Chapter 8

Prescription Drug Misuse, Behavioral Addictions and Mental Health Integration

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8.1. Literature Review

Adolescence is a critical developmental phase characterized by concurrent, rapid, and dynamic restructuring across neurobiological, cognitive, and psychosocial domains, as well as the pursuit of independence, the acquisition of autonomy, and identity construction (National Academies of Sciences, Engineering, and Medicine, 2019). During this period, the asynchrony between reward processing mechanisms and high level executive functions in the brain renders adolescents more open to risk-taking behaviors compared to children and adults (Steinberg, 2008). Empirical evidence demonstrates that the propensity for risk-taking remains low in childhood, gains momentum with the onset of adolescence, reaches its peak in late adolescence, and shifts into a downward trend during adulthood (Romer et al., 2017). These developmental dynamics establish adolescence as a fragile threshold for the manifestation of various risky and problem behaviors, most notably substance use (Duell et al., 2018; Willoughby et al., 2021). However, in contemporary literature, the vulnerability faced by adolescents is no longer restricted to traditional illicit substances; it constructs a multidimensional

threat area expanding from chemical addiction risks, such as the nonmedical misuse of prescription drugs, to modern behavioral addiction spectrums like digital gaming and gambling.

Beyond illicit substances, the nonmedical misuse of prescription drugs during adolescence, defined as the nonintentional or nonprescribed consumption of medications prescribed by a physician (Schepis et al., 2019), constitutes a severe public health problem on a global scale (Martins & Ghandour, 2017; Perlmutter et al., 2018). Understanding the dynamics driving adolescents toward this chemical risk behavior is possible through Problem Behavior Theory (PBT), which addresses the dynamic interaction between the individual and the environment within a multivariate socio psychological framework (Donovan, 2005). PBT explains these problem behaviors, which are disapproved of by conventional societal norms and trigger social control responses, through three fundamental systems: the personality system, the perceived environment system, and the behavior system (Donovan, 2005). The personality system of PBT comprises an individual's beliefs, values, and internal motivations (Donovan, 2005). According to the theoretical framework, placing an excessive importance on personal independence relative to academic achievement during adolescence, a high tolerance toward nonnormative behaviors, and a propensity to oppose adult authority operate as major internal risk factors for substance use (Alexander et al., 2018). Within the context of prescription drug misuse, this situation emerges as a purposeful behavior aimed at coping with stressful stimuli brought by the developmental period or announcing autonomy (Donovan & Jessor, 1985). Indeed, while the literature indicates that academic failure functions as a critical risk factor in medication misuse, strong personal moral beliefs, high self-esteem, high religiosity, and future oriented academic expectations serve as protective shields within this system.

The perceived environment system encompasses an adolescent's subjective interpretation of their own social world, including peer and family relationships (Donovan, 2005). Empirical evidence reveals that opioids are the most frequently misused medications among adolescents, and they are

primarily sourced from family and friend circles (Schepis et al., 2019). This situation directly aligns with the risk factors of having substance using individuals in the immediate environment and easy access to medication within PBT's perceived environment system. Furthermore, navigations within the environmental system appear to differentiate according to gender. While female adolescents are entirely dependent on family and friend sources to obtain opioids and stimulants, male adolescents more frequently attempt to acquire these medications through physicians (Schepis et al., 2019). Within the environmental system, peer approval, peer medication misuse, and low parental monitoring escalate risk, whereas high levels of parental monitoring, open communication within the family, and peer attitudes disapproving of substance use balance the system as protective factors (Nargiso et al., 2015). The behavior system is the domain where an individual actually exhibits actions that conform to societal norms, termed conventional, or deviate from them, termed problematic (Donovan, 2005). According to PBT, risky behaviors rarely manifest in isolation; on the contrary, they follow a mutually triggering pattern. The simultaneous clustering of prescription drug misuse with smoking and other delinquency related behaviors confirms this conventional behavior equivalence. Conversely, conventional behaviors such as regular school attendance and abstaining from substance use operate as primary elements protecting the adolescent from systemic deviation (Alexander et al., 2018).

Transcending traditional chemical substances, modern risk areas emerging in adolescence are behavioral addictions that gained momentum alongside technological transformations. Within this spectrum, problematic gambling performed in a repetitive manner despite negative consequences and incurred harms (American Psychiatric Association, 2022) and continuous gaming activities that impair functionality by causing distinct distress in personal, social, familial, and educational domains of life come to the forefront (World Health Organization, 2022). Epidemiological data confirm that the adolescent population is developmentally highly fragile in the face of these two modern addiction risks. Indeed, empirical evidence shows that one of

every six adolescents gambled within the past twelve months (Tran et al., 2024), 1.4 percent of adolescents in the fifteen to sixteen age group across Europe display problematic gambling patterns (ESPAD Group, 2019), and gambling prevalence fluctuates between 0.2 percent and 12.3 percent in general adolescent samples (Calado et al., 2017). Similarly, the global prevalence of gaming disorder reached a high rate of 3.0% (Stevens et al., 2021), arriving at a level comparable to obsessive compulsive disorder and certain substance addictions. Among adolescents, these rates hover around 1-9% (Gentile et al., 2017) or 8.8% (Gao et al., 2022). In both behavioral addictions, male adolescents are at a distinctly higher risk compared to female adolescents, pointing toward a biopsychosocial commonality (Marraudino et al., 2022; Richard & King, 2023; Wang et al., 2025; Weidberg et al., 2018).

In order to explain the complex mechanisms behind this empirical prevalence within a nonlinear, dynamic framework, the Interaction of Person-Affect-Cognition-Execution (I-PACE) model provides a comprehensive theoretical ground (Brand et al., 2016). Representing the core of the I-PACE model, the Person dimension represents vulnerability variables including an individual's genetic and neurobiological architecture, past life experiences, and personality traits. These individual vulnerabilities in adolescence are shaped by factors such as high levels of impulsivity, risk-taking propensities, and early age exposure to gambling or gaming activities (Weidberg et al., 2018). Personal vulnerabilities defined by Király et al. (2023) for gaming addiction, alongside underlying motivations for achievement, competition, or escape, perfectly align with this individual vulnerability component of I-PACE. Furthermore, the model predicts that these vulnerabilities initiate the addiction process through a dynamic interaction with environmental factors such as family structure, peer relationships, school climate, and the widespread expansion of e-sports. At this point, the fact that video game playing escalates gambling severity and contributes to developing gambling problems among adolescents (Richard & King, 2023) empirically exemplifies how game related factors, such as structural game designs and monetization

techniques, interact with gambling cognitions to manipulate an individual's behavioral processing.

The motor power driving the progression of behavioral addiction is the cyclical interaction between the Affect and Cognition systems of the I-PACE model (Brand et al., 2016). According to the contemporary interpretation of the model, the addiction process evolves from an early stage, where diagnostic criteria are not yet fully met but exhibited behaviors are harmful, to a late stage characterized by complete breakdown of functionality (Brand et al., 2025). Although adolescents, unlike adults, utilize gambling primarily as a tool for socialization rather than making money, motivational structures undergo a radical transformation as the process progresses. In the early stage, pleasure and reward craving, representing the joy and excitement felt during the execution of the behavior, are dominant; however, as the addiction chronicizes, it shifts toward compensation mechanisms and relief craving aimed at mitigating stress and negative affect. This transformation is accompanied by dysfunctional cognitive processes such as gambling related cognitive distortions, desire thinking, which means conscious focusing with mental images, and permissive beliefs or self-permission that rationalize sacrificing long term goals for short term pleasure. Consequently, with the collapse of the Execution system comprising decision making and control mechanisms, the adolescent traps themselves within a cycle of chasing losses, failure to quit, and unstoppable repetitive gaming, thereby completing the clinical picture (Brand et al., 2025).

In explaining the internal psychological motivations behind adolescents orienting toward both prescription drug misuse and behavioral addictions like digital gaming and gambling, one of the most powerful theoretical approaches is the Self Medication Hypothesis (SMH). Formulated by Khantzian (1985, 1997), this hypothesis posits that individuals do not select substances or risky behaviors randomly; on the contrary, they orient toward specific substances or actions to mitigate their specific psychological pain, unendurable emotional states, and emotion regulation difficulties. Because adolescence is a phase where anxiety, depression, and emotional fluctuations are frequently

experienced due to neurobiological vulnerabilities and intensive academic or social stressors, adolescents may resort to dysfunctional coping mechanisms to deal with this internal distress.

Empirical literature confirms the powerful link between psychiatric comorbidities and addictive patterns in adolescents within the context of the SMH (Bolton et al., 2006; Gould et al., 2012; Leeies et al., 2010). Epidemiological investigations conducted by Turner et al. (2018) clearly demonstrated that individuals with mood and anxiety disorders tend to self-medicate via alcohol, illicit substances, or prescription drugs to suppress these symptoms. For instance, an adolescent experiencing attention deficit hyperactivity disorder (ADHD) or academic anxiety misusing stimulant medications to increase focus, or an adolescent experiencing intense anxiety orienting toward opioids to become emotionally numb, directly exemplifies the specific substance selection mechanism predicted by the SMH.

Furthermore, contemporary literature reveals that the SMH is not restricted merely to chemical substances but also encompasses the behavioral addiction spectrum. For adolescents exhibiting social anxiety, loneliness, or depressive symptoms, digital gaming worlds and gambling activities function as artificial sanctuaries where they can escape from real world psychological pain and feelings of inadequacy. The adolescent attempts to compensate for negative affect that they cannot regulate in real life through reward mechanisms in games or the instantaneous dopaminergic arousal generated by gambling (Király et al., 2023). Consequently, both the nonmedical consumption of prescription drugs and compulsive gaming or gambling behaviors emerge as dysfunctional self-medication efforts developed by the adolescent to mask an underlying profile of psychological distress.

8.2. Methodology

8.2.1. Overview and protocol deviations

The pre-specified protocol identified three confirmatory families for Chapter 8: prescription drug misuse (Family 8A), behavioral addictions

(Family 8B), and mental health outcomes (Family 8C). Analyses for Families 8A and 8B were conducted as planned and are reported in Section 8.4.

Family 8C outcomes — psychological distress (*Y_DIST*) and psychosomatic symptom index (*Y_PSY*) — were not estimable. As noted in the codebook, these variables are not part of the ESPAD 2019 master questionnaire and require supplementary national instruments (e.g., K6, GHQ-12, or the HBSC psychosomatic checklist). No such instrument was included in the Northern Cyprus ESPAD 2025 survey wave. Consequently, *Y_DIST* and *Y_PSY* could not be derived, and all models in Family 8C (Models 8.6 and 8.7) and the pre-specified mediation model (SEM 8.8: school attachment → gaming → sleep/psychosomatic) are not reported. This deviation is attributable to instrument design rather than data quality or analytical failure. Future waves should incorporate a validated mental health screening instrument to enable the planned analyses.

8.2.2. Analytical strategy

For Family 8A, five hierarchical logistic regression models were estimated for *Y_RXMIS* through sequential block entry (Block A: demographics; Block B: family; Block C: school; Block D: peer tranquillizer use; Block E: perceived availability of tranquillizers). For Family 8B, full models incorporating all five predictor blocks were estimated for *Y_GAME_score* (linear regression), *Y_GAMB* (logistic regression), and *Y_GAMBFREQ* (ordinal logistic regression). Two pre-specified interaction terms were tested in each model: gender × peer substance use and gender × parental monitoring. BH-FDR correction was applied separately within each confirmatory family. As individual school identifiers were unavailable, region-level random intercepts were initially estimated but produced singular fits across all models; standard regression models were therefore used throughout. Additionally, multi-class prescription misuse (*Y_RXMULTI*) was observed in only six students (0.6%); multinomial regression was therefore not estimable and Model 8.2 is not reported. In all Family 8B models, 260 observations were excluded due to missing values on the perceived risk

variable (prisk_alc_occ_n), attributable to “Don’t know” responses recoded as missing per protocol; the analytical sample for Family 8B was therefore n = 789. All analytical decisions deviating from the pre-specified protocol are documented in Section 8.3.1.

8.3. Results

8.3.1. Prescription drug misuse (family 8A)

The lifetime prevalence of any prescription drug misuse (Y_RXMIS) was 3.5% (n = 37). Painkillers used for intoxication purposes (C32d) constituted the most common form of misuse (n = 33, 3.1%), followed by tranquillizers or sedatives without prescription (C32a; n = 7, 0.7%). Multi-class misuse was rare (n = 6, 0.6%) and was not modelled.

Table 8.1. Lifetime prevalence of prescription drug misuse by drug type

Prescription Drug Type	n	%
Any prescription drug misuse (Y_RXMIS)	37	3.5
Painkillers used for intoxication (C32d)	33	3.1
Tranquillizers/sedatives without prescription (C32a)	7	0.7
Multi-class misuse (≥ 2 drug types)	6	0.6

Note. N = 1,049. Percentages based on total analytical sample. Multi-class misuse (n = 6) was not modelled due to insufficient case counts.

Sequential block entry in the hierarchical logistic regression models produced consistent improvements in model fit. The demographic block alone (Model 8.1a; AIC = 319.51) provided a limited baseline. The addition of family variables (Block B; AIC = 309.48), school-related variables (Block C; AIC = 302.53), and peer tranquillizer use (Block D; AIC = 299.59) each produced modest incremental improvements. The largest improvement occurred with the addition of perceived availability of tranquillizers (Block E; Model 8.1e; AIC = 216.33), indicating that this variable accounts for substantial unique variance in prescription drug misuse.

Table 8.2. Hierarchical logistic regression predicting prescription drug misuse (y_rxmis): sequential block entry results

Predictor	β	SE	p	p_adj	AIC
Block A — Demographics (Model 8.1a)					319.51
Gender	0.908	0.483	.060	.193	
Block B — Family variables added (Model 8.1b)					309.48
Family support	−0.256	0.112	.023	.102	
Block C — School variables added (Model 8.1c)					302.53
Academic performance	—	—	>.18	n.s.	
Truancy	—	—	>.18	n.s.	
Block D — Peer tranquillizer use added (Model 8.1d)					299.59
Peer tranquillizer use	—	—	>.18	n.s.	
Block E — Perceived availability added (Full model, 8.1e)					216.33
Perceived availability of tranquillizers	0.887	0.179	< .001	< .001	
Family support	−0.256	0.112	.023	.102	
Gender	0.908	0.483	.060	.193	

Note. n = 820. β = unstandardized logistic coefficient. SE = standard error. p = uncorrected two-tailed p-value. p_adj = BH-FDR corrected p-value within Family 8A. AIC = Akaike information criterion. Dash (—) indicates β and SE not reported for not significant predictors (all p > .18). n.s. = not significant after BH-FDR correction

In the full model (Model 8.1e; n = 820), perceived availability of tranquillizers was the sole statistically significant predictor after BH-FDR correction (β = 0.887, SE = 0.179, p < .001; p_adj < .001), indicating that students who perceived tranquillizers as easier to obtain were substantially more likely to report misuse. Family support showed a negative association at the uncorrected level (β = −0.256, SE = 0.112, p = .023) but did not survive BH-FDR correction (p_adj = .102). Gender showed a marginal positive association (β = 0.908, SE = 0.483, p = .060). All other predictors — school type, family wealth, parental monitoring, truancy, academic performance, and peer tranquillizer use — were not significant (all p > .18). Model discrimination was good given the low outcome prevalence (AUC = 0.788, 95% CI [0.686, 0.889]; Brier score = 0.028). Variance inflation factors were all below 2.0, confirming the absence of multicollinearity.

The two pre-specified interaction terms — gender × parental monitoring and gender × peer tranquillizer use — were not statistically significant and produced higher AIC values relative to the main-effects model, providing no support for gender moderation of either pathway.

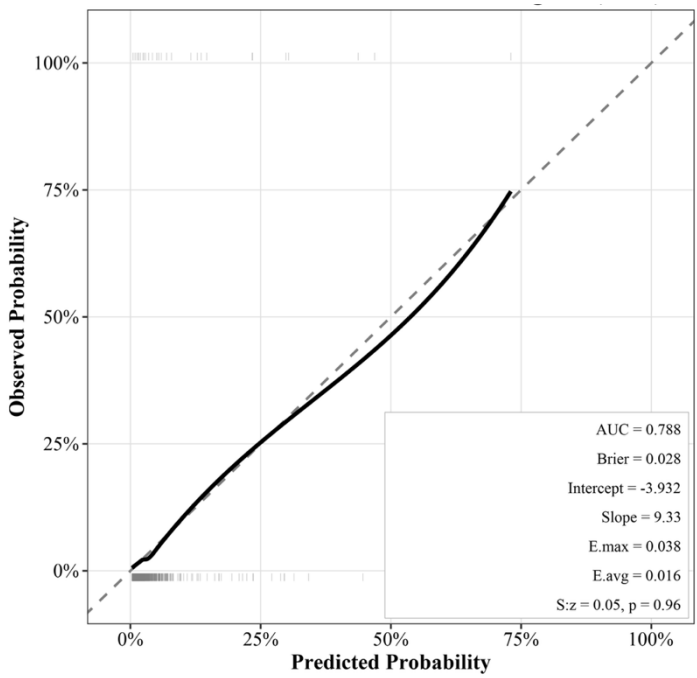

Figure 8.1. Calibration plot – non-prescribed drug use (M8.1)

Calibration of the prescription misuse model was excellent. The logistic calibration curve closely followed the ideal diagonal (Slope = 1.00, Intercept ≈ 0.00), with a maximum calibration error of Emax = 0.083 and a mean calibration error of Eavg = 0.005. The Spiegelhalter calibration test was not significant (S:z = 0.020, p = .984), confirming adequate calibration.

Influence diagnostics were assessed using Cook's distance. While 33 observations exceeded the 4/n threshold (0.005), maximum Cook's distance was 0.125, well below the substantive concern threshold of 0.5. No observations were considered unduly influential.

Average marginal effects (AME) were computed for the prescription misuse model. Perceived availability of tranquillizers showed the largest

marginal effect (AME = 0.025, SE = 0.006, $p < .001$), indicating that a one-unit increase in perceived availability was associated with a 2.5 percentage point increase in the probability of prescription misuse. Family support showed a marginal protective effect (AME = −0.007, SE = 0.003, $p = .029$) that reached conventional significance at the uncorrected level but did not survive FDR correction. All other predictors showed not significant marginal effects.

According to the findings, the most decisive factor behind students' misuse of prescription drugs is their perceived ease of access; youth who believe they can easily obtain tranquilizers are significantly more likely to misuse them. In contrast, while family support initially appears to have a protective effect, this influence does not remain statistically definitive or robust after applying strict corrections. All other factors analyzed —such as gender, academic performance, truancy, or having friends who use tranquilizers— showed no direct or significant impact on drug misuse. In short, the most critical point in preventing youth from misusing these medications is reducing their perceived availability.

8.3.2. Gaming (family 8b — model 8.3)

A composite gaming score (*Y_GAME_score*) was constructed from three components: (1) a weighted weekly average of gaming hours (C39a–b; school days weighted 5/7, nonschool days 2/7), (2) the C41 problematic gaming attitude subscale (three items; range 3–15; M = 7.14, SD = 3.86), and (3) z-standardisation of both components prior to summation to ensure equal weighting. The resulting composite (range: −2.08 to 4.19) was treated as a continuous outcome in a standard linear regression model.

Gender was by far the strongest predictor of gaming scores (β = −1.17, SE = 0.11, $p < .001$; p_adj < .001), indicating that male students reported substantially higher gaming engagement and problematic gaming attitudes than female students. Academic performance was the only other significant predictor after BH-FDR correction (β = −0.35, SE = 0.11, $p = .001$; p_adj = .005), with higher-achieving students showing lower gaming scores. Truancy

(p = .051), perceived risk (p = .089), and parental monitoring (p = .069) showed marginal associations that did not survive correction. School type, family wealth, family support, and peer alcohol use were not significant (all p > .22). The model explained 15.0% of variance in gaming scores (adjusted R^2 = 0.140; $F(9, 779) = 15.26$, $p < .001$).

The pre-specified interaction terms — gender × peer alcohol use (p = .304; ΔAIC = +0.93) and gender × parental monitoring (p = .980; ΔAIC = +2.00) — were both not significant and increased AIC, providing no evidence of gender moderation.

Table 8.3. Linear regression predicting composite gaming score (Y_GAME_score; Model 8.3)

Predictor	β	SE	p	p_adj
Gender	−1.17	0.11	< .001	< .001
Academic performance	−0.35	0.11	.001	.005
Truancy	—	—	.051	n.s.
Perceived risk	—	—	.089	n.s.
Parental monitoring	—	—	.069	n.s.
School type	—	—	>.22	n.s.
Family wealth	—	—	>.22	n.s.
Family support	—	—	>.22	n.s.
Peer alcohol use	—	—	>.22	n.s.

Note. n = 789 (260 excluded due to missing perceived risk values per protocol). β = unstandardized coefficient. SE = standard error. p_adj = BH-FDR corrected p-value within Family 8B. Adjusted R^2 = 0.140; $F(9, 779) = 15.26$, $p < .001$. Dash (—) indicates β and SE not reported for not significant predictors. n.s. = not significant.

According to the findings, boys are by far the heaviest gamers and demonstrate the most problematic gaming attitudes —this stands as the single strongest finding in the model. Students who perform well academically are meaningfully less likely to exhibit problematic gaming patterns, suggesting that school engagement acts as a natural buffer. No other factor —such as family income, parental rules, or peer influences— makes a significant difference once gender and academic performance are accounted for.

8.3.3. Gambling (Family 8B — Models 8.4 and 8.5)

Gambling participation in the past 12 months (Y_GAMB) was reported by 48 students (4.6%). Of these, 24 gambled monthly or less, 15 reported gambling two to four times per month, and nine gambled two or more times per week.

In the binary gambling model (Model 8.4; n = 789), three predictors were statistically significant after BH-FDR correction. Gender was the strongest predictor (β = −1.961, SE = 0.409, p < .001; p_adj < .001), indicating that male students were substantially more likely to report gambling. Truancy was similarly strong (β = 1.590, SE = 0.374, p < .001; p_adj < .001), with higher truancy associated with increased gambling participation. Peer alcohol use was also a significant positive predictor (β = 0.531, SE = 0.138, p < .001; p_adj < .001). Family wealth, parental monitoring, and family support showed marginal associations at the uncorrected level (p = .058–.091) that did not survive FDR correction. Model discrimination was excellent (AUC = 0.850, 95% CI [0.792, 0.907]; Brier score = 0.042), and variance inflation factors were all below 2.0.

Table 8.4. Binary logistic regression predicting gambling participation (y_gamb) with average marginal effects (model 8.4)

Predictor	β	SE	p	p_adj	AME	AME SE
Gender	−1.961	0.409	< .001	< .001	−0.085	0.018
Truancy	1.590	0.374	< .001	< .001	0.076	0.019
Peer alcohol use	0.531	0.138	< .001	< .001	0.023	0.006
Family wealth	—	—	.058	n.s.	—	—
Parental monitoring	—	—	.091	n.s.	—	—
Family support	—	—	.072	n.s.	—	—
Academic performance	—	—	>.18	n.s.	—	—
School type	—	—	>.18	n.s.	—	—
Perceived risk	—	—	>.18	n.s.	—	—

Note. n = 789. AUC = 0.850, 95% CI [0.792, 0.907]; Brier score = 0.042. β = unstandardized logistic coefficient. AME = average marginal effect on probability scale. All VIFs < 2.0. Dash (—) indicates AME not computed for not significant predictors. n.s. = not significant after BH-FDR correction.

The ordinal gambling frequency model (Model 8.5) produced results fully consistent with the binary model. Gender (b = −2.001, t = −4.928), truancy (b = 1.638, t = 4.383), and peer alcohol use (b = 0.518, t = 3.797) were the dominant predictors. Family support showed a notable negative association (b = −0.214, t = −2.184), suggesting that stronger family support is associated with lower gambling frequency across the ordinal spectrum. The proportional odds assumption was satisfied (overall $\chi^2(18) = 15.32$, p = .64), supporting the appropriateness of the cumulative logistic model.

The pre-specified interaction — gender × parental monitoring in the gambling model — was not significant (p = .187; ΔAIC = +0.11) and is not retained.

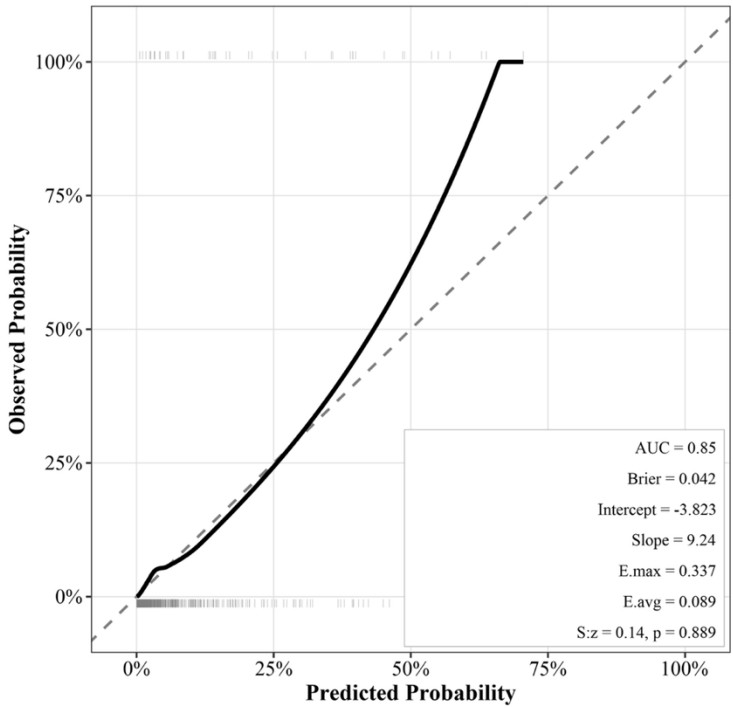

Figure 8.2. Calibration plot – gambling (M8.4)

Calibration of the gambling participation model was good. The logistic calibration curve followed the ideal diagonal (Slope = 1.00, Intercept ≈ 0.00), with a mean calibration error of Eavg = 0.010. The maximum calibration error

was somewhat elevated (Emax = 0.232), likely attributable to the low outcome prevalence (n = 48, 4.6%), which limits the stability of calibration estimates in the upper probability range. The Spiegelhalter calibration test was not significant (S:z = −0.232, p = .816), confirming that overall model calibration was adequate.

Average marginal effects (AME) were computed for the gambling participation model. Gender showed the largest marginal effect (AME = −0.085, SE = 0.018, p < .001), indicating that being female was associated with an 8.5 percentage point lower probability of gambling participation. Truancy showed a strong positive marginal effect (AME = 0.076, SE = 0.019, p < .001), and peer alcohol use showed a significant positive effect (AME = 0.023, SE = 0.006, p < .001). All other predictors showed not significant marginal effects.

According to the findings, gambling is rare overall, but among those who do gamble, three factors stand out clearly: boys are much more likely to gamble than girls; students who skip school regularly are significantly more likely to gamble; and having friends who drink alcohol also increases gambling odds. This suggests that gambling tends to cluster with other risk-taking behaviors within the same social circles.

8.3.4. Cross-family summary

Across both confirmatory families, gender emerged as the most consistent predictor, with male students showing higher prescription misuse risk, higher gaming engagement, and substantially greater gambling participation. Perceived availability of tranquillizers was the dominant predictor of prescription misuse, accounting for a large share of model fit improvement. For behavioral addictions, truancy and peer alcohol use showed robust associations with gambling, while academic performance was the key protective factor for problematic gaming. No pre-specified gender interaction terms survived significance testing in any model. BH-FDR correction preserved the primary findings in both families, confirming that the reported associations are unlikely to reflect false discovery.

8.4. Discussion

The findings of this study indicate that the propensity of adolescents to engage in the nonmedical misuse of prescription drugs closely aligns with contemporary global and regional epidemiological estimates. Among the distinct individual and environmental risk vectors evaluated across the analyses, the perceived accessibility of sedatives emerges as one of the most prominent structural elements explaining adolescent medication misuse behavior. Even after controlling for variations in familial, academic, or peer-focused variables, the subjective belief that prescription medications are easily obtained exerts a powerful facilitating impact on this specific form of chemical misuse. This structural phenomenon is meaningfully evaluated within the conceptual framework of the Self-Medication Hypothesis (SMH) formulated by Khantzian. The SMH foundational assumption posits that individuals do not select substances randomly or solely as an expression of sensation seeking; on the contrary, they purposefully engage with specific chemical agents to mitigate internal psychological pain, emotional distress, and underlying difficulties in emotion regulation. The observable tendency of adolescents to orient toward painkillers, nonprescribed tranquilizers, and sedatives specifically to numb emotional pain, achieve sedation, or seek relief underscores a calculated attempt to mask underlying anxiety and internal distress through pharmacological pathways. This theoretical framework is further supported by the pharmacological capacity of analgesics to induce emotional blunting, combined with the calming, inhibitory effects of sedatives on the central nervous system. Consequently, when an adolescent perceives these sedatives as highly accessible within their immediate social microsystem, it can cognitively activate a maladaptive coping scenario during moments of developmental stress. It is also highly noteworthy that the protective impact of general environmental frameworks, such as family support, lacks statistical persistence when more rigorous controls are introduced to the models. This baseline lack of significance suggests that an adolescent's internal drive for emotion regulation, coupled with the resulting subjective beliefs regarding

availability, occupies a far more dominant role in driving chemical misuse than generalized macro-environmental protective structures.

Furthermore, the empirical outcomes generated in this study indicate that gender functions as one of the most robust determinants shaping behavioral addiction pathways across both gaming and gambling domains. Male adolescents devote significantly more hours to digital gaming, display higher rates of problematic gaming attitudes, and demonstrate a distinctly higher probability of participating in gambling activities compared to their female peers. This marked gender asymmetry observed across the behavioral addiction spectrum represents a universal finding that is continuously replicated cross-culturally within the established literature. This universal dynamic exhibits a striking parallel with international trends documented in the ESPAD 2024 report. According to the ESPAD 2024 results, the past 30-day gaming prevalence among male adolescents across Europe (89%) and their past 12-month gambling participation rate (29%) hover distinctly higher than the rates observed among female adolescents (71% and 16%, respectively). Moreover, the proportions of male students demonstrating high gaming risk scores (30% versus 13%) or displaying potentially harmful gambling profiles are more than double those of female students.

This systemic disparity is comprehensively interpreted within the biopsychosocial vulnerability frameworks emphasized in the Person dimension of the Interaction of Person-Affect-Cognition-Execution (I-PACE) model. Structural individual characteristics, alongside underlying motivations for competition, achievement, or escape, may render male adolescents uniquely vulnerable to the instantaneous reward cycles embedded within digital platforms. Nevertheless, the fact that general digital gaming prevalence experienced a dramatic surge over time to reach 80% in the ESPAD 2024 data -with gaming rates among female adolescents nearly tripling- demonstrates that this digital risk domain transcended traditional gender boundaries to establish a shared cultural lifeworld encompassing the entire adolescent population.

When evaluating adolescent gambling tendencies specifically, the data reveal that risky peer actions, such as alcohol consumption within the immediate friend circle, operate as a crucial environmental facilitator that increases both gambling frequency and the overall probability of participation. From the perspective of Problem Behavior Theory (PBT), this finding strongly supports the assertion that the presence of risk-taking individuals and peer pressure within the perceived environment system tethers adolescents to maladaptive behaviors. Adolescents may utilize gambling primarily as an instrument for social acceptance, peer integration, and socialization within their friendship networks rather than as a calculated pursuit of financial gain. In this regard, the rapid expansion of digitalized risk environments is starkly highlighted by the ESPAD 2024 data, where online gambling channels have grown to reach a 14% prevalence rate alongside an inflation of potentially harmful gambling behaviors to 8.5% among youth. Conversely, the analyses demonstrate that school truancy accelerates gambling orientations, whereas high academic achievement exerts a powerful reducing effect on problematic gaming. Within the behavior system of PBT, conventional orientations such as regular school attendance and high educational expectations represent pro-social behaviors that shield adolescents from systemic developmental deviations. Adolescents who maintain a strong attachment to their academic responsibilities and preserve future-oriented educational goals exhibit a significantly lower probability of allocating their unstructured time to digital or behavioral dependencies.

Unexpectedly, the empirical models provide no support for the protective role of parental monitoring, which failed to emerge as a significant predictor as either a main effect or through pre-specified gender interaction terms. Similarly, the hypotheses predicting that gender would moderate the pathways of peer influence or parental supervision were not supported by the data. This systemic lack of significance suggests that during the later stages of the adolescent developmental trajectory, generalized parental control mechanisms become increasingly limited when confronted with the immediate behavioral modeling of peers and the subjective accessibility

schemas constructed by the individual. As the pursuit of independence intensifies, peer group norms and environmental opportunity structures structurally overshadow distal parental supervision.

Beyond developmental explanations, the non-significance of parental monitoring within the statistical models can also be evaluated within a framework of conceptual and structural data limitations. While this research effectively measured generalized domestic rule-setting and tracking processes, the available dataset lacked a specific analytical block capturing family members' own history of substance use, household medication storage habits, and explicit parental attitudes of approval or disapproval toward these behaviors. Within the PBT literature, it is widely argued that substance-specific familial modeling and explicit behavioral boundaries exert a far more decisive inhibitory impact on adolescent risk-taking than generalized, nonspecific parenting controls. Consequently, the inability to mathematically account for these substance-specific family dynamics may have structurally restricted the true protective power of the family system from fully manifesting within the multivariable analyses.

8.5. Conclusion and Policy Recommendations

This chapter examined prescription drug misuse, behavioral addictions, and the planned mental health outcomes within a socioecological framework integrating Problem Behavior Theory, the I-PACE model, and the Self-Medication Hypothesis. The findings indicate that both environmental accessibility and social-contextual factors play a central role in shaping adolescent risk behaviors.

For prescription drug misuse, perceived availability of tranquillizers emerged as the dominant predictor, substantially outweighing family, school, and peer-related variables. This finding suggests that reducing access opportunities may be more effective than relying solely on general prevention messaging. Strengthening medication storage practices within households, increasing public awareness regarding prescription drug sharing, and

implementing stricter monitoring of prescription medications may therefore represent key prevention priorities.

For behavioral addictions, male adolescents consistently displayed higher gaming engagement and gambling participation than female adolescents. Academic achievement emerged as an important protective factor against problematic gaming, whereas truancy and peer alcohol use significantly increased the likelihood of gambling involvement. These findings suggest that behavioral addictions should not be addressed as isolated phenomena but rather as components of a broader adolescent risk-behavior ecosystem.

From a policy perspective, schools should implement early identification programs targeting chronic absenteeism and declining academic performance, as these indicators may signal elevated vulnerability to behavioral addictions. Prevention programs should also incorporate peer-focused approaches that address the clustering of gambling, alcohol use, and other risk-taking behaviors. Finally, given the increasing normalization of digital gaming and online gambling environments, educational initiatives promoting digital literacy, responsible gaming, and awareness of gambling-related harms should be integrated into adolescent health promotion strategies.

Although the planned mental health analyses could not be conducted, the theoretical framework and existing literature suggest that emotional distress may function as an underlying driver of both prescription drug misuse and behavioral addictions. Future prevention strategies should therefore incorporate mental health promotion and emotion regulation components alongside traditional substance-use interventions.

8.6. Bias and Limitations

Several limitations should be considered when interpreting the findings. First, the cross-sectional design prevents causal inference and limits conclusions regarding the temporal ordering of the observed associations. Consequently, the directionality of relationships among accessibility, peer

influences, academic functioning, and addictive behaviors cannot be definitively established.

Second, a major limitation concerns the planned mental health component of the study. The Northern Cyprus ESPAD survey did not include validated measures of psychological distress or psychosomatic symptoms, making it impossible to estimate the pre-specified mental health models and mediation analyses. As a result, the role of mental health variables could only be discussed theoretically rather than empirically examined.

Third, the absence of school-level identifiers prevented multilevel modelling and restricted the analyses to conventional regression approaches. Potential clustering effects within schools therefore were not fully accounted for.

Several outcome-specific measurement limitations are also acknowledged. Multi-class prescription drug misuse was too rare for multinomial modelling, and a substantial number of observations in the behavioral addiction analyses were excluded because of missing responses on perceived-risk items. Although these exclusions followed the pre-specified protocol, they may have reduced statistical power.

Finally, all measures were based on self-reported questionnaires and are therefore subject to recall bias and social desirability effects. Sensitive behaviors such as prescription drug misuse, gambling, and other risk behaviors might be underreported. In addition, although model calibration and discrimination were generally satisfactory, external validation was not feasible within the available dataset. Therefore, all reported performance indicators should be interpreted as measures of internal model performance rather than confirmed generalizability to other adolescent populations.

Future research should incorporate validated mental health screening instruments, longitudinal designs, and school-level contextual data to better understand the developmental pathways linking psychological distress, substance-related behaviors, and behavioral addictions during adolescence.

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