017).

CONCLUSION

The early identification of women at risk for alcohol misuse is important for prevention and treatment programs that target women and families (e.g. Ashley *et al.*, 2003). Findings of the present study suggest that perceived similarity to a heavy-drinking female role model (Lindgren *et al.*, 2016) or 'female drinker' prototypes could be incorporated in intervention programs that seek to reduce problem-drinking behavior or improve problem recognition among female drinkers. There is promise for the prototypes of the typical 'female drinker' to be revised through women's cognitive contemplation and written imagined characterizations of both the female-drinker prototype and the female-non-drinker prototype, as well as associated social comparison processes concerned with how similar the self is to each, respective prototype (Ouellette *et al.*, 2005).

Women's alcohol use in the USA, including prevalence, volume, frequency, and heavy episodic drinking, has increased over the last decade, and the rate of increase has been greater among women than men (Dawson *et al.*, 2015). Current trends in women's drinking behavior suggest that a greater number of heavy-drinking women are likely raising young girls. Self-perceptions of similarity to a heavy-drinking female role model, such as one's mother, may potentially impact daughters' risk of alcohol misuse. As the number of female drinkers in the USA continues to grow (Grant *et al.*, 2001, 2004; White *et al.*, 2015), the influence of genetic and psychosocial contributors to female alcohol misuse warrants further study. Understanding how long-held beliefs and schemas pertain to alcohol use behavior contribute to gendered drinking outcomes has promise for informing the treatment and prevention of AUDs among women.

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CONFLICT OF INTEREST STATEMENT

None declared.

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