Intergenerational Addiction: Nature and Policy

Irene G. Frazier[1] & Ishaan S. Prasad[2]

University of California, Los Angeles

[1]Department of Psychology, West Valley College (ifrazier@ucla.edu)
[2]Luskin School of Public Affairs, UCLA (iprasad@ucla.edu)

Author Note

Correspondence

Irene G. Frazier is a Visiting Researcher at the University of California, Los Angeles. She is affiliated with the Department of Psychology at West Valley College. Irene specializes psychobiological inquiry and clinical applications. To contact her, please email ifrazier@ucla.edu.

Ishaan S. Prasad is affiliated with the Luskin School of Public Affairs at the University of California, Los Angeles. Ishaan specializes in the application of mixed-methodology analysis to issues of social welfare. To contact him, please email iprasad@ucla.edu.

Replication

Replication data and scripts for the quantitative analyses presented in this paper are available with the Harvard Dataverse: https://doi.org/10.7910/DVN/UQF6CZ.

Interview transcripts and notes for the qualitative analyses presented in this paper are not publicly available in the interest of respondent privacy.

Distribution and Rights

No funding or grants were accepted in the pursuit of this research. The authors of this paper have designated this paper as an open access publication. This paper may be freely accessed through the Harvard Dataverse.

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Abstract

To date, literature on addiction has been largely secular between the social sciences and clinical science fields. The authors aim to remedy this gap with a mixed-method and interdisciplinary investigation of addiction patterns. Through a semistructured life review interview with a 69-year-old Caucasian male and recovering addict, the authors find that childhood experiences with alcohol and narcotics were substantial precursors to the respondent's adult addiction. The authors explain this theoretically, applying Erikson's (1950) psychosocial stages of development and Bandura's (1961) social learning theory, giving rise to a pattern of intergenerational addiction. The authors validate and generalize their findings by analyzing the 2022 National Survey of Drug Use and Health (NSDUH). The authors conclude with implications for policy and directions for future research.

Keywords: addiction, generational patterns, mixed-method, social work, life review, interview, National Survey of Drug Use and Health (NSDUH), intergenerational addiction

Introduction

Nationally, 48.7 million individuals, aged 12 or older, have struggled with a Substance Use Disorder (SUD) within the past year, approximately 17.3% of the population (SAMHSA, 2023). Substance use, misuse, and addiction more broadly is a deadly and pervasive disease that is explored across the clinical, neuroscientific, and policy domains. Understanding addiction captivates researchers and policymakers alike due to its profound impact on individuals, families, and communities across the United States.

To fully appreciate the nature of addiction, researchers must investigate the risk factors of addiction on an individual and societal level. While a great deal of research has been done on the genetic components of addiction predispositions (e.g. Buciută & Coman, 2022; Hiroi & Agatsuma, 2005), this research is generally clinical or scientific in nature. Simultaneously, while extensive research has been done on psychosocial risk factors for addiction, such as socioeconomic status (Redonnet *et al.*, 2012) or a history of childhood abuse (Bennett & Kemper, 1994), these papers generally emanate from social science disciplines or methodology. We aim to unite these distinct perspectives on addiction.

In the United States, approximately 1 in 8 children live in a household where at least one parent or caretaker had a SUD within the past year (Lipari & Van Horn, 2017). This is a discriminant known to correlate with socioeconomic disadvantages, academic challenges, social developmental issues, and impaired family functioning (Lipari & Van Horn, 2017). We suspect that these childhood environmental factors have a substantial predictive capability over adult addiction, which informs both preventative and interventional policy on a national scale.

Parental drug abuse has been widely studied as a predictor of adverse outcomes for children on domains ranging from adolescent aggression (Brook *et al.*, 2007) to school performance (Chandy *et al.*, 1993). However, the research to date has largely avoided theoretical explanations or analysis to inform prevention and intervention measures. This is a symptom of broader gaps in addiction literature. Current addiction research is largely methodologically distinct, between qualitative and quantitative studies, as well as largely

secular, rarely uniting multiple disciplines in the approach to inquiry. These factors have produced substantial gaps in the existing literature which we aim to fill.

We expand on existing research in three ways. First, we propose a theoretical framework for explaining the predisposition to substance misuse for children of substance abusing parents. Second, we employ a mixed-method approach to inquiry, triangulating qualitative and quantitative findings for a methodologically robust analysis. Third, we employ an interdisciplinary approach to inquiry, bridging the divide between clinical and scientific research with social science and policy research.

We begin with a case study interview of a recovering addict. We probe multiple aspects of his addiction and recovery to produce a set of qualitative findings and a theoretical framework explaining the predisposition to adult substance misuse for children of substance abusing parents. We then quantitatively analyze national data to scrutinize the generalizability of our findings and inform policy.

Qualitative Analysis

Our qualitative analysis aims to examine multiple aspects of addiction and recovery as well as produce a theoretical framework to explain our findings.

Methods

A 69-year-old middle class Caucasian male participated in a semistructured life review interview per Butler's (1963) methodology. The respondent in this case study was recruited from a local Alcoholics Anonymous organization. Inclusion criteria stipulated that the respondent be an older individual, specifically beyond the midlife stage, and that the individual be an addict or recovering addict.

The respondent was made aware of the voluntary nature of his participation and provided informed consent beforehand. Multiple measures were taken to protect the respondent's anonymity. Data collection was carried out through extensive notetaking by an observing researcher, rather than audio recording or transcription. This approach aimed to capture critical themes as well as nuanced details that were potentially relevant to the research. The decision to forego audio recording and transcription was made to prioritize the

comfort and privacy of the respondent. All interview notes were then screened for personally identifiable details and were accordingly redacted. The respondent's identity was therein replaced by the pseudonym "Cuttlefish".

The interview was conducted by an experienced researcher who made substantial efforts to build rapport with Cuttlefish both before and during the interview, pausing and re-probing responses continually. The life review interview covered topics such as the respondent's demography, childhood, successes, failures, and views on aging and death. The interview process also involved the continual reiteration of Cuttlefish's responses, ensuring that the interviewer fully understood what the respondent intended. Per standard practices for semistructured qualitative interviews, when themes emerged organically, the interviewer deviated from the predesigned questions to explore them in greater depth, ensuring a dynamic and responsive interview environment.

Two anonymous researchers unaffiliated with the study performed a two-step coding process for the interview notes. Initially, inductive coding was employed to identify themes from the respondent's interview. This was followed by two rounds of deductive coding, assigning portions of the notes to categories established through the inductive round. Continuous efforts were made to ensure the trustworthiness of the analysis, including the use of iterative coding, per grounded theory practices. The coders acknowledged their role in the research process, recognizing the potential influence of their background and experiences on data collection and analysis. Reflexivity was maintained throughout the study; researchers actively considered and addressed their own biases.

Findings

It is clear that Cuttlefish's life has been defined by a battle with addiction and, moreover, that his successful adaptation (Rowe & Kahn, 1987) has been defined as what Cuttlefish views as winning that battle: his sobriety. When asked about significant influences over his lifetime, Cuttlefish readily identified his father. Specifically, he describes how his father had a "side" to himself which was a "party person". Since Cuttlefish's childhood, his father would throw nightlong drinking and dancing parties in the home. As with most

children, Cuttlefish seems to have normalized his childhood home environment.

At three years old, Cuttlefish and his younger brother would wake up after these parties to find several adults passed out on their couches. Cuttlefish and his brother would then go around the home, looking for beer in mostly empty bottles to drink, aiming to imitate—or model—their father's behavior. Cuttlefish reports being genuinely drunk for the first time at around three or four years old, and considers himself to be an alcoholic since that point. At the age of sixteen, Cuttlefish learned how to create a fake ID that resembled a temporary drivers' license in the State of California. Cuttlefish recalls using these fake IDs to purchase beer and cigarettes.

Cuttlefish describes that when his second wife bore children, he felt "built" to be a parent, but was actually severely underprepared for parenthood. Cuttlefish claims he was an alcoholic at this time, but had not yet accepted it. Cuttlefish feels a sense of responsibility, guilt, and shame for how his two children turned out in the same way that Cuttlefish blames his father for the way that he himself turned out.

Both of Cuttlefish's children are addicts and homeless. According to Cuttlefish, neither of his children seem motivated to get off the streets or to get clean. Cuttlefish's daughter also lost custody of her own child in a family violence case. Cuttlefish shows a great deal of guilt for his children, believing that, the same way he modeled his alcoholism after his father, Cuttlefish's children modeled their addictions after him. Cuttlefish has offered to help his children pay for placement in sober living environments. Neither child has accepted his offer at the time of our interview.

Theoretical Insights

We apply Erikson's (1950) theory of psychosocial development and Bandura's (1961) social learning theory to explain the intergenerational addiction phenomena demonstrated by Cuttlefish's experiences. We believe that Cuttlefish's substance abuse beginning at a young age is defined by two known and understood effects: a parental mimicking behavior and a normalization of childhood experiences. Moreover, we believe these findings are generalizable.

Cuttlefish's imitation of his father's drinking behavior, beginning in toddlerhood, reflects an attempt to take initiative and explore adult roles. We believe this is a parental mimicking behavior central to the "Initiative versus Guilt" stage of psychosocial development (Erikson, 1950). This behavior explains children imitating their parents by playing "house" and taking on "mommy" or "daddy" roles with peers as much as it explains Cuttlefish drinking at the age of three. Another perspective is Piaget (1923) who would explain this as a form of imitative play, central to the preoperational stage; we do not adopt this model, however, as it reduces substance abuse behaviors at this age to an outgrowth of symbolic thought, which does not explain continued use into adulthood.

This imitation factor explains an earlier exposure to substance abuse behavior, which is more cognitively damaging than even slightly delayed exposures (O'Leary *et al.*, 2017). However, this does not explain the continued exposures throughout childhood. Alcohol, even drunkenness, as a child is damaging, but it does not necessarily indicate total addiction; another factor must explain how this gateway exposure develops into a SUD.

This second factor is best explained as a normalization process, as in Bandura (1961). This is the same phenomena which explains how children in homes with domestic abuse are likely to normalize that agression and grow up to become abusers or abusees. In the same mechanism, Cuttlefish, like many children with substance abusing parents, normalized the behaviors which his parents were engaging in—and which he found relatively unburdened access to (e.g. finding leftover beer)—reducing his perception of the risks associated with substance use behaviors. This reduced estimation of risk contributes to a propensity for exposure to more dangerous and addictive substances later in adult life.

Quantitative Analysis

Our quantitative analysis aims to test hypotheses which arise naturally from the Cuttlefish Case Study and to advise on related policy measures. Specifically, Cuttlefish's interview remarks indicated several potential predictors of adult addiction; we aim to assess these predictors for their broader generalizability. These predictors include Cuttlefish's early exposure to alcohol and the normalization of substance use during youth, facilitated by

parental leniency and increased access.

Based on Cuttlefish's interview remarks, we form three hypotheses. First, we hypothesize that early alcohol exposure predicts problematic adult substance use. Second, we posit that perceived parental leniency toward substance use behaviors and increased access to narcotics will correlate with a diminished perception of risk among the youth population of the corresponding behaviors and use. Third, we predict that drug education curriculum involving parental participation will be associated with the greatest increase in the perceived risks of substance use behaviors among the youth population.

Methods

We utilize data sourced from the Substance Abuse and Mental Health Services Administration's (SAMHSA's) 2022 National Survey on Drug Use and Health (NSDUH). We specifically focus on the 2022 survey year as it represents the most recent available data at the time of our research. The NSDUH is conducted annually by SAMHSA to assess substance use and mental health issues among the noninstitutionalized population aged 12 and older across all 50 states and the District of Columbia (SAMHSA, 2022a). The NSDUH employs an extensive methodology for data collection and coding which is publicly available (SAMHSA, 2022a). Given its vast scope and rigorous methodology, we believe the NSDUH is the most reliable quantitative source for our inquiry.

We import the data into RStudio. Of the 2,605 informational columns which the 2022 NSDUH offers, we identify 18 variables of interest across four key categories: general respondent information and history, addiction disorders and substance use information, respondent perceptions and attitudes, and youth experiences (for underage respondents only). We clean our data in an iterative process, omitting irrelevant columns, then systematically reformatting and restructuring the remaining data to our requirements.

We run three distinct analyses, each corresponding to one of our research question. The first analysis aims to correlate, in the adult population, drinking for the first time at an earlier age to an increased likelihood of experiencing characteristics of problematic substance use. The second analysis aims to correlate, in the youth population, perceived parental

leniency regarding substance use behaviors and ease of access to narcotics with a decrease in the perceived risks of substance use behaviors. The third analysis aims to quantify, in the youth population, the efficacy of different drug education formats on increasing the perceived risk of substance use behaviors.

Results

Analysis 1: Effects of Early Drinking

We create a dummy predictor variable, drank as a minor, where respondents who reported first drinking under the age of 18 were encoded with a `1` and respondents who reported first drinking after the age of 18 were encoded with a `0`. Non-adults as well as adults who have never drunk are omitted from the data. We then identify 6 key dummy response variables of interest which we attempt to correlate with our dummy predictor: whether the respondent reports ever having a substance use disorder (SAMHSA, 2022a), whether the respondent ever used cocaine (SAMHSA, 2022a), whether the respondent ever used ecstacy (including "molly" or "MDMA"; SAMHSA, 2022a), whether the respondent ever used methamphetamine (SAMHSA, 2022a), and whether the respondent ever binge-drank alcohol (SAMHSA, 2022a).

We fit the 6 OLS models and interpret them applying Bonferroni's (1936) correction for multiple comparisons. The fitted models are shown in Table 1. The results affirm our hypothesis that drinking alcohol for the first time as a minor predicts adult substance use behaviors. Specifically, individuals who reported first drinking alcohol under the age of 18 are approximately 14.803% more likely to report ever having struggled with a substance use disorder, 25.315% more likely to report ever binge-drinking alcohol, 20.883% more likely to report ever using cocaine, 13.973% more likely to report ever using ecstacy (including "molly" or "MDMA"; SAMHSA, 2022a), 8.477% more likely to report ever using methamphetamine, and 3.895% more likely to report ever using heroin (Table 1).

It is important to note, however, that this analysis is correlational; omitted variables, inverse causality, and spurious correlation may bias these OLS estimates and prohibits causal conclusions. We find that drinking alcohol for the first time as a minor is a significant

predictor of substance use behaviors and experiences in adult life.

Analysis 2: Youth Perceptions of Risk

We subset the dataset for only respondents aged 17 or younger. We use 4 columns corresponding to risk assessments of various substance use behaviors: the perceived risk level of smoking a pack of cigarettes every day (SAMHSA, 2022a), binge-drinking every day (SAMHSA, 2022a), trying heroin (SAMHSA, 2022a), or using cocaine on a monthly basis (SAMHSA, 2022a). These behaviors were rated by respondents on a scale from `1`, "no risk," to `4`, "great risk," with only discrete values (i.e. `1`, `2`, `3`, or `4`; SAMHSA, 2022a). We use these 4 columns as independent response variables.

Simultaneously, we identify 2 columns related to parental disapproval of substance use behaviors: how a youth's parents would feel about them binge-drinking daily (SAMHSA, 2022a) and how a youth's parents would feel about them smoking a pack of cigarettes daily (SAMHSA, 2022a). These disapprovals were rated by respondents on a scale from `1`, "neither approve nor disapprove," to `3`, "strongly disapprove," with only discrete values (i.e. `1`, `2`, or `3`; SAMHSA, 2022a). We pair these 2 predictor variables with the prior 2 response variables under the hypothesis that a decrease in parental disapproval over a substance use behavior (i.e. an increase in leniency towards a behavior) decreases the perceived risk of engaging in that behavior for a youth respondent.

Next, we identify 2 columns related to ease of access to various narcotics: the perceived difficulty, if the respondent truly desired it, in obtaining heroin (SAMHSA, 2022a) and cocaine (SAMHSA, 2022a), respectively. These difficulties were rated from `1`, "probably impossible," to `5`, "very easy," with only discrete values (i.e. `1`, `2`, `3`, `4`, or `5`; SAMHSA, 2022a). We pair these 2 predictor variables with the latter 2 response variables under the hypothesis that an increase in the ease of access to a substance will decrease the perceived risks of using that substance for a youth respondent.

We treat the variables as continuous to ease interpretation, though alternative methodology may be to treat variables as ordinal. We also scale all variables to range between 0 to 100 to permit comparisons across coefficients.

We fit the 4 OLS models and interpret them applying Bonferroni's (1936) correction for multiple comparisons. The fitted models are shown in Table 2. The results affirm both of our hypotheses; an increase in the parental disapproval towards a substance use behavior is associated with a significant increase in the perceived risk of that behavior in the youth population and an increase in the ease of obtaining a narcotic is associated with a significant decrease in the perceived risk of using that narcotic in the youth population.

Specifically, every 1 unit increase in the perceived parental disapproval towards pack-a-day smoking is associated with an approximately 0.225 unit increase in the perceived risk of pack-a-day smoking in the youth population while every 1 unit increase in the perceived parental disapproval towards daily binge drinking is associated with an approximately 0.233 unit increase in the perceived risk of daily binge-drinking in the youth population (Table 2). Simultaneously, every 1 unit increase in the perceived ease of obtaining heroin is associated with an approximately 0.063 unit decrease in the perceived risk of trying heroin in the youth population while every 1 unit increase in the perceived ease of obtaining cocaine is associated with an approximately 0.08 unit decrease in the perceived risk of using cocaine in the youth population (Table 2).

It is important to note that this analysis is correlational; omitted variables, inverse causality, and spurious correlation may bias our OLS estimates and prohibits causal conclusions. We find that increases in parental disapproval towards substance use behaviors are associated with significant increases in the perceived risks of the corresponding behaviors in the youth population. Additionally, we find that increases in the ease of obtaining narcotics are associated with significant decreases in the perceived risks of using the corresponding narcotics in the youth population.

Analysis 3: Efficacy of Drug Education

We subset the dataset for only respondents aged 17 or younger. We use the same 4 variables corresponding to risk assessments of various substance use behaviors as in Analysis 2: the perceived risk level of smoking a pack of cigarettes every day (SAMHSA, 2022a), binge-drinking every day (SAMHSA, 2022a), trying heroin (SAMHSA, 2022a), or using

cocaine on a monthly basis (SAMHSA, 2022a). These behaviors were rated by respondents on a scale from `1`, "no risk," to `4`, "great risk," with only discrete values (i.e. `1`, `2`, `3`, or `4`; SAMHSA, 2022a). We use these columns as independent response variables. These perception-of-risk variables are not rescaled in this analysis.

Next, we identify 3 binary variables indicating if the youth respondent experienced various types of drug education within the past 12 months: whether their parents had discussed with them the dangers of alcohol and tobacco (SAMHSA, 2022a), whether they had participated in a school-based drug education program in a regular day class (e.g. health or physical education; SAMHSA, 2022a), and whether they had participated in a school-based drug education education program outside of a regular day class (e.g. school assembly; SAMHSA, 2022a). We use these 3 columns as dummy predictor variables.

We fit 4 Multiple Regression OLS models where each response variable is regressed onto all 3 dummy predictor variables simultaneously. We interpret the models applying Bonferroni's (1936) correction for multiple comparisons. The fitted models are shown in Table 3. The results suggest that parent-initiated drug education is associated with the greatest positive increase in perceived risk level of substance abuse behaviors in the youth population. Both types of school-based drug educations (inside and outside of regularly scheduled day classes), however, have more nuanced associations.

Receiving parent-initiated drug education is associated with, on average, an approximately 0.101 point increase in the perceived risk of pack-a-day smoking, 0.128 point increase in the perceived risk of daily binge-drinking, 0.12 point increase in the perceived risk of trying heroin, and an approximately 0.119 point increase in the perceived risk of trying cocaine in the youth population (Table 3).

Receiving drug education at school in a regularly scheduled day class (e.g. Health or Physical Education) is associated with, on average, an approximately 0.103 point increase in the perceived risk of pack-a-day smoking and an approximately 0.119 point increase in the perceived risk of daily binge-drinking in the youth population (Table 3); however, this drug education format is also associated with an approximately 0.052 point decrease in the

perceived risk of trying heroin and 0.021 point decrease in the perceived risk of using cocaine in the youth population (Table 3).

Receiving drug education at school, but outside of a regularly scheduled day class (e.g. School Assembly), is associated with, on average, an approximately 0.085 point increase in the perceived risk of trying heroin and an approximately 0.048 point increase in the perceived risk of trying cocaine in the youth population (Table 3); however, this drug education format is also associated with an approximately 0.005 point decrease in the perceived risk of pack-a-day smoking and 0.003 point decrease in the perceived risk of daily binge-drinking in the youth population.

It is important to note that this analysis is correlational; omitted variables, inverse causality, and spurious correlation may bias our OLS estimates and prohibits causal conclusions. Additionally, because the predictor variables included in this analysis were not mutually exclusive, the fitted coefficients may be biased by multicollinearity and interaction effects. We find that parent-initiated drug education is consistently associated with significant positive increases in the perceived risks of substance use behaviors in the youth population, whereas both types of school-based drug educations (inside and outside of regularly scheduled day classes) have inconsistent, unreliable, and usually not significant associations with the perceived risks of substance use behaviors in the youth population.

Discussion

Findings

Our qualitative analysis, centered around Cuttlefish's interview remarks, highlights the profound impact of parental substance use on children. We explain this phenomena theoretically by applying Erikson's (1950) theory of psychosocial development and Bandura's (1961) social learning theory, emphasizing the roles of parental mimicking and normalization processes in developing SUDs. We generalize and further explore our findings quantitatively, revealing significant associations between early exposure to alcohol and adult substance use behaviors, parental leniency and the perceived risk of substance use behaviors in the youth population, and access to narcotics and the perceived risks of narcotic use in the youth

population. We also evaluate the correlations between drug education programs and the perceived risks of substance use behaviors and narcotic abuse, finding that parent-initiated drug education is associated with the greatest increases in perceived risks of substance use behaviors and narcotic abuse in the youth population, while school-based drug educations are inconsistent and generally not significant in their effects.

Cuttlefish's remarks illustrate the deep-seated influence of a parent's substance use on a child's development and future substance use behaviors. The normalization of alcohol use and mimicking of his father's behaviors led Cuttlefish to begin drinking at a young age, solidifying a pattern of addiction that persisted into adulthood and then with Cuttlefish's own children. Cuttlefish's reflection on his life and the subsequent struggles of his own children underline the cyclical nature of SUDs. These observations align with Erikson's (1950) theory of psychosocial development and Bandura's (1961) social learning theory, providing a theoretical framework to explain this intergenerational pattern.

Our quantitative analysis corroborates our qualitative findings by demonstrating that early alcohol exposure is a significant predictor of adult SUDs. The data also supports the hypothesis that parental leniency and increased access to narcotics reduce the perceived risks of these behaviors among youth. Notably, we also found that drug education programs, particularly those involving parental participation, are associated with higher perceived risks of substance use behaviors in youth, suggesting a critical role of family involvement in preventative measures.

Implications for Policy and Practice

Our findings suggest the need for strategic policies that address the environmental, as well as the individual, factors which contribute to SUDs. Interested policymakers should focus on improvements in the prevention, education, and intervention areas. We emphasize the role of the environment in addiction policy; the accessibility of narcotics, quality of drug education, and substance use of caretakers are significant determinants of perceived risks in the youth population.

When narcotics are proliferated in a community, youths consider them easily accessible

and less risky to use. This finding could support supply interdiction policies, however we are cautious about this conclusion. While supply interdiction can reduce the prevalence of narcotics and increase perceived risks among youth, it is not effective alone. The perception of accessibility in the youth population is shaped by the prevalence of addiction in their communities; children who are normalized to public overdoses, intoxication, and use in their communities are at the highest risk. Therefore, we advise a stricter enforcement of public intoxication laws in conjunction with interdiction measures.

Education is another critical component of effective addiction policy. Children are highly impressionable, which should be leveraged in curriculum design. Our research indicates that current school-based drug education programs are generally ineffective, indicating a need for curriculum improvements. Effective drug education is honest and open; often this involves candid discussions about the personal suffering addiction can cause, the risks—including death—associated with narcotic use, and how exposure to gateway drugs predicts more serious addictions. Given that early exposure dramatically increases the risk of adult addiction, the primary goal of drug education should be to discourage use among youth altogether.

Despite the best prevention and education efforts, it is inevitable that some parents and caretakers will be addicts. Therefore, intervention is the final component of a comprehensive addiction policy. In most states, parental addiction alone is not sufficient grounds for child removal without other evidence of harm or neglect. However, our research suggests that parental addiction is inherently harmful to children and should be recognized as such. Social workers should be trained to identify parental addiction and be empowered to take protective measures when it is present. Simultaneously, addicted parents should be supported with addiction counseling and treatment in the interest of family preservation. However, it is damaging in itself for children to be in the care of an actively addicted parent; intervention procedures must enable protective removals while caretakers undergo such treatment.

In summary, addressing addiction within the context of child welfare requires multiple approaches that includes effective prevention, education, and intervention strategies.

Policymakers must recognize the profound impact of environmental factors and the critical need for community support in mitigating SUDs. Enhancing supply interdiction policies, improving the depth and honesty of drug education programs, and adopting a proactive stance towards parental addiction are all effective strategies. Additionally, ensuring that social workers, law enforcement officers, and similar responders understand and are equipped to handle the effects of addiction on child welfare, including training which incorporates modern findings such as our own, will further strengthen these efforts. Ultimately, a holistic approach to addiction policy can significantly reduce SUD developments, protect children, and support families towards recovery and stability.

Limitations and Further Study

This study offers valuable insights into addiction patterns through a mixed-method inquiry and helps bridge the methodological and disciplinary gaps in addiction literature. This study is preliminary and identifies a novel pattern in addiction. As such, it should be viewed as an initial step towards a better understanding of addiction behaviors and treatment responses. Several limitations must be acknowledged to provide context for our findings. Subsequent research should seek to resolve these limitations, replicate and expand upon our findings, and explore additional dimensions of the identified pattern.

The qualitative component of this study focused on a single case study. While this approach offered an in-depth understanding of the respondent's experiences, it may not capture the broader spectrum of experiences among addicts and recovering addicts. An ethnographic approach, which examines multiple cases in diverse contexts, could provide a more comprehensive understanding of addiction. Additionally, a case study, by definition, is not demographically representative, limiting the generalizability of our findings. Future studies should include a diverse sample to explore how demographic factors, such as age, gender, ethnicity, and socioeconomic status, influence addiction experiences and recovery processes.

The analysis 2 segment focuses on perceived factors of children in relation to drug use. What is perceived may have a correlation to but is not necessarily fact.

Our research also focuses on the policy implications of the intergenerational addiction pattern. While this provides valuable insights, incorporating perspectives from clinical models, such as cognitive (McHugh *et al.*, 2010) and dialectical (Dimeff & Linehann, 2008) behavior therapies or emotionally focused therapy (Fletcher & MacIntosh, 2018), could offer a more holistic understanding of this intergenerational pattern and its implications for addiction treatment. Future research should expand the theoretical framework to include these clinical perspectives and incorporate investigations of actively recovering addicts to improve intervention practices.

We do consider the NSDUH data to be reliable and representative of the United States population, though not necessarily of other nations. Further, the NSDUH data is restricted to the responses of individuals aged 12 and above, which prohibits inquiry of early childhood experiences (SAMHSA, 2022a). The NSDUH also does not directly address the question of parental substance use behaviors, both for youth and adults, which are central to this inquiry. Further research may consider employing survey instruments tailored to the intergenerational pattern detection and investigating early-childhood experiences.

Statistically, it is important to note that our applications of Bonferroni's (1936) correction increases the probability of a Type II (false negative) error, though we believe that our sample size is robust enough, despite this, to detect even low magnitude effects. Additionally, while our OLS estimates are easily interpetable and generally founded in the nature of the data, it may be appropriate to treat scaled questions on the NSDUH as ordinal variables, examined using logistical regressions (Cox, 1958; Nelder & Wedderburn, 1972). Lastly, the statistical procedures we employ are correlational in their determinations; further research may consider data identifications for quasi-experimental methods, such as Differences-in-Differences (Snow, 1855; Orley, 1978) or Instrumental Variable estimations (Wright, 1928; Reiersøl, 1941), which would enable causal conclusions.

We believe that the novel pattern described in this study emerged due to the interdisciplinary and intermodal nature of the research. This approach, which integrates qualitative and quantitative methods, as well as insights from multiple disciplines, should

serve as a model for future research. Addiction is an elusive issue which sits at the nexus, not only between several fields, but between several disciplines altogether. As such, the approach to inquiry must be comprehensive in its nature. In conclusion, while these limitations highlight where caution is warranted, they also point towards valuable directions for future research. Addressing these limitations will enhance the robustness and applicability of our findings and contribute to a more comprehensive understanding of addiction patterns.

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Table 1: Analysis 1, OLS models examining the effect of underage drinking on lifetime substance use disorder (self-reported), alcohol binge drinking, and narcotic uses.

Response:	SUD	Binge-Drink†	Cocaine	Ecstacy‡	Meth	Heroin
Intercept	0.060***	0.508***	0.059***	0.042***	0.021***	0.008***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.001)
Drank as Minor	0.148***	0.253***	0.209***	0.140***	0.085***	0.039***
	(0.004)	(0.005)	(0.004)	(0.003)	(0.003)	(0.002)
Observations	32,152	32,482	33,080	33,082	33,076	33,088
R^2	.046	.069	.077	.047	.029	.014
Residual SE	0.338	0.462	0.362	0.313	0.246	0.166
Residual DF	32,150	32,480	33,078	33,080	33,074	33,086

Significance Codes: * < .1, ** < .05, *** < .01.

† An alcohol binge is defined as drinking 4-5+ drinks in one sitting (SAMHSA, 2022a).

‡ Includes use of "molly" or "MDMA" (SAMHSA, 2022a).

Table 2: Analysis 2, OLS models examining perceptions of risk based on corresponding perceived parental attitudes and perceived accessibility for youth.

Response:	Binge-Drink† (Daily)	Smoking (Pack-a-day)	Heroin (Try)	Cocaine (Monthly Use)
Intercept	65.250***	64.763***	84.627***	83.946***
	(1.203)	(1.334)	(0.457)	(0.437)
Parent Attitude	0.233***	0.225***		
	(0.012)	(0.014)		
Accessibility			-0.063***	-0.080***
			(0.012)	(0.010)
Observations	9,986	9,982	9,635	9,716
R^2	.034	.026	.003	.006
Residual SE	18.773	19.791	22.264	21.455
Residual DF	9,984	9,980	9,633	9,714

Significance Codes: * < .1, ** < .05, *** < .01.

† An alcohol binge is defined as drinking 4-5+ drinks in one sitting (SAMHSA, 2022a).

Table 3: Analysis 3, OLS models examining perceptions of risk based on drug educations for youth.

Response:	Binge-Drink† (Daily)	Smoking (Pack-a-day)	Heroin (Try)	Cocaine (Monthly Use)
Intercept	3.387***	3.376***	3.258***	3.189***
	(0.013)	(0.014)	(0.016)	(0.016)
Parent-Initiated Education	0.128***	0.101***	0.120***	0.119***
	(0.015)	(0.016)	(0.019)	(0.018)
In-Class Education	0.119***	0.103***	-0.052**	-0.021
	(0.016)	(0.017)	(0.020)	(0.019)
Out-of-Class Education	-0.003	-0.005	0.085***	0.048*
	(0.018)	(0.019)	(0.022)	(0.021)
Observations	9,089	9,081	8,912	8,988
Multiple R^2	.016	.010	.007	.006
Adjusted R^2	.016	.010	.006	.005
F-Statistic‡	50.535***	30.513***	20.032***	17.375***
Residual SE	0.725	0.764	0.867	0.834
Residual DF	9,085	9,077	8,908	8,984

Significance Codes: * < .1, ** < .05, *** < .01.

† An alcohol binge is defined as drinking 4-5+ drinks in one sitting (SAMHSA, 2022a).

‡ All models have 3 predictors (Model DF = 3).