



Social Influences on Alcohol Outcome Expectancy Development From Childhood to Young Adulthood: a Narrative Review

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Abstract

Purpose of Review Alcohol outcome expectancies emerge in early childhood, develop throughout adolescence, and predict alcohol outcomes well into adulthood. Social factors shape how expectancies are learned in myriad ways, yet such social learning influences seldom are examined in the context of developmental factors. This review summarized literature on the social origins of alcohol expectancies through vicarious (observational) and experiential (direct) alcohol-related learning from childhood to young adulthood within a social learning framework.

Recent Findings Young children primarily endorse negative expectancies, which decline rapidly with age amidst escalations in positive expectancies across adolescence. Parents and peers can contribute to vicarious learning about alcohol and facilitate experiential learning in different ways and to varying degrees across development. Media and social media, which children are increasingly exposed to as they mature, often depict alcohol-outcome relations that may further contribute to expectancy development in later adolescence and young adulthood.

Summary Social influences on alcohol expectancy learning are complex and change over time, although this dynamic complexity typically is not depicted in extant literature. Developmentally informed research capturing co-occurring shifts in social influences and alcohol expectancies is needed.

Keywords Alcohol outcome expectancy · Vicarious learning · Childhood · Adolescence

Introduction

Alcohol outcome expectancies precede drinking decisions [1–4] and, thus, represent promising targets for successful drinking interventions [5–7]. Expectancies represent learned if/then propositional beliefs about the expected effects of drinking. Positive expectancies characterize beliefs that drinking will bring favorable outcomes (e.g., making social gatherings fun, reducing stress), and negative expectancies characterize beliefs about unfavorable drinking outcomes (e.g., cognitive impairment, aggression) [8, 9]. Extensive literature spanning several decades has implicated expectancies—especially positive expectancies—in the emergence of drinking risk across adolescence and young adulthood [4, 10, 11]. Positive expectancies predict earlier drinking

initiation [1, 2], heavier drinking [12], and even drinking and alcohol problems as far out as almost 20 years [13]. Expectancies emerge early in life [14] and change precipitously across early development. Negative expectancies decline gradually with age amid rapid growth in positive expectancies [15–17], possibly increasing risk for drinking initiation and escalation [12, 18]. Nevertheless, the early origins of expectancies and developmental mechanisms underlying changes in these alcohol beliefs remain poorly understood. Research aimed at better understanding such processes could inform clinical efforts targeting expectancies that undergird drinking to reduce alcohol-related harms.

Alcohol-related knowledge accumulates in myriad ways and through many sources. Social learning theories propose that expectancies comprise learned beliefs about the probable outcomes of behavior [19], including drinking [20]. Expectancies about alcohol outcomes, thus, can emerge in childhood [14], well-before most individuals begin drinking themselves [21–23]. Social learning theories emphasize two mechanisms of alcohol-related learning: vicarious and experiential learning [19, 20]. Through vicarious learning,

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individuals encode expectancies from the environment by observing the effects of others' drinking. Through experiential learning, individuals acquire expectancies through their own direct experiences with alcohol's effects. Both forms of learning often occur in social contexts, highlighting the centrality of social influences on these learning processes and relevance of social learning theories to account for such social influences. Vicarious and experiential learning also likely shift over time [24], across childhood and adolescence and then into adulthood, in response to evolving social environments, maturing cognitive abilities, and/or personal drinking experiences. Therefore, social influences may contribute differently to vicarious and experiential alcohol-related learning across development, resulting in dynamic changes to expectancies that contribute to drinking risk.

Social learning of alcohol information from childhood to young adulthood occurs through complex and dynamic processes. Early in childhood, and prior to their own alcohol initiation, children may develop expectancies primarily through vicarious learning, whereby they attend to others' alcohol outcomes and encode learned alcohol-outcome associations [25]. Children also may learn and internalize others' expressed beliefs about alcohol effects (e.g., someone mentioning a need to drink after a stressful day; someone bemoaning a hangover). Normative cognitive development may strengthen such learning with age. Specifically, vicarious learning requires attention to and memory of alcohol outcomes, thereby likely predicated to specific stages of development in which children possess relevant cognitive capacities [24]. Logical thinking and advanced reasoning abilities, which may emerge even later [26], undergird propositional thinking such that expectancies could become more complex and nuanced over time. In addition to changes in cognitive capacity for alcohol information, the social influences that shape alcohol-related learning also change over time, especially those relevant to vicarious learning that occurs exclusively through others. Socialization theories often suggest a growth in salience of peers relative to family with age, such that families may be primary alcohol socialization influences in early childhood while peers become more prominent in adolescence [27, 28]. Notably, vicarious learning influences may change considerably with the onset of experiential learning in adolescence. Direct experiences with alcohol then become integrated into existing expectancy schemas. Such burgeoning experiential learning may be supplemented by adolescents' increasing involvement in media and social networking platforms as a novel source of vicarious learning. Finally, brain development in adolescence and young adulthood heightens reward sensitivity that, combined with slowly maturing regulatory capacity, may precede increases in sensation seeking [29] and alcohol

experimentation [30] to contribute to the strengthening of positive expectancies during this period. Efforts to incorporate such considerations into understanding alcohol expectancy learning could inform developmentally specific interventions to promote alcohol beliefs that curtail drinking onset and escalation.

The present narrative review applies social learning theory to examine extant literature on social influences in expectancies from childhood to young adulthood. This review considers unique developmental factors that may contextualize vicarious and experiential learning at multiple developmental stages and levels of social influence: family, peers, and media (e.g., print media [magazines, newspaper advertisements], broadcast media [television], internet media). We focus on several stages of development crucial for alcohol expectancy emergence and change [15]: early childhood (birth to 8 years), late childhood/early adolescence (9–13 years), middle adolescence (14–17 years), and late adolescence/young adulthood (18–21 years). We identify key developmental considerations for alcohol-related learning at each stage and then review extant literature on these theorized influences, providing broad conclusions and recommendations for future research.

Early Childhood (Birth to 8 Years)

Developmental Considerations in Alcohol Expectancy Formation

Expectancies emerge as early as four years of age [14], and children as young as six years old attribute both subjectively positive (e.g., feel good, feel pretty) and negative (e.g., feel angry) outcomes to alcohol [31, 32]. Across early childhood, children's abilities to attend to, remember, and synthesize alcohol information from the environment mature and could strengthen alcohol-related learning. Sustained attention and working memory rise rapidly from three to nine years [33, 34], perhaps allowing older children to pay attention to environmental events for longer and retain alcohol-outcome representations that become alcohol expectancies. Language milestones, particularly across the first four years of life [35], may help children form such action and outcome (if/then) propositional relations. Young children's expression, and thus self-report, of these early expectancies often depends upon co-developing language skills, which may lead to some confounding of language development and expectancies. Developmentally appropriate implicit assessments that rely less on language may help disentangle expectancy emergence from language development.

Developmentally-Salient Social Influences on Alcohol-Related Learning

For children exposed early in life, alcohol use often is minimal in quantity and frequency (e.g., sipping with parental permission, religious occasions) such that direct experiential learning may be relatively limited in scope. Perhaps accordingly, to our knowledge, experiential learning influences on early expectancies have yet to be examined. Given the generally low levels of alcohol involvement during this developmental period, alcohol experiences in early childhood may be unlikely to result in negative outcomes (e.g., hangovers) and could serve to weaken negative expectancies, although this remains an important direction for future research. Early experiences also may have a relatively limited impact on expectancy development compared to observational learning such that vicarious rather than experiential learning processes explicated in social learning theory may be predominant in early childhood. Such vicarious learning in early childhood may operate through important sources of social influence, namely family, peers, and the media.

Empirical Findings Regarding Social Influences on Expectancy Development

Family

Young children tend toward concrete thinking [26] with more advanced attentional and memory abilities developing later in life [33, 34]. Children, thus, may be likely to encode the most memorable, vivid outcomes that they observe of family members' drinking (perhaps strongly negative ones). Limited, correlational findings offer some support for this; young children (mean age = 5.2 years) in Switzerland, particularly boys, with greater parental (mother and father) drinking reported more negative expectancies [36]. However, support has not been uniform, as parents' drinking did not relate to 6–8-year-old children's expectancies in another correlational sample from the Netherlands [37]. Children become better able to integrate multiple sources of alcohol information with age, and as a result, expectancies may develop from more nuanced (perhaps both positive and negative) observations about alcohol outcomes. Some correlational research with older children suggests parent drinking may be associated with not only unfavorable but also favorable expectancies [37]. Specifically, older children reported less positive expectancies with greater mother drinking yet more positive expectancies with greater father drinking [37]. Sociocultural and/or gender norms may underlie such divergent associations. For example, mother drinking may have more direct negative effects if mothers carry more childcare responsibilities than fathers, or children may internalize

norms that drinking is more acceptable for men. Ultimately, research on early childhood vicarious learning through family modeling remains limited and disparate. Findings across investigations may depend on cultural differences in alcohol acceptability, social influences outside the home, and/or parent's level of drinking, which could not be directly compared across extant research and, thus, represent important directions for future research.

Peers

Vicarious learning through peers may be less prevalent during this period as proximal age peers often are minimally involved with alcohol. Indeed, peers have been comparatively less researched as a source of early alcohol-related learning. However, young children do report some knowledge of their peers' attitudes toward alcohol [38], suggesting peer networks could be shaping expectancies this early in life. Future research should explore the possible role of peers in early expectancy formation.

Media

Similar to peer influences, research has not yet shed light on media influences in early alcohol-related learning. Early childhood environments often are saturated with various media modalities (e.g., television, tablet, smartphone) and platforms (e.g., YouTube, Netflix) [39] that could depict alcohol-outcome relations to contribute to early alcohol expectancies. Specifically, children spend considerable time watching television [40, 41], and alcohol is portrayed commonly in children's entertainment programming [42]. Young children also report gaining alcohol knowledge from television, even more than from parents or siblings [38], highlighting the need to examine any media influences on early vicarious learning.

Conclusions

Findings confirm expectancies emerge in early childhood, yet are limited and largely inconclusive regarding which social influences contribute to alcohol-related learning due to an overwhelming focus on parent influences only. Limited evidence suggests that children begin to learn about alcohol's effects vicariously through parents, in increasingly complex ways over time. Nevertheless, parents may not represent the sole source of vicarious learning. Research is needed on peer and/or media influences during this early stage of development. Future research also could explore shifting influences of parents and additional family members in conjunction with seminal cognitive development.

Late Childhood/Early Adolescence (9–13 Years)

Developmental Considerations in Alcohol Expectancy Formation

Logical thought and inductive reasoning abilities that emerge in later childhood [26] may allow children to encode specific alcohol-outcome relations from their environment (e.g., alcohol made someone clumsy) and better extrapolate these observations into global expectancy schemas (e.g., alcohol could impair driving). Children endorse broad negative expected effects of alcohol (e.g., violence, aggression, health problems, drunk driving) in late childhood [43] and view negative outcomes as much more likely than positive outcomes [18]. During the transition into adolescence, however, positive outcomes are viewed as increasingly likely while perceptions of negative outcomes remain relatively stable [18]. Such patterns may suggest growing ambivalence about alcohol that could translate into willingness to drink if offered [44].

Developmentally-Salient Social Influences on Alcohol-Related Learning

Positive expectancies may grow in salience from childhood into adolescence due to expanded sources of vicarious learning supplemented with possible experiential learning as consistent with social learning theory. Children's vicarious learning from family members may persist, and vicarious learning from peers may begin to expand as children gain independence to self-select into peer networks [45] and as alcohol consumption/opinions among peers become more common. Peer and family environments also may provide access to alcohol, thereby eliciting experiential learning for the subset of children who begin to drink early in life [21]. Finally, media and social media exposure to alcohol-promoting content may provide additional vicarious learning that further reinforces growing positive expectancies. Social media use often emerges in late childhood and early adolescence [46], perhaps propelled by an evolution toward peers and identity formation. Social media may provide exposure to often favorable depictions of alcohol's effects to promote growth in positive expectancies. Adolescents' strivings toward autonomy, independence, and attainment of adult status may render (social) media depictions of adolescent drinking particularly impactful if such depictions project favorable images of engaging in an adult behavior and rebelling against authority.

Empirical Findings Regarding Social Influences on Expectancy Development

Family

Children's attention, memory, and/or reasoning skills mature during this developmental period, perhaps helping children better focus on and encode alcohol-outcome relations from family alcohol experiences. Correlational findings appear consistent with such patterns; parent or elder sibling drinking has been related to more positive expectancies among older children (i.e., approximately 10–14 years old) in Taiwan and the Netherlands [47–50] but not to expectancies or children's adoption of parent positive expectancies among younger children (i.e., approximately 6–11 years old) in the US [51, 52]. Father drinking often relates more strongly to expectancies than mother drinking [47, 50], but see [48], possibly due to greater drinking by fathers and, hence, greater visibility of alcohol effects (see 47, 50). Taken together, findings suggest children increasingly encode seemingly positive outcomes of parents' drinking as they transition into adolescence. Findings on the influence of more severe and/or diagnosable parent alcohol consumption, in contrast, are inconclusive. Some correlational and experimental research suggests mother (or both parents') problem drinking does not relate to expectancies [12, 53–55], while other research finds some association [56]. Similarly, some correlational research suggests that father problem drinking relates to greater *positive* expectancies [55] while other research suggests greater *negative* expectancies [12] and still other research suggests nonsignificant associations [56]. Overall, at problem levels of use, the specific role of parent drinking on expectancy development remains unclear. Efforts to examine exposure to and interpretation of alcohol effects among children whose parents experience significant alcohol problems are needed. Finally, importantly, research suggests parent influences on expectancy learning might become less potent once children begin consuming alcohol themselves [49, 50].

Peers

During late childhood, peers emerge as important sources of vicarious learning and also may facilitate experiential learning. Correlational research suggests adolescents whose friends consume alcohol/substances or approve of drinking tend to attribute more global outcomes to alcohol [57] and more positive sociability [49, 58] and relaxation [49] expectancies, perhaps dependent on their puberty status [49]. Alcohol-related learning might occur more through repeated exposure to peer drinking than exposure to any peer drinking, consistent with expectancies

representing learned beliefs according to social learning theory. Specifically, exposure to *any* peer drinking did not differentiate positive expectancy trajectories [47], but exposure to more frequent friend/peer drinking or greater friend/peer drinking related to increases in positive expectancies over time [59–61]. Patterns shift with the onset of experiential learning once adolescents begin drinking. Greater peer drinking related to high, increasing positive expectancies over 2 years but generally not to concurrent expectancies among schoolchildren who had begun drinking [47, 49]. Peer networks may facilitate alcohol access and provide opportunities to experience favorable alcohol effects (e.g., social enhancement) over time.

Media

According to social learning theory, the media may contribute to vicarious learning through depiction of alcohol-outcome relations [62]. However, the limited number of extant studies precludes substantive conclusions on media influences in late childhood. From the few studies conducted, greater in-the-moment exposure to alcohol advertisements (e.g., television, point-of-sale, branded merchandise, online) was not associated with acute alcohol expectancies [63]. Greater exposure to television alcohol advertisements in particular, however, has been correlated with more positive expectancies or less negative expectancies [64, 65]. Similar to peer influences, any such vicarious learning through media sources may depend on repeated exposure to alcohol-outcome depictions over time. Single-session exposure to alcohol advertisements in an experimental paradigm did not appear to acutely alter expectancies [66]. Research also has explored general television exposure regardless of alcohol content, which presumably provides some exposure to alcohol-outcome depictions given the high prevalence of alcohol portrayals in televised programming and commercial breaks [67] that could contribute to the formation of expectancies through observational learning. Nevertheless, such research has been more mixed. Greater general television exposure has been linked to increasing or stable patterns of positive expectancies over time [47] and more positive subsequent social and relaxation expectancies [64], yet not to concurrent expectancies [68, 69].

Conclusions

Children endorse more positive expectancies in the presence of greater parent drinking, supporting vicarious alcohol-related learning from the family that may strengthen as children's logical thinking and inductive reasoning abilities mature. However, such influences are less clear for children whose parents drink problematically. Furthermore,

consistent with social learning theory, repeated exposure to peer drinking and/or media alcohol-outcome depictions also may contribute to the growth of positive expectancies in early adolescence.

Middle Adolescence (14–17 Years)

Developmental Considerations in Alcohol Expectancy Formation

Positive expectancies rise steadily throughout adolescence following rapid escalations at the transition into the teenage years [15]. Negative expectancies remain relatively stable and possibly even decline as youth approach young adulthood [15]. Such patterns may emerge, in part, from continually maturing critical thinking or abstract reasoning abilities that allow adolescents to reflect more critically on their earlier (largely negative) expectancies in childhood. Most adolescents begin to drink around 13–15 years of age [21–23], and as such, they also may increasingly incorporate both directly experienced and inferred (through others' drinking) positive alcohol effects into more complex expectancy schemas. Neurodevelopmental changes that heighten sensitivity to rewards near the end of early adolescence could underlie increases in sensation-seeking [29] and impair decision-making amid emotional arousal [70] to further contribute to positive expectancy growth.

Developmentally-Salient Social Influences on Alcohol-Related Learning

Social learning theory suggests that vicarious and experiential learning can shift over time, and experiential learning may be particularly salient in adolescence as most youth first consume alcohol. Alcohol initiation, often facilitated through the social context, provides direct experiences with alcohol effects that may considerably alter expectancies developed from earlier observational experiences. Vicarious learning likely continues, perhaps especially from peers (rather than family members) as drinking becomes more normative [71] and often occurs in social settings with peers [72]. Media sources also may be ubiquitous. Most adolescents in the US own a mobile device [73] and, on average, spend over 7 h engaged with digital media daily [74]. Social media proliferates during this developmental period, particularly the use of platforms such as Instagram, Snapchat, and YouTube [75]; adolescents report that 30% of their friends post about alcohol on social media [76] and may perceive friend's alcohol posts as realistic and representative of their actual drinking behavior [77]. Social

media, thus, might provide considerably potent vicarious learning [62].

Empirical Findings Regarding Social Influences on Expectancy Development

Family

Family influences through vicarious learning may wane as peer environments rise in salience and children experience direct alcohol effects through their own initiation. Findings from correlational research among high-risk samples support such patterns. Parent/family alcohol use disorder generally has not been related to expectancies among adolescents in the US [78, 79], but see [32]. However, findings on parent drinking have been mixed. Parent problem drinking has been associated with greater positive expectancies among youth in the US [80] and stronger implicit arousal expectancies among youth in Germany [81], yet *lower* positive expectancies among youth in Australia [82]. Broader cultural differences in how adolescents interpret observed alcohol effects (e.g., acceptable or unacceptable; normative or atypical) may underlie these mixed findings and represent an important area for future investigation.

Peers

Despite their putative significant influence during the height of adolescence, peer influences on the acquisition of expectancies have been considerably under-researched during this developmental period. Limited correlational research does support a continued relevance of peers to expectancy learning. Greater perceived friend drinking or approval of drinking has been related to more positive expectancies concurrently and over time [80, 83–86], but see [87]. Findings support the transmission of expectancies from peers, which may occur through learning about peers' alcohol expectancies, observing peers' drinking outcomes, and/or experimenting with alcohol within peer contexts.

Media

Literature suggests conflicting media influences on expectancy development in adolescence, which may result from complex and bidirectional associations of media exposure with alcohol expectancies. That is, adolescents with more favorable expectancies may be more likely to seek out alcohol content, and greater exposure to alcohol content may strengthen positive expectancies. Correlational and particularly cross-sectional designs are less suited to disentangle these bidirectional associations and, perhaps accordingly, have yielded inconclusive findings. Greater exposure to alcohol advertisements through magazines

and beer concessions has been correlated with more positive expectancies among drinkers [86]. Greater exposure to movie depictions of drinking—regardless of its outcomes—has been related to more positive expectancies [85, 88], perhaps particularly among those with lower adaptive self-control [89], yet not to changes in positive or negative expectancies over time [90]. Finally, perceived alcohol posts by friends on social media have not related to changes in positive or negative expectancies across 3 months [76]. Experimental research can more readily isolate media effects on expectancies and thus far appears more conclusive. Specifically, high school students randomly assigned to view clips of the television program *Jersey Shore* depicting negative alcohol outcomes reported less favorable expectations about alcohol than those viewing clips depicting positive alcohol outcomes [91], supporting media influences on expectancy formation.

Conclusions

Peers continue to be an important social influence on the emergence of positive expectancies in middle adolescence, possibly through modeling self-described positive effects of drinking or facilitating access to alcohol to promote experiential learning. Social influences through family appear less consistently evidenced, concordant with a theorized diminishing salience of family environments during this period. Media depictions of alcohol-outcome representations could reinforce or change expectancies through supplemental vicarious learning yet, as such, remain inconclusive given the challenges accounting for possible bidirectionality of media exposure and alcohol expectancies.

Late Adolescence/Young Adulthood (18–21 Years)

Developmental Considerations in Alcohol Expectancy Formation

Positive expectancies become prominent in young adulthood as negative expectancies decline rapidly near the end of adolescence [15]. Young adulthood encompasses fundamental transitions toward adult independence amid new academic, occupational, and/or relational responsibilities [92, 93]. Broadening environments may bring wider sources of alcohol information to integrate into expectancy schemas. Young adulthood also represents a time of increasing focus on efforts in identity formation and, as such, the establishment of personal values that could influence salience of positive or negative expectancies. Finally, social attention peaks in young adulthood [94] such that socially-derived alcohol

information from family, peers, and/or social media may be particularly influential relative to earlier in development.

Developmentally-Salient Social Influences on Alcohol-Related Learning

Young adults synthesize broad vicarious and experiential alcohol-related learning into increasingly nuanced expectancies. Peer networks may shift considerably with the young adult's new roles and responsibilities (e.g., pursuing higher education, enlisting in the military, seeking employment) [92, 93], which may bring new sources of vicarious learning that portray different alcohol effects or differentially reinforce certain expectancies based on context [20]. Specifically, young adults entering college may develop unique college drinking expectations [95] that may heighten specific positive expectancies. Through concurrent identity development, young adults also often redefine their relationships with family members, particularly if relocating outside the home. Family influences may become more indirect as young adults observe family members' drinking less frequently. Rather than serving as a direct influence, family members instead may influence opportunities for vicarious and experiential learning during this time by communicating alcohol attitudes, controlling alcohol access, or monitoring social networks. Media depictions of alcohol outcomes, perhaps particularly through social networking sites, may further supplement vicarious learning, with young adults overwhelmingly active on social media sites (e.g., Instagram, Snapchat, Facebook) several hours each day [96].

Empirical Findings Regarding Social Influences on Expectancy Development

Family

Family influences through vicarious learning may decline as experiential learning accumulates and adolescents increasingly individuate from family and integrate into peer networks. However, at least some research suggests possible persisting parental influence. Parent influences may operate less directly (i.e., modeling of drinking) and instead more indirectly (e.g., expressed opinions on acceptability of youth drinking; monitoring behavior and social networks). Indeed, young adult expectancies may be one mechanism through which parents continue to influence their children's drinking. For example, parents' approval of student drinking related to fewer negative expectancies among college athletes [97], and emerging adult boys whose fathers met the criteria for an alcohol use disorder tended to report more positive expectancies [78]. Parents who convey information

on alcohol's deleterious effects or their own disapproval of drinking, as done in some successful interventions [98, 99], may increase children's negative expectancies to thereby curtail their drinking.

Peers

Peer influences are theorized to remain salient in young adulthood, and limited correlational research supports these frameworks. Greater friend drinking [100] and perceived teammate drinking approval [97] related to more positive or less negative expectancies, respectively, among college students in the US. Findings suggest young adults continue to encode positive expectancies from their peer networks, even as they enter into novel social networks (e.g., college teams) following role transitions.

Media

Extant literature suggests generally clear evidence for media influences on vicarious learning in young adulthood. Correlational research has found that college students more engaged with alcohol content on social media and exposed to films glorifying college drinking report greater positive and/or lower negative expectancies [101, 102]. Greater objective and subjective exposure to alcohol content on Instagram also has been correlated with college students' endorsement of more positive expectancies [103]. Furthermore, within experimental research, college students randomized to view film clips of positive alcohol outcomes tended to report more positive expectancies after exposure relative to those randomized to view no alcohol content [104]. Research has yielded more conflicting findings on general television or internet exposure [105], perhaps since such work cannot model exposure to alcohol content specifically.

Conclusions

Peer and media influences persist and may even grow in young adulthood, each a salient source of transmission of alcohol's positive effects that may contribute to declines in negative expectancies and heightened salience of positive expectancies that coincides with peak drinking risk [106]. Family influences also appear to shift during this time, with parents' indirect influences emerging as a potentially important driver of alcohol-related learning. However, findings regarding social influences on expectancies during young adulthood remain limited in number. Young adulthood represents a period of elevated alcohol risk, and expectancies play an important role in young adult drinking [107], such that more research focused on this developmental period is needed.

Directions for Future Research

Social learning theory highlights reciprocal determinism of the individual with their environment, whereby social environments not only shape individuals' expectancies but individuals' expectancies also shape their future environments [20, 24]. Thus, early environments may influence subsequent social opportunities for vicarious and experiential learning. Literature overwhelmingly characterizes vicarious and experiential learning *within* rather than *between* developmental stages. Furthermore, though bidirectional associations are posited, research has not explored how any such bidirectional relations may change across developmental periods. Research should test how social environments and expectancies change, both uniquely and in concert with one another, over time to more fully understand the origins of early expectancies and experiences, as well as their cascading influences in later developmental periods. Clinical interventions then could target any modifiable contributors to early alcohol expectancies at specific developmental stages. Such early interventions might prevent the development of overly positive alcohol expectancies in early childhood or the weakening of negative expectancies that precede downstream alcohol use and problems later in life.

Vicarious and experiential learning change across development, yet these changes are not well understood. Some research has considered different sources of influence and forms of learning in the acquisition and maintenance of expectancies (e.g., 47, 49, 50). However, the field largely has not considered how these influences change in salience over developmental periods. Future research should characterize such developmental processes, because clinical interventions that target social sources of alcohol-related learning not relevant at the respective developmental stage are likely to have limited impact. Efforts also are needed to delineate how social influences change from before to after alcohol initiation. Such research could determine whether interventions targeting social influences are useful for all youth regardless of their experiences with alcohol, or whether prevention efforts aimed at delaying alcohol initiation (and, thus, experiential learning) are more impactful on alcohol expectancy development patterns. Efforts could target changes in expectancies across adolescence that might hasten alcohol initiation.

Expectancies drive drinking in conjunction with subjective evaluations, or perceived desirability or valuation, of expected outcomes [18, 57, 108, 109]. For example, adolescents who perceive alcohol likely to bring about cognitive or motor impairment yet do not place great value on avoiding such impairment may engage in problem drinking. Expectancies designated as “negative” in the literature also may not uniformly be perceived as such (e.g., adolescents may boast about and enjoy praise from peers for blackout drinking). Such subjective evaluations also may derive from social influences and shift considerably across

early development. Young children may view “negative” expectancies more uniformly negative, while adolescents may perceive “negative” expectancies as more nuanced or even positive depending upon differential reinforcement from the social context. Such perceptions could have quite different implications for drinking outcomes. More fine-grained understanding of changes in and social influences on subjective evaluations across childhood and adolescence would prove valuable for early intervention by identifying adolescents at risk for alcohol initiation and problem use.

Despite much recent focus on youth media engagement, media—particularly social media—influences on how youth understand and anticipate alcohol's effects appear under-researched (with a few notable exceptions: [76, 101, 103]). Emerging research suggests a role of social media in positive expectancy development that might promote both alcohol [103] and e-cigarette [110] use. Future research should cover the breadth of possible alcohol content sources, including friend posts (see 76), alcohol social media marketing (see [111]), and celebrity/influencer content (see [112]). Since expectancies develop through repeated exposure to alcohol outcomes, ecological momentary assessment (EMA) could hold promise in modeling effects of repeated exposure to social media content within one's naturalistic environment. Efforts to understand when adolescents are at risk for acquiring favorable expectancies from alcohol content/advertisements could inform parents, educators, and policy makers on the media sources salient in expectancy development at certain developmental stages. Such efforts could allow for age-based recommendations for social media access and youth programming.

Conclusions

Findings suggest considerable social influences on vicarious and experiential learning underlying formation of alcohol expectancies, consistent with social learning theories. Such social influences shift significantly across early development. Children and early adolescents may acquire expectancies primarily through vicarious learning from within the family, perhaps more so with age as consistent with their maturing attentional, memory, and reasoning abilities. Peer and media influences might grow throughout adolescence into young adulthood, providing exposure to further vicarious learning on (potentially largely positive) alcohol effects and also facilitating opportunities for strong experiential learning through alcohol initiation. Efforts to better capture these shifting social influences on alcohol-related learning could inform social targets and timing for clinical efforts to reduce emergence of overly favorable expectancies that could lead to harmful alcohol outcomes well into middle adulthood.

Summary of theorized and empirical contributors to alcohol expectancy development

Early childhood (birth to 8 years)

- | | |
|----------------------|--|
| Patterns | • Alcohol expectancies, both positive and negative, emerge as early as four years of age [14] |
| Theorized influences | • Vicarious alcohol-related learning may predominate through proximal others, often family and parents, or media sources following children's acquisition of attention and memory skills |
| Empirical findings | • Family: Parents' drinking tends to relate to children's expectancies more so with age [36, 37], possibly due to children's developing cognitive abilities [33, 34]
• Peers: Peers relatively underexamined and may be minimally involved with alcohol [21–23]
• Media: Media is also underexamined despite children's significant media exposure [39–41] |

Late childhood/early adolescence (9–13 years)

- | | |
|----------------------|--|
| Patterns | • Positive expectancies rise with age while negative expectancies remain relatively stable [15] |
| Theorized influences | • Logical thought and inductive reasoning skills [26] may facilitate stronger vicarious learning
• Social media emergence [46] and rising peer drinking [21] expands alcohol-related learning |
| Empirical findings | • Family: Parent influences might strengthen with children's developing cognitive skills [47–50] yet weaken with the onset of experiential learning once children begin drinking themselves [49, 50]
• Peers: Greater exposure to peer drinking relates to growth of positive expectancies [59–61]
• Media: Repeated alcohol-outcome depictions may relate to more favorable expectancies [64, 65] |

Middle adolescence (14–17 years)

- | | |
|----------------------|---|
| Patterns | • Considerable growth in positive expectancies amid stable/declining negative expectancies [15] |
| Theorized influences | • Cognitive development may further expand vicarious learning from myriad social influences
• Neurodevelopmental changes [29, 70] may promote experimentation and experiential learning |
| Empirical findings | • Family: Parents' alcohol use might relate to expectancies differently across cultures [80–82]
• Peers: Greater peer alcohol use and approval relates to more positive expectancies [80, 83–86]
• Media: Mixed findings may suggest possible bidirectional relations [76, 85, 86, 88–91] |

Late adolescence/young adulthood (18–21 years)

- | | |
|----------------------|---|
| Patterns | • Rapid declines in negative expectancies result in highly salient positive expectancies [15] |
| Theorized influences | • Both vicarious and experiential learning opportunities may broaden with expanding personal and social network drinking, possibly shifting with role transitions and peer networks [92, 93] |
| Empirical findings | • Family: Persisting parent associations [78, 97], possibly through communication and monitoring
• Peers: Peer alcohol use/approval may relate to declines in unfavorable expectancies [97, 100]
• Media: Media alcohol-content exposure may relate to rises in positive expectancies [101–104] |
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Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

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