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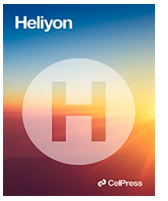

Research article

Parental health risk preferences, socio-economic status and offspring's alcohol behavior in South Africa

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ABSTRACT

Alcohol consumption represents a widespread behavior with detrimental effects on both individuals and society. Understanding the factors influencing offspring alcohol consumption is crucial for identifying potential risk factors and informing prevention and intervention strategies. Existing empirical literature underscores the intricate interplay of biological, environmental, and social factors in shaping offspring alcohol consumption. Building upon this foundation, this study investigates the determinants of health risk preferences, such as alcohol consumption, among South African offspring, utilizing a dataset comprising the 2008, 2010, 2012, and 2014 waves of the National Income Dynamic Study (NIDS). Logistic regressions are employed to model the determinants of offspring alcohol consumption, while ordered logits are utilized to assess the impact of parental drinking on offspring drinking frequency. The findings indicate that parental drinking significantly influences offspring alcohol intake. Specifically, daughters' alcohol consumption is influenced solely by maternal drinking, whereas sons are affected by both parents' alcohol consumption. Furthermore, while daughters from currently disadvantaged backgrounds may exhibit higher tendencies towards alcohol consumption, those with mothers from such backgrounds and fathers from more affluent backgrounds are less likely to engage in such behavior. Additionally, the results suggest that male offspring from higher-income brackets are less likely to consume alcohol, yet sons of wealthy fathers are more likely to adopt such lifestyles.

1. Introduction

The established relationship between health as human capital and economic growth [1,2] underscores the significant link recognized in numerous studies between health risk preferences and health outcomes [3,4]. Deterioration in health status can profoundly impact employment, productivity, and economic growth. Health risk preferences, exemplified by alcohol consumption [5,6], can have enduring health consequences spanning multiple generations. Hence, comprehending the transmission of parents' health risk preferences to subsequent generations carries substantial inter-generational economic policy implications. Moreover, researchers have identified socio-economic status (SES), encompassing income, education, and employment, as influential factors in the adoption and transmission of these health risk preferences. Some studies have investigated how offspring's own SES influences this behavior [7], while others have focused on parental SES as a contributing factor [8].

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In South Africa, where approximately 50 % of the population lives below the poverty line [9], issues like education and unemployment persist. Consequently, studying how alcohol consumption among South African offspring responds to poverty and other indicators of social class, alongside parental preferences, is imperative. Alcohol consumption is a significant public health concern in South Africa, with the country having one of the highest levels of alcohol consumption per capita in the world [10]. The consequences of excessive alcohol consumption are multifaceted, impacting not only individual health but also social and economic outcomes. In this context, understanding the determinants of alcohol behavior, particularly among the younger generation, is crucial for developing effective interventions and policies. Parental health risk preferences, including their attitudes and behaviors towards alcohol, play a critical role in shaping offspring's alcohol behavior. Research has shown that children of parents who consume alcohol are more likely to engage in drinking themselves [11]. The intergenerational transmission of health risk behaviors is a well-documented phenomenon, with parental modeling being a key factor in the socialization process [12]. In the South African context, where alcohol abuse is a widespread issue, understanding the influence of parental health risk preferences on offspring's alcohol behavior is particularly relevant.

Socio-Economic Status (SES) is another critical determinant of alcohol behavior. Studies have indicated that individuals from lower SES backgrounds are more likely to engage in risky alcohol consumption patterns [13]. In South Africa, the correlation between socio-economic disparities and health outcomes, including alcohol-related harms, is well-established [6]. The interplay between socio-economic factors and alcohol behavior is complex, influenced by access to resources, stress levels, social norms, among others. The alcohol behavior of offspring is influenced by a combination of genetic, environmental, and social factors. In addition to parental influences and socio-economic status, peer pressure, cultural norms, and individual psychological factors also play a role [12,14]. In South Africa, the prevalence of alcohol consumption among youth is a growing concern, with studies indicating that early initiation of drinking is associated with increased risk of developing alcohol use disorders later in life [15]. Given the multifaceted nature of alcohol behavior and its significant implications for public health, understanding the determinants of offspring's alcohol behavior in South Africa is essential. By examining the roles of parental health risk preferences and socio-economic status, this study aims to contribute to the development of targeted interventions and policies to reduce alcohol-related harms among the South African youth.

This paper contributes to the literature by investigating the factors influencing alcohol consumption in South Africa. Utilizing data from four waves (that is, 2008, 2010, 2012, and 2014) of the NIDS dataset, the study aims to investigate the determinants of health risk preferences, such as alcohol consumption, in South African offspring, with a focus on parental health risk preferences and socio-economic status (SES). The rationale for conducting this study is based on the recognition that alcohol consumption is a prevalent behavior with potential negative consequences for individuals and society. By understanding the determinants of offspring alcohol consumption, the study seeks to identify risk factors and inform prevention and intervention efforts. The study contributes to relevant policy or strategy by providing insights into how parental health risk preferences and SES influence offspring alcohol behavior. This information is crucial for developing targeted interventions and policies to mitigate the intergenerational transmission of health risk behaviors and address socio-economic disparities in alcohol consumption. The findings can inform strategies to reduce alcohol-related harm and promote healthier behaviors among future generations in South Africa.

The study further contributes to policy and strategy by highlighting the importance of gender-specific interventions. The findings reveal that parental drinking influences offspring alcohol intake differently based on the gender of both the parent and the offspring. For example, daughters are affected by their mothers' alcohol consumption, while sons are influenced by both parents. This suggests that policies aimed at reducing alcohol consumption should consider the different dynamics in parent-offspring relationships and tailor interventions accordingly. Additionally, the study sheds light on the role of socio-economic factors in offspring alcohol behavior. The results indicate that offspring from disadvantaged backgrounds are more prone to indulging in drinking practices, while those from more affluent backgrounds are less likely to consume alcohol. This underscores the need for policies that address the socio-economic determinants of alcohol consumption, such as poverty reduction and education improvement, to prevent the onset of risky alcohol behaviors. By examining the intergenerational transmission of health risk preferences and the impact of socio-economic status, the study provides valuable insights for policymakers and public health practitioners. It highlights the need for comprehensive strategies that address both the familial and socio-economic factors influencing alcohol consumption among South African youth.

Furthermore, the study's focus on the gender dimensions of transmission underscores the importance of designing gender-sensitive policies. For instance, interventions targeting mothers may have a broader impact by influencing both sons and daughters, while those targeting fathers may need to be tailored differently to address the specific dynamics between fathers and sons or fathers and daughters. This highlights the need for a nuanced approach to policy design that takes into account the complex interplay of gender, familial relationships, and alcohol consumption patterns. The study also offers insights into the broader socio-economic context in South Africa, where issues such as poverty, education, and unemployment remain prevalent. By examining how these factors interact with parental health risk preferences to influence offspring alcohol behavior, the research provides a basis for policies that address the root causes of alcohol consumption. For example, interventions that improve educational opportunities and employment prospects for disadvantaged groups could indirectly reduce the likelihood of alcohol consumption among offspring by alleviating socio-economic stressors. In summary, the study's contribution to relevant policy or strategy lies in its comprehensive examination of the determinants of offspring alcohol behavior in South Africa. It underscores the importance of considering both familial and socio-economic factors in designing effective interventions to reduce alcohol consumption and its associated harms. By informing targeted and nuanced policy approaches, the study has the potential to contribute to the development of more effective public health strategies to address alcohol-related issues in South Africa.

More specifically, this study assesses the differential response of sons' and daughters' alcohol consumption behaviors to parental alcohol consumption, parental income, parental educational attainment, and offspring educational levels, while controlling for factors such as age, marital status, race, and household demographics. Utilizing self-reported data on alcohol consumption from both offspring

and their respective fathers and mothers, we examine the transmission of this behavior. Initially, individuals are classified into drinkers and non-drinkers using a simple logistic regression model. Subsequently, alcohol consumption frequency is categorized into four groups and modeled using ordered logistic regression. Various parental socio-economic variables are utilized as proxies for offspring backgrounds. The results corroborate the influence of parental drinking on offspring's drinking habits. They indicate a stronger transmission of this health risk preference from mothers to offspring compared to fathers. Additionally, the findings suggest that daughters primarily emulate their mothers' drinking behaviors, with a lesser influence from fathers, while sons tend to emulate both parents, particularly strongly from fathers. Moreover, the study reveals that daughters from lower income households are more predisposed to alcohol consumption. Specifically, the alcohol preferences of female offspring are positively influenced by poor mothers and affluent fathers. Interestingly, affluent sons display lower tendencies for alcohol consumption; however, sons of wealthy fathers appear more inclined towards drinking.

The organization of this paper is as follows: Section 2 presents the literature review. Section 3 outlines the methodology and data used in the study. Results from the empirical analysis are presented and discussed in Section 4. Finally, Section 5 concludes with policy implications.

2. Review of literature

2.1. Economic issues of alcohol consumption

While alcohol consumption and its associated problems vary globally, the burden of diseases attributed to alcohol intake remains significant across most countries. Alcohol consumption is widely acknowledged as a key risk factor for various diseases, disabilities, and fatalities, among other health risks [16–18]. It has been identified as a causal factor in approximately 200 diseases [19], including infectious diseases such as tuberculosis and HIV/AIDS [20–22], a particularly pertinent issue in countries like South Africa where these diseases are prevalent. In addition to its impact on disease burden, alcohol consumption can impose significant costs on society, including injuries and various social problems. For instance, the total cost of road traffic crashes (RTCs) in South Africa in 2015 was estimated at 142.95 billion ZAR [23], with the country ranking among the most affected by drunk driving globally in 2012 [19]. RTCs not only have negative implications for socio-economic development but also adversely affect public health and well-being [23], exacerbating South Africa's existing disease burden [24], particularly given the heavy reliance of the population on the public health system [25].

Furthermore, alcohol consumption can impact labor productivity by directly affecting health outcomes [2]. suggest that healthier workers tend to be more energetic and productive, while a decline in health can result in absenteeism from work [26], leading to wage losses and reduced productivity, particularly in developing countries where manual labor is predominant. Moreover, heavy episodic drinking can impair academic performance, hindering human capital accumulation [27], which in turn can hinder economic growth. These findings underscore the significance of understanding the determinants of alcohol consumption, as highlighted by various researchers studying the complex interplay between alcohol consumption, health outcomes, social costs, and economic productivity.

2.2. Theoretical underpinning

[28] elucidate three fundamental premises characterizing the economic approach to human behavior. Firstly, an individual's preferences dictate the level of satisfaction derived from consuming goods and services. Secondly, individuals confront constraints on their choices, notwithstanding their unlimited desires. Thirdly, the optimization of one's well-being is contingent upon these constraints. From these premises, an economic agent appears rational in behavior. Hence [28], posit that a rational individual, who maximizes utility while considering the future repercussions of actions, may opt to consume addictive substances. Their framework draws on [29]'s rational addiction theory, which posits that addictive goods consumption can be rationalized as individuals maximizing utility within their constraints [29]. further contend that stressful situations, such as work tensions or peer pressure, may prompt substance consumption decisions. While the demand for addictive goods has predominantly been modeled based on the rational addiction theory [30], note a limitation of the model: it inadequately addresses why certain individuals become habituated to substances initially.

In efforts to enhance understanding of substance use determinants [31], categorizes key theories underlying substance use and abuse, including the traditional, ecological, health awareness, and life skills approaches. The traditional approach, championed by authors like [32–35], posits genetic causes for alcohol consumption and abuse, framing alcohol abuse as a disease. The ecological perspective attributes substance use to environmental factors, cultural norms, stress, and values, with proponents such as [36–38]. The health awareness theory emphasizes the role of awareness of health risks and social support in curbing substance consumption, as advocated by Refs. [39,40]. Lastly, the life skill theory attributes substance abuse to workplace and family-related stressors, highlighting the importance of social support and coping mechanisms, as articulated by Refs. [41,42].

Studies have identified various determinants of alcohol consumption and abuse based on these theoretical foundations. Risk factors such as family, education, neighborhood, and individual characteristics have been discerned [43–45]. Offspring socioeconomic status (SES), parental SES, and parental health risk preferences have been highlighted as determinants of offspring substance use. While some findings suggest that improvements in SES can lead to positive lifestyle changes, others contend that such enhancements might increase substance use [8]. [7] assert that offspring with higher SES are more prone to alcohol consumption, attributing this to achievement pressure and parental isolation due to career demands. Parental attributes have also emerged as influential factors affecting offspring behavior, with [46] suggesting that parental alcohol use increases the likelihood of offspring experimenting with

alcohol, possibly due to alcohol availability at home.

2.3. Empirical considerations

The aforementioned theoretical foundations and the various factors delineated as determinants of substance use have been applied in diverse empirical approaches. Income, education, and other indicators of social class have been identified as factors that could influence offspring health risk preferences. [8] demonstrate a positive association between income and education with alcohol use. Higher family incomes may lead to increased substance use due to greater purchasing power [47]. Conversely [7], assert that low family incomes might prompt substance use as a coping mechanism, driven by elevated stress levels and limited access to alternatives. However, they suggest that different socioeconomic status (SES) indicators may have varying impacts on substance use. Although education intuitively enhances information processing abilities, thus facilitating better health-related decisions [8], find an association between education and increased substance use.

Research indicates that parental socio-economic factors can significantly influence these behaviors in offspring. Parents' education, recognized as a crucial contributor to child development [48], plays a pivotal role in shaping these habits. Educated parents are better equipped to guide their children towards making informed decisions [49]. However, since education may also reflect employment effects [50], the absence of parents due to work commitments can detrimentally impact offspring behavior [51]. Additionally, the stability of the home environment, particularly parents' marital status, may also be influential. Research suggests that children from broken homes, such as those affected by divorce, are more prone to engaging in risky behaviors compared to those from more stable family environments [52]. Hence, socio-economic conditions emerge as crucial determinants of substance use. This analysis accounts for both offspring and parental socio-economic status (SES), encompassing factors such as income, education, and employment, while also considering the marital statuses of both groups.

In general, it can be postulated that parents convey their preferences to their offspring. Brown and [53] conducted a cross-sectional analysis examining the relationship between parental financial risk preference and that of their offspring, finding a significant positive relationship. Similarly [51], Hryshko et al. (2011) conducted a panel study in the United States, analyzing risk preferences in terms of investment behavior, and identified a positive relationship between parental risk behavior and that of their offspring [54,55]. have also corroborated the significance of parental transmission of risk attributes to offspring in the United States and Finland, respectively.

Other studies have specifically investigated the intergenerational transmission of substance use. Some suggest that this behavior can be transmitted from parents to offspring either directly or indirectly [46]. established a strong link in the parent-offspring transmission of smoking behavior, emphasizing time preference as a medium of transmission. They also found that a longer planning horizon resulted in a lower likelihood of offspring adopting parental risk preferences compared to shorter planning horizons [56]. reported that parental use of tobacco and alcohol predicted offspring's use at ages 15 to 18. Additionally, [57]'s study on the intergenerational transmissibility of alcohol use patterns in Moscow revealed that parents' alcohol consumption influenced their offspring's drinking habits [58]. Also confirmed the intergenerational continuity of substance use. To the best of our knowledge, similar analyses regarding alcohol consumption in the South African context are lacking. Hence, this study focuses on South Africa, specifically examining the aspects of transmissibility.

Previous literature has also acknowledged gender disparities in the transmission of risk preferences. For instance, in Australia [46], observed a higher probability of mothers transmitting risk preferences to their daughters than to their sons. Similarly [46], found that female offspring are more influenced by their mothers' risk preferences than by those of their fathers, whereas male offspring are equally influenced by both parents' risk preferences. Additionally [58], reported a greater transmission of substance use from mothers to daughters compared to sons. In our context, it is therefore imperative to investigate whether the transmission of these health risk preferences varies across the four parent dyads (father-son, father-daughter, mother-son, and mother-daughter). It has been suggested that the transmission is strongest along the same gender lines.

In an endeavor to expand current knowledge on the determinants of alcohol use in the South African context, this paper conducts an analysis akin to those discussed above. While many authors have primarily considered parental education as a potential influence on offspring's risky behaviors, this paper deviates from others by also taking into account parental alcohol and income status in addition to education.

3. Methodology and data

3.1. Data

This study utilizes data from the National Income Dynamic Study (NIDS), a nationally representative household survey conducted in South Africa through face-to-face interviews. The initial wave was completed in 2008, encompassing a sample of 28,000 individuals from approximately 7300 households. Subsequent waves were carried out in 2010, 2012, and 2014, maintaining the same individuals and households across waves. Each resident member of a household is individually interviewed and assigned a unique identifier (pid) for tracking within and across waves. Household identification within a given wave is facilitated through unique identifiers as well. Data collected from the questionnaires are stored in separate files for each wave and can be merged across waves using the individual identifier. Filial relationships are established via parental pids [59]. For this analysis, data from all four waves are aggregated to augment the sample size.

It is essential to acknowledge that since this analysis focuses on offspring and parents, the sample size is contingent upon individuals who can be linked to their mothers and fathers using parental unique identifiers. Individuals without parental pids are

consequently excluded from the sample. Additionally, the age range is confined to individuals between 10 and 30 years, further reducing the sample size. Socio-economic variables in this study may also experience a loss of observations due to the dependence on parental pids, leading to further diminution of the sample size. These considerations limit the overall sample to 5002 observations, comprising 2335 males and 2667 females. The principal variables extracted from the dataset are outlined as follows.

3.2. Alcohol

The survey encompasses various health-related and socio-economic inquiries that serve as controls for assessing the determinants of offspring alcohol consumption. Emphasis is placed on relevant questions pertinent to the present study. Within the NIDs, two alcohol-related questions are included: "how often do you drink alcohol" and "how many standard drinks do you usually have." This study opts to utilize the former question, focusing on the frequency of alcohol consumption. The response options for this question are as follows: "I have never drunk alcohol"; "I no longer drink alcohol"; "I drink very rarely"; "Less than once a week"; "one or two days a week"; "three or four days a week"; "five or six days a week"; "everyday drinkers." These options are dichotomized to differentiate between drinkers and non-drinkers, with "I have never drunk alcohol" representing non-drinkers, while the remaining options signify alcohol consumers. To categorize the frequency of drinking, "I drink very rarely" is classified as "rare drinkers," while "less than once a week" and "one or two days a week" are combined as regular drinkers. Additionally, "three or four days a week," "five or six days a week," and "everyday drinkers" are amalgamated into the category labeled as "greater than three days a week/everyday drinkers." Utilizing looping techniques in STATA facilitates the isolation of all pertinent parental variables.

3.3. Income groups

The income variable in the NIDS is nominal and is recorded at the household level. To ensure comparability, the variable was adjusted for inflation using the appropriate deflators provided by the NIDS. To assess disparities in alcohol consumption between affluent and impoverished households, the income variable is initially categorized into five income quintiles. Households falling within the bottom three quintiles are classified as poor, as the mean incomes of these quintiles fall below the South African poverty line of R992 per month [9]. The fourth and fifth quintiles are designated as middle and high-income groups, respectively. This analysis examines alcohol consumption patterns across the "rich," "middle," and "poor" strata. Additionally, fathers and mothers are stratified according to these income groups to evaluate the potential impact of parental income status on offspring alcohol consumption.

Table 1
Variable list and definitions.

Variable name	Meaning	Description		
Dependent variable				
Alcohol	Dummy for alcohol status of individuals	0 = Non-drinkers; 1 = Drinkers		
Alcohol freq	Frequency of drinking in individuals	1 = Non-drinkers; 2 = Rare drinkers; 3 = Drinks 1 or 2days/week; 4 = drinks more than 3 day/week		
Explanatory Variables				
Variable name			Meaning	Description
Individual	Mother	Father		
	Mothers' alcohol	Fathers' alcohol	Alcohol status of parents.	0 = Non-drinkers; 1 = Drinkers
Married	Mothers' marital status	Fathers' marital status	Categorical variables capturing the marital status of individuals and parents.	0 = Never married 1 = Married 2 = Widow/Divorce
Employment	Mothers' employment	Fathers' employment	Employment status of individuals and parents.	1 = Unemployed 2 = Employed
Education	Mothers' education	Fathers' education	Educational status of individuals and parents.	0 = No education 1-Primary 2 = Secondary 3 = Tertiary
Income groups	Mothers' income	Fathers' income	Income groups of individuals and parents	1 = Poor 2 = Middle class 3 = Rich
Race			Population groups of individuals	1 = African 2 = Mixed race 3 = Indian 4 = White
Settlement types				1 = Traditional 2 = Urban 3 = Rural
Age			Age of individuals	
Age2			The square of individuals' age	

3.4. Other variables

Parental and offspring socio-economic indicators, which are recognized influencers of drinking behaviors, are incorporated into all models. These encompass offspring and parental employment statuses (further categorized into male and female employment status), offspring and parental education, parental marital status, and age. Additionally, household demographics such as different settlement types (urban, rural, and traditional) are included.

- Employment status: The employment variable encompasses various options, including "not economically active," "unemployed discouraged," "strictly unemployed," and "employed." For this study, "not economically active," "unemployed discouraged," and "strictly unemployed" are merged to form the category "non-employed."
- Education: School attendance is classified based on the South African educational system's school classification criteria, grouping individuals into primary, secondary, and tertiary education categories [60]. Those who have never attended school are categorized as having "no education."
- Marital status: Marital status is grouped into individuals who are "never married," "married," "living with a partner," "widowed," and "divorced." The options of "married" and "living with a partner" are combined into a single category of "married." Similarly, "widowed" and "divorced" are combined into "widow/divorce." This consolidation facilitates the comparison between single-headed households and those headed by both parents. Table 1 below gives the variable list and their descriptions.

3.5. Estimation technique

For this study, the binary and ordered logistic regressions were used to analyze the data for several reasons: (i) The binary logistic regression method is appropriate for modeling the probability of a binary outcome, such as whether an individual is a drinker or a non-drinker [61]. In the context of the study, binary logistic regression is used to model the determinants of offspring alcohol consumption, with the outcome variable being whether the offspring consumes alcohol (1) or does not consume alcohol (0). This approach allows for the estimation of the odds ratios for the independent variables, providing insights into the factors that increase or decrease the likelihood of alcohol consumption [62]; and (ii) the ordered logistic regression method is suitable for analyzing ordinal dependent variables, where the outcomes have a natural order but the distances between the categories are not necessarily equal [63]. In the study, ordered logistic regression is used to examine the extent to which parental drinking influences offspring drinking frequency. The drinking frequency is categorized into an ordinal variable with levels such as "rare drinkers," "regular drinkers," and "greater than three days a week/everyday drinkers." Ordered logistic regression enables the analysis of the impact of various factors on the ordered categories of drinking frequency, taking into account the ordered nature of the dependent variable [64].

Theoretical literature identifies a set of fundamental frameworks from which we draw the determinants of alcohol consumption. The basic framework relates the alcohol behavior (Y) of an individual i to a set of m determinants (X) as follows:

$$Y_i^* = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} \ldots . \ \beta_m x_{im} \tag{1}$$

Y_i^* in (1) is the unobserved underlying dependent variable, while Y in (2) and (3) are the observed binary and ordered categorical outcomes.

$$Y_{it} : \begin{cases} 1 \ if \ takes \ Alcohol \\ 0 \ otherwise \end{cases} = \beta_i AC_{it} + \beta_i X_{it} + \varepsilon_{it} \tag{2}$$

$$Y_{1t} : \begin{cases} 0 \ Non - drinkers \\ 1 \ Rare \ drinkers \\ 2 \ Regular \ drinkers \\ 3 \ > three \ days \ a \ week \ or \ everyday \ drinkers \end{cases} = \beta_i AC_{it} + \beta_i X_{it} + \varepsilon_{it} \tag{3}$$

Y_{1t} from (1) and (2) are the offspring's intake and frequency of alcohol respectively. AC_{it}, is the parent's intake of alcohol. X_{it} represents other determinants of offspring's risk preferences such as parental and offspring SES like education; income levels; labor market participation, demographics such as race, settlement types, marital status, and ε_{it} is an independent error term. Logit and probit models seem suitable for the estimation of this type of frameworks. The marginal effects of both these models are the same. This study makes use of logit models.

3.6. Simple logit

The underlying logistic regression framework proposed to model the probability of drinking ($P(Y = 1)$) closely follows [65]. The logistic function is given as follows:

$$\Pr(y = 1) = \Pr(X'\beta + \mu > 0)$$

$$= \Pr\left(-\mu < X'\beta\right)$$

$$= F(X'\beta) \tag{4}$$

Where F (.) is the c.d.f of $-\mu$. This yields the logit model, with μ logistically distributed.

3.7. Ordered logit

Furthermore, given that the dependent variable is not continuous but is a binary variable that can also be categorized (Y^*), as people cross threshold on this fundamental variable, their values on the perceived ordinal variable Y changes [66]. Ordered logits therefore allow us to estimate the effects of explanatory variables on the underlying Y^*.

$$Y_i^* = X_i'\beta + \mu_i \tag{5}$$

Thus, following [65], an n-alternative ordered model can be defined as:

$$Y_i = j \quad if \quad \partial_{j-1} < Y_i^* \leq \partial_j, \mathrm{j} = 1 \ldots\ldots\ldots \mathrm{n}$$

Where $\partial_0 = -\infty and\, \partial_n = \infty$.
Therefore,

$$Pr(Y_i = j) = Pr\left(\partial_{j-1} < Y_i^* \leq \partial_j\right) = Pr\left(\partial_{j-1} < X_i'\beta + \mu_i \leq \partial_j\right) \begin{matrix} = Pr\left(\partial_{j-1} - X_i'\beta < \mu_i \leq \partial_j - X_i'\beta\right) \\ = F\left(\partial_j - X_i'\beta\right) - F\left(\partial_{j-1} - X_i'\beta\right) \end{matrix}$$

Where F is the cumulative distribution function of μ_i, and μ is logistically distributed with $F(z) = \frac{e^z}{1+e^z}$. The regression parameters β, and n-1 threshold parameters, $\partial_1 \ldots\ldots \partial_{n-1}$ are obtained by maximizing the log likelihood with $p_{ij} = \Pr(Y_i = j)$.

The different logistic functions are estimated with the cluster options, to correct for possible correlation of errors within clusters [65]. Since our data set reports alcohol intake by individuals across four different waves, we therefore cluster the regressions by individuals and wave.

4. Empirical results and findings

4.1. Descriptive statistics

The descriptive statistics of the sample are presented in Table 2, categorized by overall, male, and female. On average, 24.2 % of the sample reported consuming alcohol, with a higher proportion of males (35.2 %) compared to females (14.2 %). Among those who drink rarely (17 %), 23.7 % are males and 11 % are females. For regular drinkers (5.3 %), more males (8.6 %) are reported than females

Table 2
Descriptive statistics.

Variable	Overall		Male		Female	
	Mean	SD	Mean	SD	Mean	SD
	N = 5002		n = 2335		n = 2667	
Alcohol	0.242	0.428	0.352	0.48	0.142	0.350
Fathers' alc	0.387	0.487	0.386	0.49	0.389	0.488
Mothers' alc	0.108	0.310	0.105	0.31	0.110	0.313
Alcohol frequency						
Non-drinkers	0.758	0.428	0.648	0.48	0.858	0.350
Rare-drinkers	0.170	0.376	0.237	0.43	0.110	0.313
Regular-drinkers	0.053	0.224	0.086	0.28	0.023	0.151
>3 days/week drinkers	0.019	0.135	0.029	0.17	0.009	0.097
Employment						
Unemployed	0.766	0.424	0.731	0.44	0.797	0.402
Employed	0.234	0.424	0.269	0.44	0.203	0.402
Fathers' employment						
Unemployed	0.527	0.499	0.515	0.50	0.539	0.499
Employed	0.473	0.499	0.485	0.50	0.461	0.499
Mothers' employment						
Unemployed	0.659	0.474	0.668	0.47	0.650	0.477
Employed	0.341	0.474	0.332	0.47	0.350	0.477
Education						
No education	0.011	0.103	0.010	0.10	0.011	0.106
Primary	0.122	0.327	0.152	0.36	0.095	0.293
Secondary	0.756	0.429	0.743	0.44	0.769	0.422
Tertiary	0.111	0.314	0.096	0.29	0.125	0.331
Fathers' education						

(continued on next page)

Table 2 (*continued*)

Variable	Overall		Male		Female	
	Mean	SD	Mean	SD	Mean	SD
	N = 5002		n = 2335		n = 2667	
No education	0.242	0.429	0.236	0.42	0.248	0.432
Primary	0.359	0.480	0.343	0.47	0.373	0.484
Secondary	0.300	0.458	0.322	0.47	0.280	0.449
Tertiary	0.099	0.299	0.099	0.30	0.099	0.298
Mothers' education						
No education	0.227	0.419	0.216	0.41	0.236	0.425
Primary	0.375	0.484	0.362	0.48	0.386	0.487
Secondary	0.302	0.459	0.320	0.47	0.286	0.452
Tertiary	0.097	0.296	0.102	0.30	0.092	0.289
Marital status						
Never married	0.954	0.209	0.939	0.24	0.968	0.176
Married	0.037	0.190	0.054	0.23	0.022	0.148
Widow/divorce	0.009	0.092	0.007	0.09	0.009	0.097
Fathers' marital status						
Never married	0.011	0.105	0.010	0.10	0.012	0.110
Married	0.985	0.121	0.985	0.12	0.985	0.121
Widow/divorce	0.004	0.061	0.005	0.07	0.003	0.052
Mothers' marital status						
Never married	0.014	0.119	0.014	0.12	0.015	0.120
Married	0.982	0.134	0.982	0.13	0.982	0.135
Widow/divorce	0.004	0.063	0.004	0.06	0.004	0.063
Age	23.153	7.047	22.976	6.86	23.312	7.211
Age-squared	585.714	391.216	574.887	376.01	595.429	404.202
Workingage	0.999	0.038	0.999	0.04	0.998	0.040
Income groups						
Poor	0.435	0.496	0.430	0.50	0.438	0.496
Middle	0.260	0.439	0.254	0.44	0.265	0.441
Rich	0.306	0.461	0.315	0.46	0.297	0.457
Fathers' income group						
Poor fathers	0.543	0.498	0.535	0.50	0.551	0.497
Middle class	0.234	0.423	0.229	0.42	0.239	0.426
Rich	0.223	0.416	0.237	0.43	0.210	0.407
Mothers' income group						
Poor	0.437	0.496	0.431	0.50	0.442	0.497
Middle class	0.251	0.434	0.245	0.43	0.256	0.436
Rich	0.312	0.464	0.324	0.47	0.302	0.459
Race						
African	0.780	0.414	0.790	0.41	0.771	0.420
Mixed race	0.182	0.386	0.166	0.37	0.196	0.397
Indian	0.016	0.127	0.021	0.14	0.012	0.110
White	0.022	0.145	0.023	0.15	0.020	0.142
Settlement						
Traditional	0.463	0.499	0.459	0.50	0.468	0.499
Urban	0.447	0.497	0.451	0.50	0.443	0.497
Farms	0.090	0.286	0.090	0.29	0.089	0.285

(2.3 %), a trend similarly observed for those who drink more than three times a week (1.9 %), with males comprising 2.9 % compared to females at 1 %. The majority of offspring in the sample are unemployed (76.6 %), with a slightly higher proportion of females (79.7 %) compared to males (73.1 %). Employment rates also vary, with fewer females (20.3 %) employed compared to males (26.9 %).

In terms of education, 12.2% of offspring completed primary education, 75.6% secondary, and 11% tertiary. A larger percentage of mothers completed primary education (37.5%) compared to fathers (35.9%), while secondary education completion rates were almost equal between mothers and fathers (30 % and 30.2 % respectively). On average, 95% of offspring are unmarried, with females comprising a higher percentage (96.8%) compared to males (93.9%). Married or cohabiting individuals constitute 5.4 % of males (3.7 % of total offspring) and 2.2 % of females.

Divorce or widowhood rates are low, with more females (0.9%) than males (0.7%) falling into this category. Additionally, 98.5% of fathers and mothers are either married or cohabiting. The average age of individuals in the sample is 23 years. Approximately 43.5% of offspring are categorized as poor, while 26% are middle class and 30.6% are affluent. The sample includes a higher percentage of poor fathers (54.3%) than mothers (43.7%), while more mothers (31.2%) fall into the affluent category compared to fathers (22.3 %). Finally, the majority of the sample comprises black Africans (78%), followed by mixed-race individuals (18.2%), Indians (1.6%), and whites (2.2%).

4.2. Regression results and discussion

The econometric results are derived from the simple and ordered logit models. The simple logit model, presented in Table 3, is disaggregated into three columns: the overall sample (Column 1), the male sub-sample (Column 2), and the female sub-sample

Table 3
Simple Logit with individual and parental income groups.

VARIABLES	(1)	(2)	(3)
	ME overall	ME male	ME female
Fathers' alcohol	0.067[b]	0.142[a]	0.027
	(0.032)	(0.047)	(0.033)
Mothers' alcohol	0.123[a]	0.102	0.115[a]
	(0.039)	(0.068)	(0.040)
Poor	0.065	−0.020	0.136[a]
	(0.050)	(0.081)	(0.043)
Rich	−0.066	−0.108	−0.010
	(0.053)	(0.084)	(0.043)
Poor fathers	−0.076	−0.204[c]	0.033
	(0.065)	(0.121)	(0.047)
Rich fathers	0.061	0.232[b]	−0.104[c]
	(0.062)	(0.098)	(0.059)
Poor mothers	0.006	0.118	−0.114[b]
	(0.056)	(0.092)	(0.049)
Rich mothers	−0.003	−0.145	0.085
	(0.061)	(0.101)	(0.058)
Age	0.171[a]	0.199[a]	0.101[a]
	(0.040)	(0.060)	(0.038)
Age-squared	−0.003[a]	−0.004[a]	−0.002[b]
	(0.001)	(0.001)	(0.001)
Employed	0.162[a]	0.186[a]	0.099[b]
	(0.047)	(0.066)	(0.043)
Employed fathers	0.023	−0.050	0.047
	(0.037)	(0.058)	(0.034)
Employed mothers	0.025	0.028	−0.005
	(0.035)	(0.060)	(0.030)
Primary	0.254[a]	0.434[a]	−0.009
	(0.076)	(0.067)	(0.119)
Secondary	0.159[a]	0.315[a]	−0.051
	(0.060)	(0.034)	(0.097)
Tertiary	0.100	0.342[a]	−0.125
	(0.073)	(0.093)	(0.099)
Fathers' primary	−0.052	−0.015	−0.085[b]
	(0.042)	(0.069)	(0.039)
Fathers' secondary	−0.009	0.088	−0.060
	(0.046)	(0.078)	(0.047)
Fathers' tertiary	−0.071	0.034	−0.049
	(0.053)	(0.092)	(0.053)
Mothers' primary	0.031	0.077	0.041
	(0.047)	(0.073)	(0.034)
Mothers' secondary	0.045	−0.023	0.103[a]
	(0.048)	(0.079)	(0.039)
Mothers' tertiary	−0.015	−0.095	0.093[c]
	(0.057)	(0.092)	(0.051)
Married	−0.095	−0.136	−0.122[a]
	(0.076)	(0.100)	(0.020)
Widow/divorce	0.069	−0.341[a]	0.078
	(0.175)	(0.031)	(0.140)
Married fathers	−0.155	−0.524[a]	0.045
	(0.133)	(0.131)	(0.060)
Widow/divorce fathers	−0.091	−0.338	−0.041
	(0.238)	(0.260)	(0.086)
Married mothers	0.053	0.104	0.041
	(0.090)	(0.146)	(0.058)
Widow/divorce mothers	−0.124	−0.179	0.032
	(0.103)	(0.141)	(0.119)
Mixed race	−0.025	−0.144[c]	0.060
	(0.050)	(0.081)	(0.055)
Indian	−0.016	−0.124	0.066
	(0.072)	(0.099)	(0.097)

(*continued on next page*)

Table 3 (*continued*)

VARIABLES	(1)	(2)	(3)
	ME overall	ME male	ME female
White	0.076	−0.094	0.177[c]
	(0.075)	(0.091)	(0.094)
Urban	0.101[a]	0.049	0.120[a]
	(0.033)	(0.053)	(0.035)
Farms	0.040	0.023	0.044
	(0.057)	(0.100)	(0.054)
Wald chi2 (33)	124.63	108.01	134.70
Prob > chi2	0.000	0.000	0.000
Pseudo R2	0.1772	0.1927	0.2987
Correct classification	80.15 %	75.89 %	88.15 %
Observations	5002	2335	2667

Standard errors in parentheses.
[a] $p < 0.01$.
[b] $p < 0.05$.
[c] $p < 0.1$.

(Column 3). The table presents marginal effects, which represent the changes in the likelihood of being a drinker following a unit change in a specific regressor. Similarly, the ordered logit model, displayed in Table 4, is divided into overall, male, and female sub-samples. Each sub-sample presents the marginal effects associated with the probability of ascending magnitude of alcohol drinking frequency by offspring. Regarding the goodness-of-fit measure based on classification ratios, the percentages of correctly classified values for the simple logit models are 80.15 %, 75.89 %, and 88.15 % for the overall, male, and female models, respectively. Therefore, all our models are deemed acceptable for interpreting coefficients, with the female model demonstrating the best fit.

The econometric results reveal significant findings regarding the factors influencing offspring alcohol status, which can be categorized into three main groups of characteristics. Firstly, and most notably for this study, are parental alcohol preferences, which are distinguished between fathers and mothers. Secondly, parental socio-economic status, represented by parental income, education, and employment, serves as a proxy for the background of the offspring's upbringing. Lastly, the offspring's own socio-economic status is considered. The results are interpreted and discussed in this sequence.

4.3. Parental alcohol status and offspring's drinking preference

The marginal effects of the simple logit model in Table 3 suggest that paternal and maternal drinking significantly increases the likelihood of drinking in offspring. However, the effects vary by gender of offspring. This finding supports [57]'s study. Male offspring acquire drinking behaviours from fathers while female offspring do so from mothers only. Fathers who drink alcohol have a 14 % more likelihood of engendering drinking male offspring, compared to non-drinking fathers. The effect is not significant for female offspring. The coefficients of the ordered logit in Table 4 validate this. However, boys of drinking fathers have an 8 %, 4 %, and 2 % higher probability of being rare drinkers, of drinking one or two days a week, and more than three days a week respectively. Drinking fathers are therefore more likely to have rare drinkers than frequent drinkers. However, this may simply be reflective of the fact the number of drinkers in the current sample decrease with increasing frequency of drinking (Table 2). The fact that fathers transmit alcohol preferences only to boys is consistent with psychological literature, suggesting that fathers prefer to spend time more with their sons compared to daughters [67,68]. Hence are more likely to copy this behavior. It is nonetheless important to note that when the regressions are run with mothers separate from fathers, the coefficient of transmission from fathers to daughters become significant, suggesting that daughters also copy from fathers. The father-to-son coefficient of transmission however remains bigger (19 %), compared to that of Father-to-daughter (5 %), thus still indicating a greater probability of sons copying from fathers compared to their female counterparts.

Contrary to fathers, the simple logit model suggests that daughters and not sons take after mothers in terms of alcohol preferences. Daughters with mothers who take alcohol have an 11 % more likelihood of consuming alcohol compared to non-drinking mothers. The results from the ordered logit (Table 4) and mothers only (Table 5) models, however suggest that, maternal drinking preferences have effects on both sons and daughters' drinking frequencies.

The probability of being a rare drinker is higher by 9 % for both sons and daughters of drinking mothers. Sons of drinking mothers have a 4 % higher probability of being regular drinking, but daughters, only 2 %. The probability of drinking more than three days a week increases by 2 % for sons and 1 % for daughters whose mothers drink. This finding of mothers' drinking affecting the alcohol preferences of both sons and daughters agrees with [68] who explain that mothers are the traditional care givers from whom the initial parent-child bond is established for both the boy- and the girl-child. They go on to explain that this bond potentially affects the later-life behavior of both children. Again, as with fathers, the rate of transmission of drinking behavior decreases with increasing frequency. Comparing to the simple logit, the higher likelihood of mothers' transmission is within the rare drinkers' class for daughters, relative to sons. These findings suggest that if current policy focus is on male drinking only, it is likely to have only partial effects on males and no effects on females' drinking habits at all in the future generations. Therefore, addressing females' drinking habits today will have a stronger effect on both males and females in the future.

Table 4
Ordered logit results.

VARIABLES	ME. Overall				ME. Males				ME. Females			
	Non-drinkers	Rare-drinkers	Regular-drinkers	Drink more than 3 day/week	Non-drinkers	Rare-drinkers	Regular-drinkers	Drink more than 3 day/week	Non-drinkers	Rare-drinkers	Regular-drinkers	Drink more than 3 day/week
Alcohol_f	−0.069**	0.045**	0.016**	0.008*	−0.144***	0.082***	0.041***	0.022**	−0.032	0.024	0.006	0.003
	(0.032)	(0.022)	(0.008)	(0.004)	(0.048)	(0.030)	(0.014)	(0.010)	(0.032)	(0.024)	(0.006)	(0.003)
Alcohol_m	−0.133***	0.086***	0.031***	0.016**	−0.154**	0.087**	0.043*	0.024*	−0.126***	0.094***	0.022**	0.011*
	(0.038)	(0.024)	(0.010)	(0.007)	(0.074)	(0.041)	(0.023)	(0.014)	(0.038)	(0.028)	(0.009)	(0.006)
Poor	−0.061	0.039	0.014	0.007	0.008	−0.005	−0.002	−0.001	−0.119***	0.089***	0.021***	0.010**
	(0.051)	(0.034)	(0.012)	(0.006)	(0.083)	(0.047)	(0.023)	(0.013)	(0.038)	(0.029)	(0.008)	(0.005)
Rich	0.075	−0.049	−0.017	−0.009	0.131*	−0.074*	−0.037*	−0.020	0.015	−0.011	−0.003	−0.001
	(0.049)	(0.031)	(0.012)	(0.006)	(0.074)	(0.042)	(0.022)	(0.013)	(0.043)	(0.031)	(0.008)	(0.004)
Poor_f	0.064	−0.042	−0.015	−0.008	0.213*	−0.120*	−0.060*	−0.032	−0.056	0.041	0.010	0.005
	(0.067)	(0.044)	(0.015)	(0.008)	(0.123)	(0.071)	(0.036)	(0.021)	(0.046)	(0.034)	(0.009)	(0.004)
Rich_f	−0.048	0.031	0.011	0.006	−0.172*	0.098*	0.049*	0.026	0.098*	−0.073*	−0.017*	−0.008
	(0.058)	(0.038)	(0.014)	(0.007)	(0.092)	(0.053)	(0.027)	(0.017)	(0.057)	(0.043)	(0.010)	(0.006)
Poor_m	0.012	−0.008	−0.003	−0.001	−0.091	0.052	0.026	0.014	0.122***	−0.091***	−0.021*	−0.010**
	(0.060)	(0.039)	(0.014)	(0.007)	(0.106)	(0.060)	(0.029)	(0.018)	(0.046)	(0.032)	(0.012)	(0.005)
Rich_m	−0.001	0.001	0.000	0.000	0.134	−0.076	−0.038	−0.020	−0.093*	0.069	0.016	0.008
	(0.059)	(0.038)	(0.014)	(0.007)	(0.097)	(0.055)	(0.028)	(0.017)	(0.056)	(0.042)	(0.010)	(0.006)
Age	−0.185***	0.121***	0.043***	0.022***	−0.235***	0.133***	0.066***	0.036**	−0.102***	0.076***	0.018**	0.009**
	(0.039)	(0.025)	(0.012)	(0.008)	(0.057)	(0.032)	(0.022)	(0.015)	(0.037)	(0.028)	(0.009)	(0.004)
age2	0.004***	−0.002***	−0.001***	−0.000***	0.005***	−0.003***	−0.001***	−0.001**	0.002**	−0.001**	−0.000*	−0.000**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Employed	−0.170***	0.110***	0.040***	0.020**	−0.202***	0.110***	0.060**	0.032*	−0.097**	0.072**	0.017*	0.008*
	(0.049)	(0.032)	(0.014)	(0.008)	(0.072)	(0.039)	(0.024)	(0.017)	(0.041)	(0.029)	(0.010)	(0.005)
Employed_f	−0.003	0.002	0.001	0.000	0.070	−0.039	−0.020	−0.011	−0.029	0.021	0.005	0.002
	(0.036)	(0.024)	(0.008)	(0.004)	(0.055)	(0.030)	(0.016)	(0.011)	(0.032)	(0.024)	(0.005)	(0.003)
Employed_m	−0.030	0.019	0.007	0.003	−0.040	0.023	0.011	0.006	−0.002	0.001	0.000	0.000
	(0.035)	(0.023)	(0.008)	(0.004)	(0.060)	(0.034)	(0.017)	(0.010)	(0.028)	(0.021)	(0.005)	(0.002)
Primary	−0.238***	0.153***	0.056**	0.029*	−0.416***	0.259***	0.103***	0.054**	0.001	−0.001	−0.000	−0.000
	(0.088)	(0.059)	(0.023)	(0.015)	(0.094)	(0.064)	(0.032)	(0.027)	(0.124)	(0.084)	(0.025)	(0.015)
Secondary	−0.116	0.081	0.024*	0.011*	−0.254***	0.179***	0.053***	0.023***	0.053	−0.037	−0.010	−0.006
	(0.075)	(0.056)	(0.014)	(0.006)	(0.072)	(0.060)	(0.015)	(0.008)	(0.101)	(0.069)	(0.020)	(0.012)
Tertiary	−0.046	0.034	0.009	0.004	−0.285**	0.197**	0.061**	0.028*	0.132	−0.097	−0.023	−0.012
	(0.085)	(0.063)	(0.016)	(0.007)	(0.115)	(0.080)	(0.028)	(0.017)	(0.102)	(0.070)	(0.021)	(0.013)
Primary_f	0.044	−0.029	−0.010	−0.005	−0.010	0.006	0.003	0.001	0.086**	−0.063**	−0.015*	−0.008
	(0.047)	(0.030)	(0.012)	(0.006)	(0.081)	(0.048)	(0.021)	(0.011)	(0.039)	(0.027)	(0.009)	(0.005)
Secondary_f	0.009	−0.006	−0.002	−0.001	−0.104	0.057	0.030	0.017	0.062	−0.045	−0.011	−0.006
	(0.047)	(0.030)	(0.011)	(0.006)	(0.086)	(0.049)	(0.024)	(0.015)	(0.045)	(0.032)	(0.010)	(0.005)
Tertiary_f	0.052	−0.034	−0.012	−0.006	−0.065	0.037	0.018	0.010	0.039	−0.028	−0.007	−0.004
	(0.057)	(0.037)	(0.014)	(0.006)	(0.106)	(0.060)	(0.030)	(0.018)	(0.053)	(0.037)	(0.011)	(0.006)
Primary_m	−0.028	0.018	0.006	0.003	−0.062	0.033	0.018	0.011	−0.041	0.032	0.006	0.003
	(0.050)	(0.034)	(0.011)	(0.005)	(0.079)	(0.044)	(0.024)	(0.012)	(0.036)	(0.029)	(0.005)	(0.003)
Secondary_m	−0.043	0.028	0.010	0.005	0.022	−0.013	−0.006	−0.003	−0.093**	0.071**	0.015**	0.007*
	(0.053)	(0.035)	(0.012)	(0.006)	(0.092)	(0.053)	(0.025)	(0.014)	(0.039)	(0.032)	(0.006)	(0.004)
Tertiary_m	−0.008	0.005	0.002	0.001	0.071	−0.043	−0.019	−0.010	−0.102*	0.077*	0.017*	0.008
	(0.063)	(0.042)	(0.014)	(0.007)	(0.106)	(0.064)	(0.027)	(0.015)	(0.052)	(0.041)	(0.009)	(0.005)
Married	0.087	−0.059	−0.019	−0.009	0.131	−0.082	−0.033	−0.016	0.123***	−0.097***	−0.018***	−0.008**

(*continued on next page*)

Table 4 (*continued*)

VARIABLES	ME. Overall				ME. Males				ME. Females			
	Non-drinkers	Rare-drinkers	Regular-drinkers	Drink more than 3 day/week	Non-drinkers	Rare-drinkers	Regular-drinkers	Drink more than 3 day/week	Non-drinkers	Rare-drinkers	Regular-drinkers	Drink more than 3 day/week
	(0.081)	(0.058)	(0.016)	(0.008)	(0.109)	(0.074)	(0.025)	(0.012)	(0.020)	(0.017)	(0.006)	(0.003)
Widow/divorced	−0.060	0.037	0.015	0.008	0.348***	−0.249***	−0.069***	−0.030***	−0.053	0.038	0.010	0.005
	(0.151)	(0.089)	(0.039)	(0.022)	(0.028)	(0.029)	(0.014)	(0.010)	(0.096)	(0.066)	(0.020)	(0.010)
Married_f	0.052	−0.033	−0.013	−0.007	0.080	−0.042	−0.024	−0.014	−0.056	0.043	0.009	0.004
	(0.116)	(0.071)	(0.029)	(0.016)	(0.129)	(0.064)	(0.041)	(0.024)	(0.053)	(0.042)	(0.008)	(0.004)
Widow/divorce_f	−0.007	0.004	0.002	0.001	−0.162	0.058	0.059	0.045	0.032	−0.026	−0.004	−0.002
	(0.258)	(0.155)	(0.067)	(0.037)	(0.327)	(0.082)	(0.132)	(0.122)	(0.078)	(0.063)	(0.011)	(0.004)
Married_m	−0.136**	0.094**	0.028**	0.014**	−0.204***	0.131**	0.048***	0.026**	−0.041	0.031	0.007	0.003
	(0.059)	(0.043)	(0.011)	(0.007)	(0.075)	(0.054)	(0.016)	(0.012)	(0.054)	(0.042)	(0.008)	(0.004)
Widow/dovorce_m	0.045	−0.034	−0.008	−0.003	0.102	−0.077	−0.018	−0.007	−0.037	0.028	0.006	0.003
	(0.085)	(0.066)	(0.014)	(0.006)	(0.097)	(0.076)	(0.016)	(0.007)	(0.118)	(0.088)	(0.020)	(0.010)
Mixed race	0.040	−0.027	−0.009	−0.004	0.182**	−0.114**	−0.046**	−0.023**	−0.051	0.039	0.009	0.004
	(0.045)	(0.030)	(0.010)	(0.005)	(0.073)	(0.052)	(0.018)	(0.010)	(0.049)	(0.037)	(0.009)	(0.004)
Indian	0.054	−0.037	−0.012	−0.006	0.174**	−0.108**	−0.044**	−0.022**	−0.051	0.039	0.009	0.004
	(0.053)	(0.037)	(0.012)	(0.005)	(0.076)	(0.053)	(0.019)	(0.010)	(0.081)	(0.060)	(0.015)	(0.007)
White	−0.065	0.040	0.016	0.009	0.094	−0.055	−0.026	−0.014	−0.162**	0.114**	0.032*	0.016
	(0.070)	(0.042)	(0.018)	(0.010)	(0.100)	(0.063)	(0.026)	(0.013)	(0.077)	(0.052)	(0.019)	(0.011)
Urban	−0.099***	0.067***	0.022***	0.011**	−0.041	0.023	0.011	0.006	−0.118***	0.090***	0.019**	0.008**
	(0.034)	(0.024)	(0.008)	(0.005)	(0.057)	(0.033)	(0.016)	(0.009)	(0.034)	(0.027)	(0.007)	(0.004)
Farms	−0.051	0.035	0.011	0.005	−0.010	0.006	0.003	0.001	−0.050	0.040	0.007	0.003
	(0.052)	(0.035)	(0.011)	(0.006)	(0.089)	(0.052)	(0.024)	(0.013)	(0.051)	(0.040)	(0.008)	(0.004)
Wald chi2 (33)	288.88				250.38				162.97			
Prob > chi2	0.000				0.000				0.000			
Pseudo R2	0.135				0.1362				0.2534			
Observations	5002	5002	5002	5002	2335	2335	2335	2335	2667	2667	2667	2667

The results indicating that both paternal and maternal drinking significantly increase the likelihood of offspring drinking, with variations depending on the gender of the offspring, align with the findings of previous empirical studies and theories. This supports the theory of social learning, which posits that children learn behaviors by observing and imitating their parents [69]. The gender-specific transmission of drinking behaviors, with male offspring adopting drinking behaviors from fathers and female offspring from mothers, is consistent with gender role socialization theories. These theories suggest that children tend to model behaviors that are congruent with their gender roles, as defined by societal norms and expectations [70].

The finding that fathers who consume alcohol are associated with a 14 % higher likelihood of having drinking male offspring aligns with previous research indicating that sons are more likely to emulate their fathers' health risk behaviors, including alcohol consumption [57]. The gradation in the probability of drinking frequency (8 %, 4 %, and 2 % for rare, one or two days a week, and more than three days a week, respectively) suggests that the influence of paternal drinking may be more pronounced in initiating drinking behavior rather than in determining the frequency of drinking. This could be attributed to the role of fathers as role models for their sons, particularly in contexts where masculine identities are associated with alcohol consumption [71]. The significant influence of maternal drinking on daughters' likelihood of drinking (11 % higher compared to daughters with non-drinking mothers) is in line with studies that highlight the mother-daughter bond as a crucial factor in the transmission of health-related behaviors (see for example, Steinberg and Silk, 2002).

The ordered logit model further reveals that maternal drinking preferences also affect the drinking frequencies of both sons and daughters, albeit to a lesser extent for sons. This suggests that while mothers may have a direct influence on their daughters' drinking behaviors, their impact on sons may be more nuanced, potentially mediated by other factors such as family dynamics and communication patterns. The findings also indicate that when the analyses are conducted separately for mothers and fathers, there is evidence of cross-gender transmission, with daughters also emulating their fathers and sons being influenced by their mothers. This highlights the complexity of parental influence, suggesting that both parents play a role in shaping their offspring's alcohol behavior, albeit with varying degrees of impact based on the gender of the offspring.

4.4. Parental socio-economic status and offspring drinking preference

The three key elements pertaining to parental socio-economic status, which partially reflect the background of the offspring's upbringing, include income class, education, and employment. Sons of fathers from the bottom three income quintiles are 20 % less likely to engage in drinking compared to sons of middle-class fathers (4th income quintile). Specifically, poor fathers reduce the likelihood of their sons' drinking by 12 % in the category of rare drinkers and by 6 % in the category of regular drinkers, as indicated by the ordered logit models. However, daughters' drinking preferences do not seem to be influenced by fathers' poverty. Conversely, fathers belonging to the top end of the income distribution increase the likelihood of their sons' drinking by 23 %, while decreasing the probability of daughters' drinking by approximately 10 %. This translates to a 10 % higher probability of being a rare drinker and a 5 % higher probability of regular drinking for sons, whereas daughters have a 7 % lower likelihood of being rare drinkers and a 2 % lower likelihood of drinking regularly. Fathers' income status does not significantly affect the likelihood of offspring being the most frequent drinkers.

Similarly, daughters of poorer mothers have an 11.4 % lower probability of drinking. This aligns with the results from the mothers-only model (Table 5). Regarding drinking frequency, this corresponds to a 9 % lower probability of being rare drinkers, a 2 % lower probability of drinking regularly, and a 1 % lower probability of drinking more than three days a week. However, mothers' income status does not influence sons' drinking preferences.

These findings suggest that fathers typically provide for their children, and sons may utilize these resources to fuel drinking habits, unlike daughters who may use resources more responsibly. Poorer mothers are more likely to be present with their daughters, potentially reducing their exposure to drinking habits through maternal influence. The observation that daughters of higher income earners tend to drink less implies that females may have different motivations for drinking than males. In poorer households, daughters may associate with more affluent individuals to gain financial favors, potentially increasing their likelihood of drinking. Consequently, it is crucial to meet the needs of the girl child while fostering a close bond between the mother and daughter to decrease the probability of future drinking by the girl child. Conversely, sons may not drink out of necessity like daughters but as a means of social expression, often emulating their fathers. Therefore, interventions aimed at curbing the likelihood of future alcohol behavior need to be tailored along gender lines, with resources rationed to boys while parents are encouraged to be more generous to girls.

In addition to the effects of parental income class, parental education exhibits similar effects. Fathers with primary education reduce the likelihood of daughters' drinking by 8.5 % compared to uneducated fathers, a finding supported by the fathers-only model. However, there are no significant effects for higher levels of paternal education, and paternal education does not influence sons' drinking. The ordered logit models corroborate these findings. Conversely, mothers' secondary and tertiary education increase the likelihood of daughters' drinking by 10 % and 9 %, respectively. This trend is consistent across all drinking frequency categories, as evidenced by the coefficients of the ordered logit models and the mothers-only model. Highly educated mothers are more likely to dedicate their time to the labor market, leaving less time to bond with their daughters. Therefore, policy efforts should focus on fostering mother-daughter bonds, especially for working mothers, while promoting responsible fatherhood in terms of knowledge transmission, in addition to providing financial support to mothers to facilitate access for daughters. Notably, being married as a father reduces the likelihood of sons' drinking compared to being never married, underscoring the importance of fathers' presence in the home and their role as providers.

Parental employment status was not significant across all models considering both parents. Education possibly encompasses all the effects of employment. However, daughters of employed fathers in the fathers-only model and sons of employed mothers in the

Table 5
simple logits with Fathers separated from mothers

VARIABLES	Fathers only			Mothers only		
	(1)	(1)	(2)	(2)	(3)	(4)
	ME overall	ME male	ME Female	ME. overall	ME male	ME female
Fathers' alcohol	0.102[a]	0.190[a]	0.050[c]	–	–	–
	(0.029)	(0.043)	(0.030)	–	–	–
Mothers' alcohol	–	–	–	0.154[a]	0.132[b]	0.137[a]
	–	–	–	(0.031)	(0.054)	(0.030)
Poor	0.067	−0.010	0.116[a]	0.060	−0.017	0.102[a]
	(0.047)	(0.077)	(0.040)	(0.044)	(0.072)	(0.037)
Rich	−0.074	−0.174[b]	0.004	−0.013	−0.017	−0.041
	(0.051)	(0.082)	(0.049)	(0.049)	(0.081)	(0.040)
Poor fathers	−0.076	−0.114	−0.051	–	–	–
	(0.049)	(0.087)	(0.043)	–	–	–
Rich fathers	0.091[c]	0.146[b]	−0.029	–	–	–
	(0.048)	(0.074)	(0.050)	–	–	–
Poor mothers	–	–	–	−0.024	0.045	−0.080[b]
	–	–	–	(0.044)	(0.075)	(0.037)
Rich mothers	–	–	–	0.057	0.099	0.035
	–	–	–	(0.049)	(0.077)	(0.037)
Age	0.172[a]	0.208[a]	0.100[b]	0.145[a]	0.170[a]	0.090[a]
	(0.038)	(0.059)	(0.040)	(0.040)	(0.060)	(0.031)
Age-squared	−0.003[a]	−0.004[a]	−0.002[b]	−0.003[a]	−0.003[b]	−0.002[b]
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Employed	0.146[a]	0.167[b]	0.074[c]	0.122[a]	0.138[b]	0.033
	(0.045)	(0.067)	(0.043)	(0.039)	(0.063)	(0.030)
Employed fathers	0.043	−0.031	0.082[b]	–	–	–
	(0.034)	(0.057)	(0.032)	–	–	–
Employed mothers	–	–	–	0.048	0.089[c]	−0.016
	–	–	–	(0.030)	(0.051)	(0.022)
Primary	0.239[a]	0.429[a]	−0.039	0.154[c]	0.311[b]	−0.072
	(0.078)	(0.068)	(0.109)	(0.093)	(0.138)	(0.115)
Secondary	0.147[b]	0.310[a]	−0.044	0.029	0.139	−0.096
	(0.063)	(0.036)	(0.092)	(0.085)	(0.130)	(0.105)
Tertiary	0.087	0.354[a]	−0.100	0.035	0.229	−0.121
	(0.073)	(0.090)	(0.095)	(0.104)	(0.157)	(0.111)
Fathers' primary	−0.027	0.028	−0.088[b]	–	–	–
	(0.043)	(0.067)	(0.043)	–	–	–
Fathers' secondary	0.006	0.103	−0.065	–	–	–
	(0.045)	(0.070)	(0.050)	–	–	–
Fathers' tertiary	−0.096[c]	−0.008	−0.075	–	–	–
	(0.049)	(0.084)	(0.055)	–	–	–
Mothers' primary	–	–	–	0.038	0.124[b]	0.006
	–	–	–	(0.039)	(0.062)	(0.035)
Mothers' secondary	–	–	–	0.018	0.053	0.016
	–	–	–	(0.040)	(0.062)	(0.036)
Mothers' tertiary	–	–	–	−0.037	−0.036	0.046
	–	–	–	(0.050)	(0.082)	(0.047)
Married	−0.092	−0.123	−0.099[a]	−0.150[a]	−0.207[b]	−0.107[a]
	(0.075)	(0.106)	(0.026)	(0.053)	(0.089)	(0.023)
Widow/divorce	−0.032	−0.353[a]	0.125	0.470[a]	−0.360[a]	0.381[b]
	(0.174)	(0.027)	(0.160)	(0.153)	(0.023)	(0.169)
Married fathers	−0.105	−0.483[a]	0.033	–	–	–
	(0.106)	(0.120)	(0.056)	–	–	–
Widow/divorce fathers	−0.135	−0.564[a]	−0.059	–	–	–
	(0.124)	(0.147)	(0.080)	–	–	–
Married mothers	–	–	–	0.002	−0.110	0.099[a]
	–	–	–	(0.071)	(0.108)	(0.019)
Widow/divorce mothers	–	–	–	−0.024	−0.173	0.116[a]
	–	–	–	(0.081)	(0.125)	(0.044)
Mixed race	−0.006	−0.099	0.078	−0.015	−0.116	0.088[c]
	(0.050)	(0.081)	(0.055)	(0.043)	(0.077)	(0.049)
Indian	−0.001	−0.170[c]	0.124	0.266[b]	0.234[c]	0.050
	(0.074)	(0.093)	(0.122)	(0.134)	(0.139)	(0.072)
White	0.101	−0.117	0.309[a]	0.096	−0.030	0.167[b]
	(0.068)	(0.078)	(0.099)	(0.065)	(0.093)	(0.074)
Urban	0.094[a]	0.018	0.122[a]	0.143[a]	0.109[b]	0.138[a]
	(0.032)	(0.051)	(0.035)	(0.029)	(0.049)	(0.030)
Farms	0.014	−0.051	0.014	−0.003	−0.072	0.131[b]

(*continued on next page*)

Table 5 (*continued*)

VARIABLES	Fathers only			Mothers only		
	(1)	(1)	(2)	(2)	(3)	(4)
	ME overall	ME male	ME Female	ME. overall	ME male	ME female
	(0.053)	(0.100)	(0.046)	(0.062)	(0.087)	(0.057)
Wald chi2 (33)		7523 %	87.93 %		75.31 %	87.79 %
Prob > chi2						
Pseudo R2						
Correct classification						
Observations	5481	2576	2751	7648	3568	4080

Standard errors in parentheses.
[a] $p < 0.01$.
[b] $p < 0.05$.
[c] $p < 0.1$.

mothers-only model have a higher likelihood of drinking.

The observed relationship between parental income and offspring drinking behavior aligns with existing literature, which suggests that socio-economic factors play a crucial role in shaping health behaviors, including alcohol consumption [see [72,73], among others]. The differential impact of fathers' income on sons and daughters may be explained by gender-specific socialization patterns, where sons might be more likely to emulate their fathers' lifestyle choices, including drinking behaviors [74].

The impact of parental education on offspring drinking behavior is consistent with the literature that highlights the importance of parental education in shaping children's health behaviors [75]. The negative association between fathers' primary education and daughters' drinking could be attributed to the protective effect of educated fathers, who might be more aware of the risks associated with alcohol consumption and instill healthier behaviors in their daughters. On the other hand, the positive association between mothers' education and daughters' drinking might reflect the complex interplay between maternal employment, time spent with children, and lifestyle choices [76].

The findings related to parental employment and offspring drinking behavior are in line with research suggesting that employment status can influence health behaviors through mechanisms such as income, social networks, and stress levels [see [77,78], among others]. The lack of significant effects in models considering both parents might indicate that employment's impact is mediated by other factors such as income and education. The study's findings highlight the complex relationship between socio-economic status and drinking behaviors, with different patterns observed for sons and daughters. This aligns with research suggesting that socio-economic disparities can lead to divergent health behaviors, influenced by factors such as access to resources, social norms, and coping mechanisms [79].

4.5. Offspring socio-economic status and alcohol preferences

Offspring's income status only significantly influences the drinking preferences of poor females. Being poor is associated with a 14 % higher likelihood of drinking in females compared to the middle class. The ordered logit model suggests that female poverty is linked to a 9 % higher probability of drinking rarely, a 2 % higher likelihood of drinking regularly, and a 1 % higher likelihood of drinking more than three days a week. This aligns with the notion that females may drink to access potential financial resources through relationships with drinkers, thus poorer females are more inclined to drink relative to their wealthier counterparts. Policy attention should thus prioritize the needs of poorer females to address the drinking issues among the current and future generations.

While the simple logit model indicates that males' income status does not affect their drinking preferences, the ordered logit model suggests that males at the higher end of the income distribution drink less. This finding is supported by the fathers' only model, which reveals that belonging to this higher income class is associated with a 7 % lower probability of belonging to the rare drinking category and a 4 % lower probability of drinking regularly. This may reflect the theory of the wage effect on the demand for health, as proposed by Ref. [80], which predicts that higher wages lead to increased demand for health and consequently less risky choices. Though not significant, a similar trend is observed in females. Therefore, policies aimed at reducing alcohol consumption should be complemented by measures to ensure higher incomes, particularly for males, while also considering the bonding dynamics between mothers and daughters.

Relative to the non-employed, being employed is associated with higher drinking for both males and females, although the likelihood is higher for males (19 %) compared to females (10 %). This suggests that while the wage effect predicted by the canonical model for the demand for health may be present, and captured through income, employment may also provide social avenues for alcohol consumption among colleagues, affecting both genders. Policy measures to raise awareness of the health consequences of drinking may be more effective if targeted at the workplace and employees' social networks.

All educational categories from primary to tertiary have significant effects on male drinking compared to being non-educated, but no effect on female drinking. Having primary, secondary, and tertiary education increases the probability of male drinking by 43 %, 32 %, and 34 %, respectively. The results of the ordered logit models also support this trend, with higher probabilities of drinking observed along the frequency ladder. This calls for policies to raise awareness about the health consequences of alcohol consumption, similar to those targeting employment, to address the social effects of education on drinking behaviors. Lastly, being married is

associated with less female drinking compared to never being married, while divorced or widowed men are significantly less likely to drink. This may be attributed to divorce being accompanied by a significant loss of income, resulting in fewer resources available for drinking. This is consistent with the observation that males typically finance drinking habits, while poorer females may drink when in need.

The association between poverty and higher likelihood of drinking among females supports the notion that economic hardship can lead to increased engagement in risky behaviors, including alcohol consumption [81]. This may be attributed to the use of alcohol as a coping mechanism for stress associated with financial difficulties [78]. The fact that this trend is more pronounced among females suggests that gender-specific factors, such as the pursuit of financial resources through relationships with drinkers, may play a role. The finding that males at the higher end of the income distribution drink less aligns with [80]'s theory of the wage effect on health demand as mentioned earlier. Higher wages may lead to increased investment in health, resulting in less engagement in risky behaviors such as alcohol consumption. This trend, although not significant for females, indicates that economic well-being can influence health behaviors across genders.

The association between employment and higher drinking for both males and females suggests that social dynamics in the workplace may contribute to alcohol consumption. This is consistent with research indicating that work-related stress and socialization with colleagues can influence drinking behaviors [82]. The higher likelihood of drinking among employed individuals underscores the need for workplace interventions that address alcohol consumption and promote healthy behaviors. The significant effects of education on male drinking, with higher education levels associated with increased probability of drinking, may reflect social and cultural factors that link educational attainment with alcohol consumption. This is in line with research suggesting that socialization patterns and peer influences associated with educational settings can impact alcohol behaviors [83].

The association between marital status and drinking behaviors, with married individuals less likely to drink compared to their unmarried counterparts, aligns with research indicating that marriage can have a protective effect against risky behaviors, including alcohol consumption [74]. The reduction in drinking among divorced or widowed men may be attributed to changes in social support and financial resources following the loss of a partner. The study's findings underscore the importance of considering gender differences in the development of policies and interventions aimed at reducing alcohol consumption. The different factors influencing drinking behaviors among males and females suggest that tailored approaches are necessary to address the unique drivers of alcohol use within each gender group [84].

4.6. Other variables

The other variables worth mentioning are socio-demographics. The socio-demographic variables we control for in the models include offspring's racial groups, age, and settlement types. Compared to Africans, men of mixed race have a 14 % lower likelihood of drinking, while white females have an 18 % higher likelihood of drinking. Drinking preferences increase with age, with a one-year increase in age corresponding to a 2 % increase in the probability of drinking for males and a 1 % increase for females. However, at extreme ages, the rates of increase in drinking preferences are significantly attenuated, as indicated by the coefficients of the square of age. While there appears to be no difference in drinking preferences among males across settlement types, urban females have a 12 % higher likelihood of drinking relative to those in traditional dwellings. This suggests that the policy measures discussed above should place significant focus on urban females, particularly those of white ethnicity.

The observation that men of mixed race have a lower likelihood of drinking compared to Africans, while white females have a higher likelihood, resonates with existing literature on racial and ethnic disparities in substance use. Research has consistently shown that cultural, social, and economic factors associated with racial and ethnic identities influence alcohol consumption patterns. For instance Ref. [85], discuss how cultural norms, historical experiences, and socio-economic status contribute to variations in drinking behaviors among different racial and ethnic groups. The higher likelihood of drinking among white females may reflect cultural acceptance and social norms related to alcohol use in certain communities [78].

The finding that drinking preferences increase with age for both males and females, with a diminishing rate of increase at extreme ages, aligns with developmental theories of alcohol use. According to the life-course perspective, alcohol use patterns are influenced by age-related roles and transitions, such as entering adulthood, employment, and family responsibilities, which can impact drinking behaviors [86]. The attenuation of drinking rates at extreme ages could be attributed to health concerns and lifestyle changes associated with aging [87]. The higher likelihood of drinking among urban females compared to those in traditional dwellings highlights the role of environmental factors in shaping alcohol use. Urban environments often provide greater access to alcohol, more social opportunities for drinking, and exposure to norms that may encourage alcohol use [88]. This suggests that interventions aiming to reduce alcohol consumption need to consider the environmental context, particularly the unique challenges and risks associated with urban settings.

Inconclusion for this section, the study's findings emphasize the need for culturally sensitive and age-appropriate interventions that consider the complex interplay of socio-demographic factors in shaping drinking behaviors. Tailoring policy measures and prevention strategies to address the specific needs and risk factors of different demographic groups can enhance their effectiveness in reducing alcohol-related harms.

5. Conclusion and policy implications

In summary, utilizing simple and ordered logit models, this study aimed to explore the determinants of health risk preferences, such as alcohol consumption, among South African offspring. Offspring's alcohol consumption can be attributed to various factors including

parental drinking habits, education, marital status, income levels, gender, and socio-demographic characteristics. Unlike previous studies that predominantly focused on parental education, this study distinguishes itself by also considering parental alcohol consumption and income status alongside education.

With regards to our variables of interest, the findings indicate the following: (i) Parental alcohol consumption significantly influences offspring alcohol consumption, with gender-specific distinctions. Boys are influenced by both mothers' and fathers' drinking practices, while girls are primarily influenced by mothers, and to a lesser extent, by fathers. (ii) While poorer females are more likely to exhibit drinking habits, those with mothers from poor backgrounds and fathers from affluent backgrounds are less inclined towards alcohol intake. Conversely, wealthy males are associated with lower levels of alcohol consumption. However, males with affluent fathers are more likely to drink, whereas the opposite holds true for those with fathers from less affluent families. (iii) Educated males exhibit a higher likelihood of alcohol consumption. Father's primary education tends to positively influence daughters' alcohol preferences, whereas mothers' education has contrasting effects. (iv) Marital status also plays a role, with being married reducing the likelihood of drinking in females, while widowed or divorced males are more inclined towards alcohol consumption. Male offspring with married fathers tend to drink less.

Based on these findings, the following policy recommendations are proposed.

- Firstly, alcohol-related policies should prioritize addressing female drinking habits, as this will have a significant impact on future generations.
- Secondly, policymakers, particularly when targeting poorer households, should prioritize the needs of the girl child.
- Thirdly, policies should encourage mother-daughter bonding, especially for working mothers, while also promoting responsible fatherhood in terms of information dissemination and support provision at home.
- Fourthly, efforts to reduce alcohol consumption, especially among males, may benefit from measures aimed at increasing wages in the labor market. However, caution should be exercised to ensure that such measures do not inadvertently exacerbate alcohol consumption among females without accompanying interventions to strengthen bonding between mothers and daughters.
- Fifthly, awareness campaigns regarding the health consequences of drinking may be more effective if targeted at workplaces and employees' social networks.

In the context of South Africa, the applicability of the results and their implications for relevant policy can be discussed as follows.

(i) Addressing Parental Influence: The study's findings that parental alcohol consumption influences offspring's drinking habits suggest that interventions targeting parents could be effective in reducing alcohol consumption among South African youth. Policies could focus on family-based interventions, such as counseling and educational programs, to raise awareness about the impact of parental drinking on children [89].

(ii) Tackling Socio-Economic Disparities: Given the association between socio-economic status and offspring alcohol behavior, policies aimed at reducing socio-economic disparities could indirectly contribute to lower alcohol consumption among youth. Initiatives such as poverty alleviation programs, improving access to education, and creating employment opportunities for disadvantaged communities could be beneficial [13].

(iii) Gender-Specific Interventions: The study's findings on the differences in alcohol behavior transmission between sons and daughters highlight the need for gender-specific interventions. Policies could include targeted educational campaigns and support programs that address the unique social and cultural factors influencing alcohol behavior in males and females [90].

(iv) Educational Programs for Youth: The importance of education in influencing offspring alcohol behavior suggests that tailored educational programs for young people could be effective. These programs could provide information about the risks associated with alcohol consumption and teach coping strategies for dealing with social pressures [91].

(v) Public Health Campaigns: The study's findings support the need for public health campaigns that address the risks associated with alcohol consumption. These campaigns could focus on raising awareness about the negative consequences of alcohol use, such as its impact on health, safety, and social relationships. Tailoring these campaigns to different demographic groups, based on the study's insights into the varying influences of parental behavior and socio-economic status, could enhance their effectiveness [15].

(vi) Community-Based Interventions: Engaging communities in addressing alcohol-related issues could be a valuable approach. Community-based interventions that involve local stakeholders, such as schools, religious organizations, and community leaders, can create a supportive environment for reducing alcohol consumption among youth. These interventions can also provide alternative activities and support networks for young people [92].

(vii) Policy Enforcement: Strengthening the enforcement of existing alcohol policies, such as regulations on alcohol sales, advertising, and drinking and driving, can complement the preventive measures suggested by the study. Ensuring that these regulations are effectively enforced can help reduce the availability and appeal of alcohol to young people [93].

(viii) Monitoring and Evaluation: Implementing monitoring and evaluation systems to track the effectiveness of policies and interventions is crucial. Regularly assessing the impact of measures aimed at reducing alcohol consumption among youth can inform adjustments and improvements to these strategies [94].

Limitations of the study

This study is restricted in its breadth due to the absence of the National Income Dynamics Study, Wave 5 dataset for South Africa.

Consequently, future research endeavors should strive to integrate this dataset with the existing waves. Moreover, the study's cross-sectional design imposes limitations on establishing causal relationships between the variables. To delve deeper into the temporal dynamics of parental influence and socio-economic status on offspring alcohol behavior, longitudinal studies are imperative.

Given that the study is confined to the South African context, there may be constraints on the generalizability of the findings to other cultural or socio-economic settings. Hence, future research should broaden its scope beyond South Africa and encompass other countries to comprehensively investigate the determinants of health risk preferences, such as alcohol consumption. It's worth noting that there could be additional factors influencing offspring alcohol behavior, such as peer influence or genetic predispositions, which were not accounted for in the study. Therefore, future studies should take these variables into consideration. By addressing these limitations in future research, a more holistic understanding of the factors influencing offspring alcohol behavior can be attained. This, in turn, would facilitate the development of more effective policies and interventions, benefiting both South Africa and global communities.

Data availability statement

The data for the study will be available upon reasonable request.

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In this article, the author did not perform any experiments on humans or animals.

CRediT authorship contribution statement

Ruth Ngepah: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Charles Shaaba Saba:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

No potential conflicts of interest have been disclosed by the author regarding this article, its research, authorship, and/or publication.

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Appendix A. Supplementary data

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