Substance Use among Trans and Gender Diverse Adolescents: The Risk of Emotional Problems and Social Support as a Protective Factor

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This thesis has been written as a study assignment under the supervision of an Utrecht University teacher. Ethical permission has been granted for this thesis project by the ethics board of the Faculty of Social and Behavioral Sciences, Utrecht University, and the thesis has been assessed by two university teachers. However, the thesis has not undergone a thorough peer-review process so conclusions and findings should be read as such.

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Abstract

The current research mainly aimed to examine the relationship between gender identity and substance use, and the mediating role of emotional problems. Secondly, the moderating role of social support from friends and family in the relationships between 1) gender identity and emotional problems, and 2) between emotional support and substance abuse was examined. It is important to understand the mechanisms of emotional problems, substance use, and social support in trans and gender diverse (TGD) youth, as there is a lack of knowledge of risk and protective factors of the mental health disparities among TGD adolescents. The mechanisms were assessed by conducting multiple linear regression analyses on the 2021/22 Health Behavior in School-aged Children (HBSC) survey data. Results showed that TGD youth reported substantially more emotional problems compared to their cisgender peers. Furthermore, in the general population, youth who report more emotional problems are more likely to engage in substance use, and social support from friends and family is a buffer in this relationship. However, TGD youth did not engage in more substance use than cisgender youth. Because adolescents with non-conforming gender identities experience worrying mental health disparities, it is crucial for future interventions and policies to focus on minimizing the amount of emotional problems they experience. Future research is also needed to gain more insights into the risk and protective factors in mental health problems of TGD youth.

Keywords: Trans and gender diverse, gender identity, substance use, emotional problems, social support

Introduction

The acceptance of trans and gender diverse adolescents, i.e. young individuals who experience an ambivalence between their sex assigned at birth and their internal psychological sense of gender (referred to as gender identity) (Tyni et al., 2024), has been increasing, especially in Western societies (Pellicane & Ciesla, 2022). Nonetheless, there is growing evidence that trans and gender diverse (TGD) youth experience alarming health disparities (e.g., Mezzalira et al., 2023; Wittlin et al., 2023), even in countries with relatively inclusive policies and generally more accepting attitudes towards TGD people (Poteat et al., 2021). For example, a meta-analysis found that 46% of transgender individuals experience non-suicidal self-injury, compared to 14% of cisgender individuals (i.e., individuals who identify with their sex assigned at birth) (Liu et al., 2019). TGD youth often experience a lack of safety, as they are constantly alert for safety issues, with experiences ranging from subtle invalidation to overt aggression (Tyni et al., 2024). To illustrate: In the school context, they experience rejection, exclusion, and bullying (Baams & Kaufman, 2022; Tyni et al., 2024). Previous research has shown that this group reports multiple mental health issues, such as increased levels of anxiety and depression (Mezzalira et al., 2023; Reisner et al., 2016; Wittlin et al., 2023), as well as more suicidal ideation and suicide attempts (Aparicio-García et al., 2018; Conolly et al., 2016; Wittlin et al., 2023). Moreover, behavioral problems such as higher levels and earlier onset of substance use were also found among TGD youth, including binge drinking, marijuana use, smoking cigarettes and e-cigarettes, and illicit drug use (Fahey et al., 2023; Wittlin et al., 2023).

These mental health issues are presumably a consequence of how society reacts to TGD people, as they are a minority group that encounters several daily stressors (Meyer, 2003; Meyer, 2015). For example, they experience a lack of belongingness and acceptance (Tyni et al., 2024),

often in the form of non-affirmation (i.e., others are unwilling to acknowledge their understanding of their gender and bodies) (Tan et al., 2019). Considering how these and other stressors may lead to serious health problems, it is clear that there is a societal imperative to better understand the health inequalities and underlying risk and protective factors for this marginalized minority group.

Peer and Family Support as a Protective Factor: Overview of the Empirical Literature

On the subject of possible protective factors: Social connectedness and support may boost psychological well-being in TGD youth (Weinhardt et al., 2019). Having parents who they feel they can talk to is associated with lower levels of depressive symptoms, suicidal ideation, suicide attempts and substance use. Likewise, peer and school related support may buffer the negative effects (e.g. internalizing problems) of victimization (Mezzalira et al., 2023; Wittlin et al., 2023). This suggests that health inequities experienced by TGD youth may be minimized with protective and positive family and peer relations (Brown et al., 2020). However, in a Spanish sample, TGD youth were less likely to report high levels of social support than their cisgender peers (Aparicio-García et al., 2018), which is problematic, as this might worsen the negative health effects of the daily stressors TGD youth experience from being a minority group. It is, even if only for this reason, important to create a more comprehensive understanding of the effect of social support on the well-being of TGD youth.

The Societal Context: The Netherlands

Even though The Netherlands is considered a relatively accepting and progressive country regarding LGBTQI+ people (Flores, 2021), the place of The Netherlands on the ranking of levels of human rights and equality by The International Lesbian, Gay, Bisexual, Trans and Intersex

Association's Europe Rainbow Index has been dropping in the past decade, from 3rd to 14th (ILGA Europe, 2010; ILGA Europe, 2023). It becomes clear that The Netherlands has more to win in terms of accepting TGD youth, as a study among Dutch elementary and secondary school students found that gender non-conforming students were more likely to be victimized by bullying and harassment in and outside of the school context (Kaufman & Baams, 2022). In another Dutch study in the city of Rotterdam, adolescents of 9-11 and 13-15 years old who reported to 'wish to be the opposite sex', experienced more symptoms of anxiety and depression, as well as more attention and social problems (Ghassabian et al., 2022). Lastly, in a small sample of sexual and gender minority youth, higher levels of daily experiences with prejudice and minority stress were associated with higher levels of alcohol use. However, findings were inconsistent, as daily experiences with gender identity concealment were related to lower levels of next-day alcohol use (Kiekens et al., 2022). This again shows that there is a social need for more understanding of the health and experiences of TGD youth in The Netherlands.

Besides these findings, in a review on the mental health and substance use of sexual and gender minority youth, Hughes and colleagues (2023) stated that Dutch research on the well-being of TGD youth is lacking in comparison to other Western countries such as Canada, Australia, and the U.S. Furthermore, most studies that have been done used small non-probability samples, or only investigated the clinical population (Ghassabian et al., 2022), which makes it impossible to draw nationally representative conclusions and compare internationally. Studies on gender minority youth in The Netherlands primarily focus on individual health problems and pay little attention to resilience or protective factors (Hughes et al., 2023). Nevertheless, there is a need to understand more about protective factors in the health disparities of TGD youth, as this

knowledge is required to create informed interventions and policies for at-risk groups (Brown et al., 2020).

To fill this gap in the literature, the current study aims to answer the following questions: *(1) Is there an association between TGD gender identity and substance use among adolescents in the Netherlands, and (2) is this relationship mediated by emotional problems? Furthermore, (3) does social support from peers and family have a moderating effect in these relationships?*

Theory

TGD Youth: Conceptualization and Prevalence

As discussed in the introduction, TGD youth experience an incongruence between their sex their gender (Tyni et al., 2024). Sex refers to the sex at birth, either male or female, of an individual that is registered at their birth certificate, which is based on the infant's genitalia, hormones and chromosomes. Gender identity is a person's own internal sense of their gender, which is not necessarily set into the binary concepts man or woman (Clarke, 2022). Some TGD people identify with a binary gender (i.e., transman or transwoman), and others identify outside of the binary genders (i.e., nonbinary, genderqueer, or gender fluid) (Tyni et al., 2024).

In 2021/22, the national report of the Health Behavior in School-aged Children (HBSC) study in The Netherlands, it was stated that 3% of the 11- to 16-year-olds reported a TGD gender identity (Boer et al., 2022). In another Dutch sample of 12- to 18-year-olds, it was found that in 2.7% of the respondents their gender identity was not or only partly aligned with their sex at birth (Kaufman & Baams, 2022). In other large representative samples in the United States and Spain, the prevalence of TGD youth is comparable, as 2.5% of the population reported being trans or gender diverse (Baams & Kaufman, 2023).

Gender Minority Stress Among TGD Youth

Even though the prevalence of TGD youth might seem low, it is important to examine their well-being, as The Minority Stress Model (Meyer, 2003) explains that individuals who are member of a minority group experience heightened levels of stress. This minority stress is a result of additional daily stressors that individuals from stigmatized social groups are exposed to, e.g. discrimination and victimization (Hunter et al., 2021). As cisgender people are currently the dominant group, the minority stress of TGD people is a product of the ideologies and social norms of cisgender people that puts them in a marginalized position (Tan et al., 2019). For example, cisnormativity refers to the idea there are only two sexes, and that gender is always congruent with sex at birth (Bauer et al., 2009). This results in society being unaccepting of TGD people in terms of for instance misgendering them (i.e., misclassifying them based on the dominant, biological understanding of gender) (Kapusta, 2016), or non-affirmation, where others are unwilling to acknowledge the appropriate gender of a TGD individual (Tan et al., 2019).

Building on Meyer's (2003) model, the Gender Minority Stress Model (Hendricks & Testa, 2012), argues that gender minority individuals experience several stressors, related to their minority status, which contribute to worrying mental health problems. It was for example found that transgender individuals who had ever experienced physical or sexual violence were four times more likely to have made a suicide attempt, than those who did not experiences such violence (Hendricks & Testa, 2012). Examples of proximal stressors that TGD individuals experience are internalized transphobia (i.e., hatred for being gender diverse) and negative expectations (e.g., constantly anticipating violence or discrimination). Both proximal and distal stressor in TGD people lead to higher levels of anxiety and depression, and poorer well-being (Hunter et al., 2021).

Because of the minority stress they potentially experience, the first hypothesis of the current research is that TGD youth are expected to experience higher levels of emotional problems than their cisgender peers.

Substance Use as a Coping Mechanism

To cope with the minority stressors they experience, TGD youth might have increased risk of resorting to substance use, as previous research in samples in The U.S. has shown that TGD youth are more likely to have recently used substances, and start at an earlier age (Wittlin et al., 2023). In a small sample of gender minority adolescents, it was found that those who experience gender minority stressors are more likely to have recently used alcohol and internalized transphobia was a mediator in this relationship (Katz-Wise et al., 2021). Furthermore, among trans female youth, the odds of heavy drug use increased for those who experienced higher levels of psychological distress (i.e., anxiety, depressive and somatic symptoms) (Rowe et al., 2015). However, findings on the role of mental health difficulties in the substance use of TGD youth are inconsistent, as some studies did not find support for this relationship (e.g. Corte et al., 2016; Watson et al., 2019). This inconsistency might be due to a lack of large, representative sample studies on this subject (Fahey et al., 2023).

The current thesis aims to add to this line of research by examining the relationship between gender identity and substance use as mediated by having emotional problems among adolescents in The Netherlands. Therefore, it is expected that TGD youth report higher levels of substance use compared to their cisgender peers, and that this relationship is mediated by having higher levels of emotional problems.

The Mechanism of Social Support in TGD Youth

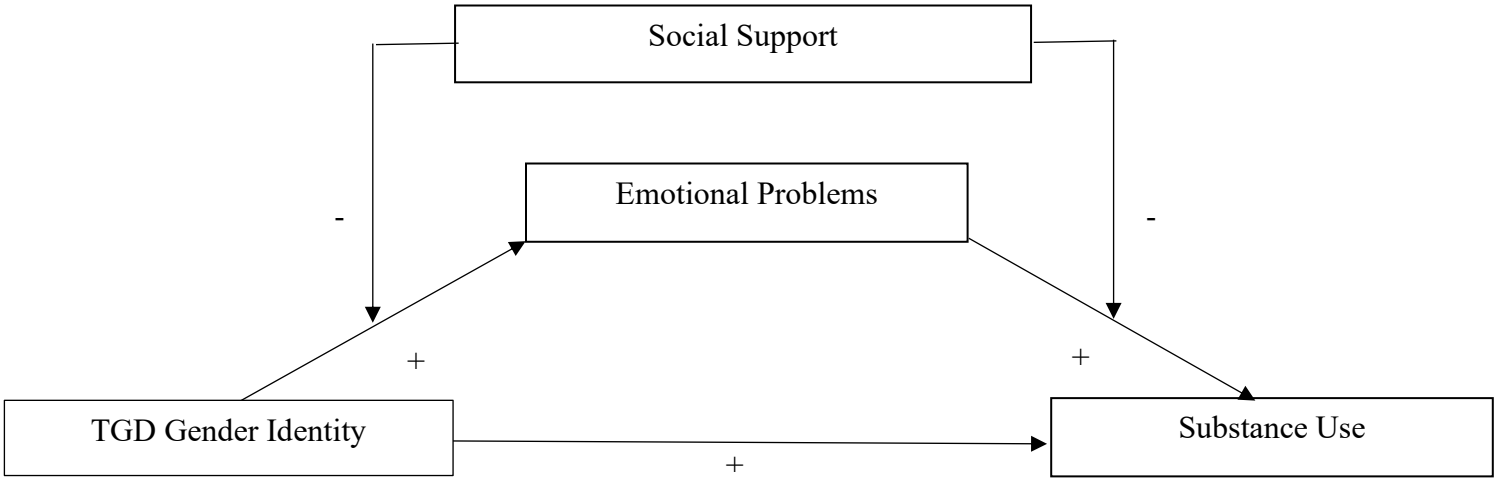
Social support from friends or other peers and family can serve as an interpersonal protective factor for mental health difficulties, such as emotional problems and substance use, in TGD youth (Wittlin et al., 2022). However, TGD youth might be less likely to experience strong family relations than cisgender youth. This might result from family rejection of the identity of the young person, or from their own exception of being rejected by their family (Brown et al., 2020). Furthermore, TGD youth are also found to be less likely to report strong peer relations than their cisgender peers (Aparicio-García et al., 2018). This lack of support is alarming, as family's acceptance of the gender identity helps insulate youth from negative experiences with discrimination and violence outside of the family context (Brown et al., 2020). Perceived parental support is found to be related to higher quality of life, fewer depressive symptoms, and a lower burden of having a transgender identity (Simons et al., 2013). In TGD college students, supportive family relationships were associated with less psychological distress (Brown et al., 2020). Vice versa, negative family relationships can increase the likelihood of mental health problems. The rejection of a child's gender identity by their family has been linked in particular to increases anxiety and depression (Fahey et al., 2023). Friend support is another important factor in TGD youth, as TGD youth who report connectedness to friends have lower levels of psychological distress, and social support may buffer the internalizing effects of victimization (Wittlin et al., 2023). In a review, Fahey et al. (2023) found that higher levels of social support might also act as a protective factor in substance use among TGD youth, as support from parents was associated with reduced substance use (Fahey et al., 2023).

To gain a clearer understanding of the protective factors in mental health issues and substance use in TGD youth in The Netherlands, the current thesis examines the moderating effect of social support from friends and family. The last hypothesis is therefore that TGD youth

who report higher levels of support from friends and family experience less emotional problems. Furthermore, those who experience emotional problems, but also high levels of social support, are expected to engage in less substance use. Figure 1 shows the conceptual model of the current research.

Figure 1

Conceptual Model Moderated Mediation Model of Substance Use Among TGD Youth



Note: – Refers to an expected negative effect, + refers to an expected positive effect.

Method

For the current thesis, secondary data from the Health Behavior in School-aged Children (HBSC) study in The Netherlands in 2021/22 is used. The HBSC study is a four-yearly cross-national research on the health and well-being of adolescents in 50 countries across Europe, Central Asia, and Canada, conducted in collaboration with the World Health Organization (WHO) Regional Office for Europe. The HBSC study aims to increase the understanding of adolescent health and well-being in their social context and because of its large scale, HBSC can be used for monitoring and comparing between and within countries (hbsc.org, n.d.).

Sample

The sample was recruited by creating a representative and nationwide distribution of students, by using a stratified sampling method. In the first step, schools were drawn from the files of the Education Executive Agency (Dienst Uitvoering Onderwijs), and to minimize selection bias, the representation of the distribution of schools in urban and rural areas was controlled for. The second step was the random selection of the classes. The number of classes included depended on the size of the school and ranged from 3-5 classes. Classes with less than 10 students were excluded. In total, 363 classes of 139 schools participated in the Dutch HBSC study. The concluding operational sample of the HBSC study consisted of 7178 adolescents, from 10 to 20 years old, which included 97.4% cisgender people, among which 52.2% was male.

Procedure

Research Design

In all classes the HBSC study was conducted through self-report questionnaires, consisting of a set of mandatory standard questions for each country and supplemented with national items. The self-report survey method is best suitable for a representative and nationwide research such as the HBSC study, as it is efficient and relatively inexpensive, and can be used for large scale testing, such as in classrooms. Furthermore, when interested in constructs like well-being and (health) behavior, such as substance use, the respondents are best qualified to witness their own personalities, behaviors, thoughts, and feelings (Paulhus & Vazire, 2007).

However, self-report methods carry a challenge considering credibility (Paulhus & Vazire, 2007); can we trust what people report about themselves? A common concern regarding credibility among researchers within the HBSC network is that adolescents might not take

questions on gender identity seriously and provide mock answers, which would jeopardize the validity of the measurement (Költő et al., 2019). This was tested in two nationwide Austrian surveys on adolescent health (including the HBSC study), and it was found that only 0.8% of the respondents provided mock answers. Thus, we can assume that almost all adolescents answer the questions on gender identity seriously (Felder-Puig et al., in press).

Data Collection Process

Data was collected from October 2021 until December 2022. Research assistants visited the schools and explained the study briefly before asking the students to fill in the questionnaire. The teachers were asked to stay in the classroom, but to not be involved in the process. Beforehand, students were informed that participation was voluntary and that they were allowed to skip any question. At primary schools, students completed written questionnaires, which were afterwards collected in a closed envelope, to guarantee anonymity. In secondary school, students completed a digital questionnaire. They received a card with a web address and a login code and were assured that their data was anonymous and would not be shared with third parties. The schools were asked to inform the parents of the participating classes on the research and received an example email with information folder. If parents objected to the study, they could tell the teacher. Because of parent's objection, 43 students did not participate. Furthermore, 34 students did not want to participate themselves.

Ethical Approval

The theoretical background, important research questions, research design, questionnaires, method of data handling, and information for schools and parents of the HBSC study were submitted to the Ethical Review Committee of the Trimbos Institute. After some adjustments, the

committee approved the execution of the research. To gain ethical approval for the secondary analysis for the current research, the research proposal was submitted to the Utrecht University Student Ethics Review & Registration Site (UU-SER) and was approved by the Ethics Review Board of the Faculty of Social & Behavioural Sciences on 8 April 2024.

Measures

Gender Identity and TGD youth

The first variable in the current study is gender identity, which was measured with two items; the first one was 'Are you a boy or a girl', with the binary answer options 'A boy' and 'A girl'. The second one was an item on gender identity, which was introduced by the following text: "*Some people see themselves as a boy, other see themselves as a girl. There are also people who cannot or do not want to make a clear choice between boy or girl. Indicate which fits you best*". The answer options were 'I see myself as a boy', 'I see myself as a girl', 'I see myself as neither a boy nor a girl', or 'Other' with an open text entry.

All respondents who answered 'I see myself as neither a boy nor a girl' or 'other' to the latter question, and those who indicated the opposite gender compared to the first item, are grouped together in the category TGD youth. All other respondents are considered the category cisgender youth. A dichotomous variable Gender Identity was created based on this, in which cisgender was the reference category.

Substance Use Frequency

The outcome variable in the current research is substance use. The following substances were included in the HBSC survey; Alcohol use, cigarettes, electronic cigarettes, drunkenness, cannabis, XTC, and nitrous oxide. Respondents were asked for the frequency of use of those

substances in the last four weeks, on a 7-point scale with the following values: 1=never, 2=1or 2 days, 3=3-5 days, 4=6-9 days, 5=10-19 days, 6=20-29 days, 7=30 days.

An exploratory factor analysis was conducted on the 6 items, using principal axis factoring with Promax oblique rotation. This resulted in two factors with eigenvalues greater than 1, and the scree plot also suggested a two-factor solution. The items alcohol, cigarettes, e-cigarettes, drunkenness and cannabis loaded on the first factor, which was interpreted as representing soft drugs. The items on XTC and nitrous oxide, loaded strongly on the second factor, which was interpreted as indicating hard drugs. Due to large number of missing answers on the items on XTC and nitrous oxide, only the items on soft drugs were included in the 7-point scale on substance use. The scale had a Cronbach's alpha of .79, indicating an acceptable to good internal consistency of the scale (Taber, 2018).

Emotional Problems

The mediator in the current research is emotional problems. To measure this, HBSC used a subscale of the Strengths and Difficulties Questionnaire (SDQ). The emotional problems subscale consists of the following five items: 'Often have a headache', 'often worrying', 'often feeling unhappy', 'feeling nervous in new situations', and 'often feeling anxious'. Respondents could answer with; 'not true', 'a little true', or 'very true'. Those items were grouped in a sub score with values ranging from 0-10, the higher the score, the more emotional problems.

Social Support from Friends and Family

The moderator in the proposed model is social support from friends and family. The seven point scale of family support was based on four items (e.g. 'Family members do their best to help me'). A similar scale based on four items (e.g. 'I can talk to my friends about my problems') was

created for friends' support. All items had seven answer options, ranging from 'completely disagree' to 'completely agree'. The items in the support scales were based on the four item Social Support Scale (SSS) (Peeters et al., 1995), which is found to be a valid and reliable instrument in other populations (Santiago et al., 2023). The two scales were grouped together in a seven-point social support scale for the current study. For an overview of all social support items included, see Appendix A.

Control Variables

Age. The first control variable in the analysis is age, as according to the Dutch HBSC national report, older adolescents are more likely to have used tobacco, alcohol, cannabis, XTC and nitrous oxide (Boer et al., 2022). On this account, there is a need to control for age as a confounder. Age was measured by asking the respondents for their birth year and month.

Family Affluence. The second control variable is family affluence, as using tobacco and cannabis is more common among adolescents who report a low family affluence (Boer et al., 2022). The HBSC survey measures Family Affluence with five items (e.g., 'does your family have a car/van?'), which are grouped together in the 10-point Family Affluence Scale (FAS) (see Appendix B for an overview of all FAS items).

Analysis Plan

Before the Main Analyses

All analyses for the current research were carried out using the statistical analysis tool JASP, version 0.18.3.0. Before conducting any of the main analyses, cases with missing data on the main variables were excluded through listwise deletion, and the included variables were controlled for the occurrence of outliers and influential cases, and the assumptions of normality,

homoscedasticity, and multicollinearity. Subsequently, a descriptive analysis was conducted to compare the means and standard deviations on the core constructs. Furthermore, with a correlation analysis the direction and strength of the correlation between all main variables was tested. In all analyses, a *p*-value of less than .05 is considered a significant result.

Mediation Model with Gender Identity, Substance Use and Emotional Problems

To test the first hypotheses of the mediation model, the four steps of Baron and Kenny (1986) were followed, using four hierarchical linear regression models. 1) Model 1 examined if there was a total effect (path c) of gender identity on substance use. 2) In model 2, the effect of gender identity on the mediator emotional problems was tested (path a). 3) In model 3, the effect of emotional problems on substance use was examined (path b). Model 2 and 3 combined represented the indirect effect (path a + b) of gender on substance use, through the mediator emotional problems. 4) In model 4, the direct effect (path c') of gender identity on substance use, whilst controlling for emotional problems was examined, to research if there was a full mediation model.

Moderation Model with Social Support

To test the last hypotheses, which included the moderation of social support from friends and family in 1) the relationship between gender identity and emotional problems, and in 2) the relationship between emotional problems and substance use, two sperate linear regression models were conducted. In the first model, with emotional problems as outcome variable, gender identity and social support were added as the predictor variables, as well as the interaction term of gender identity and social support. In the second model, with substance use as the outcome variable,

emotional problems and social support were added as predictors, as well as the interaction term of emotional problems and social support.

Results

Descriptive Results

In Table 1, the descriptive data of all variables in the analyses are presented per gender identity. After deleting the missings on the included variables, the total operational sample included consisted of 5640 respondents, with a mean age of about 14 years old (*SD*=1.88). They had a relatively high average score on the Family Affluence Scale (FAS): the mean score was 7.47 (*SD*=1.23).

The overall mean score on substance use in the past four weeks was low, as this was around 1 (*SD*=.58), which corresponds to the answer option 'never'. TGD youth reported a mean score of 5.64 (*SD*=2.72) on emotional problems which was substantially higher than the means score of their cisgender peers; they reported a means score on emotional problems of 2.94 (*SD*=2.49). TGD youth also reported on average slightly less social support (*M*=5.04, *SD*=1.24), than their cisgender peers (*M*=5.75, *SD*=1.18).

Table 1

Descriptive Statistics of All Included Variables, Reported per Gender Identity

		Cisgender (n=5493)	TGD (n=147)	Total (n=5640)
	Range	*M (SD)*	*M (SD)*	*M (SD)*
Main Variables				
1. Substance Use	1-6	1.25[a] (.57)	1.25[a] (.66)	1.25 (.58)
2. Emotional Problems	0-10	2.94[a] (2.49)	5.64[b] (2.72)	3.02 (2.54)
3. Social Support	1-7	5.75[a] (1.18)	5.04[b] (1.24)	5.73 (1.20)
Control Variables				
4. Age	10-20	13.95[a] (1.88)	13.72[a] (1.73)	13.94 (1.88)
5. FAS	0-10	7.47[a] (1.24)	7.46[a] (1.22)	7.47 (1.23)

Note: Means with different superscript letters in a row are significantly different ($p<.001$).

Preliminary Analysis

As preliminary analysis, the Spearman correlations between the variables in the main model were assessed, which are presented in Table 2. Having a TGD gender identity was significantly related to having more emotional problems, and to experiencing less social support. Furthermore, having emotional problems was positively and significantly related to substance use. No significant correlation was found between having a TGD gender identity and substance use.

Table 2

Correlations Between Main Constructs

	1	2	3
1. TGD Gender Identity	-		
2. Substance Use	-.01	-	
3. Emotional Problems	.15*	.05*	-
4. Social Support	-.11*	-.05*	-.26*

*Note. Cisgender was the reference group for the dichotomous variable Gender Identity. *p<.001*

Main Analysis Results

Mediation Model with Gender Identity, Substance Use and Emotional Problems

Before conducting the mediation analysis, the sample was checked for outliers and influential cases, and for the assumptions of regression analysis, as mentioned in the analysis plan. Regarding outliers, the standardized residuals table presented that there were several cases with a standardized residual higher than 3 (Std. Residual Min=-.61; Std. Residual Max=8.20). The most extreme outliers were checked manually, but no reason was found to exclude those cases. Other than this, all assumptions regarding mediation analysis were met.

In Table 3 and in Figure 2 the results of the four hierarchical regression models used to examine the mediation model are presented. In model 0, the effects of the confounders age and Family Affluence on substance use were examined. Age was a significant predictor of substance use, B=.13 (SE=.01), p<.001, 95% CI [0.12, 0.14], but FAS was not, B=.01 (SE=.01), p=.04, 95% CI [$4{,}882 \times 10^{-4}$, 0.02]. On this account, FAS was not included as a confounder in the rest of the analyses. Model 1 tested the total effect of gender identity on substance use. The analysis

showed that gender identity was not a significant predictor of substance use, *B*=.03 (*SE*=.04), *p*=.54, 95% CI [-0.06, 0.12]. In models 2 and 3 the analysis showed that gender identity was a significant predictor of emotional problems, *B*=2.72 (*SE*=.19), *p*<.001, 95% CI [2.36, 3.01], and that emotional problems in turn was a significant predictor of substance use, *B*=.01 (*SE*=.003), *p*<.001, 95% CI [0.004, 0.015]. In model 4, no significant direct effect of gender identity on substance use through emotional problems was found, *B*=.003 (*SE*=.01), *p*=.95, 95% CI [-0.09, 0.09]. Thus, according to the steps of Baron and Kenny (1986) as describe in the method section, no mediation effect was found.

Table 3

Hierarchical Mediation Model with Substance Use as Dependent Variable in Models 0, 1, 3 and 4 and Emotional Problems as Dependent Variable in Model 2

Variables	Model 0		Model 1		Model 2		Model 3		Model 4	
	B	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*
Constant	-.58*	.07	-.59*	.07	1.59*	.22	-.61*	.07	-.62*	.07
Gender Identity										
TGD			.03	.05	2.72*	.18			.003	.05
Emotional Problems							.01*	.003	.01*	.003
Age	.13*	.004	.13*	.004	.10*	.02	.13*	.004	.13*	.01
FAS	.01	.001								
R^2 (ΔR^2)	.12		.12 (.00)		.04 (.03)		.13 (.002)		.13 (.00)	
n	5705		5641		7079		5615		5552	

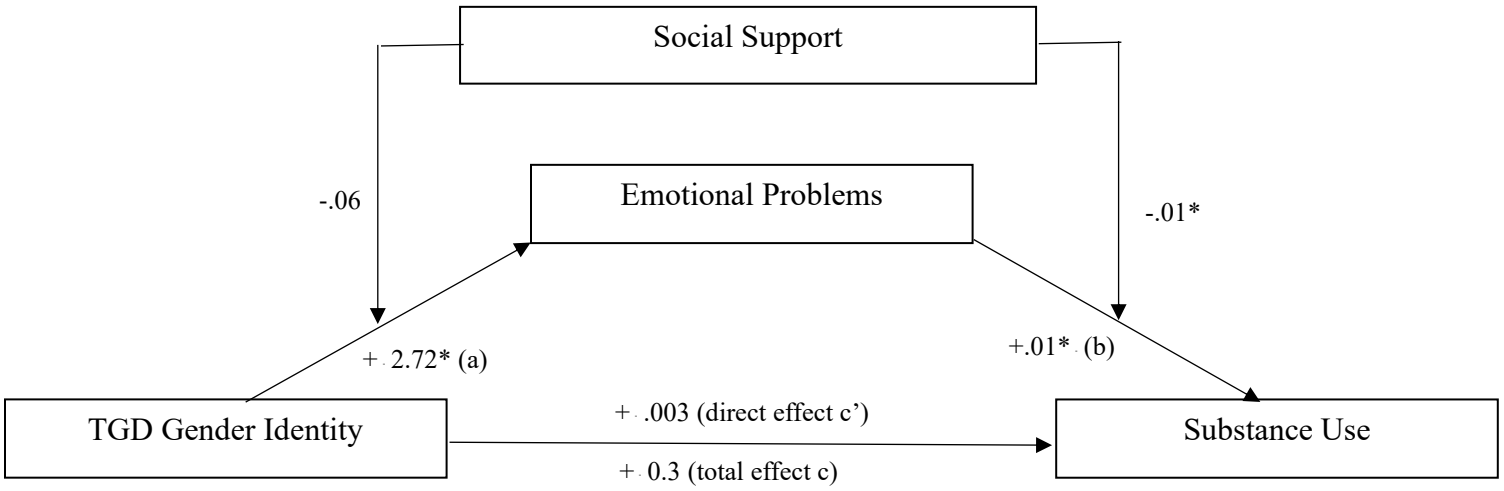
*Note: For the dichotomous variable for Gender Identity is cisgender the reference category. *p<.001*

Moderation Model with Social Support

In the first moderation model, gender identity was the predictor, emotional problems the outcome variable and social support the moderator. Whereas the second moderation model consists of emotional problems as the predictor, substance use as the outcome variable and social support as the moderator. To check for the assumptions of the moderation analysis, two simple linear regressions were conducted, and all assumptions were met. Figure 2 presents the results of the two moderation models. In the first model, emotional problems was not significantly predicted by the interaction term of gender identity and social support, B=-.06 (SE=.15), p=.69, 95% CI [-0.34, -0.23], thus no moderation effect of social support on the relationship between gender identity and emotional problems was found. This model explained 9% of the variance in emotional problems, R^2=.09. In the second model, the interaction term of emotional problems and social support did significantly predict substance use, B=-.01 (SE=.002), p<.001, 95% CI [-0.01, -0.004], thus there was a moderation effect found of social support on the relationship between emotional problems and substance use. This model explained 13% of the variance in substance use, R^2=.13.

Figure 2

Moderated Mediation Model of Gender Identity and Substance Use



*Note: - Refers to a negative relationship, and + refers to a positive relationship. *p<.001*

Discussion

What are the risk and protective factors in the worrying mental health disparities that trans and gender diverse young individuals experience? To delve into this, the current study used a nationally representative sample to examine the relationship between gender identity and substance use, and the possibly mediating effect of emotional problems. In terms of protective factors, the second aim was to examine if social support from friends and family has a moderating role in the relationships between 1) gender identity and emotional problems, and 2) emotional problems and substance use. The results showed that TGD youth had more emotional problems than their cisgender peers, and, in the general population, those who had higher levels of emotional problems, also engaged in slightly more substance use. However, TGD youth did not engage in more substance use than their cisgender peers. Furthermore, adolescents with higher levels of emotional problems who felt more support of their friends and family were less likely to resort to substance use than those who felt less supported.

It was expected that TGD youth engaged in more substance use than their peers, as some previous studies found that gender non-conforming adolescents are more likely to use substances such as alcohol, cigarettes, cannabis and illicit drugs (Day et al., 2017; Eisenberg et al., 2017; Johns et al., 2019), this was, however, not found in the current study. This inconsistency might be explained by methodological differences, as the studies referred to only measured having ever used substances during the lifetime, or they only included transgender youth and no other gender diverse youth. Furthermore, studies that did include past 30-day substance use prevalence, coded this as a binary variable (30-day prevalence or not), due to highly skewed data (Day et al., 2017; Eisenberg et al., 2017). In the current study, substance use was included as a scale variable, while the mean substance use in the general population was low. These methodological differences may (partly) explain the discrepancy in outcomes.

However, what is consistent with previous research (Eisenberg et al., 2017; Guz et al., 2021; Hunter et al., 2021) and the Minority Stress Theory (Meyer, 2003), is the finding that TGD youth experience more emotional problems than their cisgender peers. This might be explained by the extra daily stressors TGD youth encounter, due to their minority status (Hunter et al., 2021). This result also builds on the finding that adolescents in a smaller sample who wished to be of the opposite sex reported more symptoms of anxiety and depression (Ghassabian et al., 2022), similar to what the current study found in a nationwide representative sample.

To cope with the emotional problems TGD youth experience, it was expected that they would engage in more substance use. In the current study, youth (regardless of gender identity) who felt higher levels of emotional problems engaged in more substance use in the past 30 days. In previous research, a theory that has been used to explain this relationship, is General Strain Theory (Agnew, 1992). Originally this theory was used to explain the relationship between strain

and criminal behavior, but in contemporary social science it is also used to explain other behaviors, such as substance use. Peck and colleagues (2017) for example found that individuals who experience strain from discrimination and victimization, had more depressive symptoms, and this indirectly led to substance use. As TGD youth are more likely to experience stressors such as bullying and victimization (Kaufman & Baams, 2022; Kiekens et al., 2022), this relationship was also expected in the current research. However, TGD youth did not engage in more substance use than their cisgender peers. So TGD youth did not resort to substance use to cope with mental health difficulties. Certainly, the relationship between experiencing emotional problems and substance use is complicated and can vary across (sub)populations. TGD youth might for example cope with their problems in different ways than their peers, as TGD youth are likely to cope with discrimination and mental health problems by isolating from others, or internalizing stigma (Puckett et al., 2020). There is a need for more comprehensive studies to better understand the effects of emotional problems among TGD youth, and the ways in which they cope with possible strain they experience.

In contrast to previous research (Gower et al., 2018; Veale et al., 2017; Weinhardt et al., 2019), TGD youth who felt more support of their friends and family did not report less emotional problems. This discrepancy in findings might be explained by different operationalization of emotional or mental health problems. Some studies for example only investigated suicide attempts, suicidal ideation and depression, or they used a dichotomous variable to measure emotional problems. These differences may have led to different outcomes. Furthermore, TGD youth may find other sources of support which can possibly form a protective factor, as for example, TGD youth often find support and affirmation in online communities, which provide a sense of belonging and acceptance (Austin et al., 2020). To create useful interventions to decrease

the emotional problems that TGD youth experience, it is important for future research to comprehensively examine possible protective factors that buffer the difficulties they encounter.

Strengths & Limitations

The current study added to the line of research on TGD youth by using a nationally representative large sample of adolescents in the Netherlands, and by using statistical analyses to be as objective as possible. However, despite these strengths, several limitations should be kept in mind when interpreting the results. Firstly, the construct gender identity was not perfect, as the item 'Are you a boy or a girl', was interpreted as the participants sex at birth in this research, however, the item may have caused confusion for participants, which undermines its validity. This also might have led to an underestimation of the number of transgender adolescents in the population (Boer et al., 2022). Future research on TGD youth should incorporate the two-step approach, which includes one question on sex assigned at birth and another on gender identity (Jones, 2019). This method, frequently recommended as best practice for measuring gender identity, has high construct validity and is inclusive for all gender non-conforming individuals (Greytak et al., 2014; Jones, 2019). Furthermore, because of the cross-sectional nature of the current study, no causal claims can be made. We cannot be sure if TGD youth report more emotional problems because of their gender identity, or if youth with more emotional problems more often adopt a non-conforming gender identity. To fill this gap in the research, future longitudinal research is needed.

Conclusion & Implications

In the current study we gained more insight into the relationship between gender identity, emotional problems, and substance use, and the protective factor of social support in these

relationships. TGD youth did not engage in more substance use, but they did however have more emotional problems compared to cisgender youth. The results also showed that, in general, youth who report more emotional problems are more likely to engage in substance use, and that social support from friends and family can help prevent resorting to substance use. Because adolescents with non-conforming gender identities experience worrying mental health disparities and have higher level of suicidal ideation and suicide attempts (Aparicio-García et al., 2018; Conolly et al., 2016; Wittlin et al., 2023), it is crucial that future interventions and policies focus on minimizing the amount emotional problems they experience. Future research is also needed to gain more insights in the risk and protective factors of TGD youth, as this is lacking in the Netherlands. Addressing this gap through targeted research and comprehensive support strategies is essential for improving the mental health and overall well-being of TGD youth.

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Appendix A

Items in the Friends and Family Social Support Scale

1. Family members do their best to help me.
2. I receive the emotional support I need from my family.
3. I can talk to my family about my problems.
4. My family wants to help me to make decisions.
5. My friends really try to help me.
6. I can count on my friends when something goes wrong.
7. I have friends with whom I can share joys and sorrows.
8. I can talk to my friends about my problems.

Appendix B

Items in the Family Affluence Scale Including Answer Categories

1. Does your family have a car/van? (1=no; 2=yes, one; 3=yes, 2 or more)
2. Do you have your own bedroom (for only you)? (1=no; 2=yes)
3. How many computers does your family have? (1=none; 2=one; 3=two; 4=more than two)
4. How many bathrooms (with a shower/bathtub) does your house have? (1=none; 2=one; 3=two; 4=more than two)
5. Does your house have a dishwasher? (1=no; 2=yes)

Appendix C

Reflection on Interdisciplinarity

The use of theoretical insights from multiple scientific disciplines is crucial for understanding the complex issues of substance use and mental health difficulties among trans and gender diverse youth. Integrating perspectives from psychology, sociology, public health, and gender studies, allows for a more comprehensive understanding of the factors influencing these issues. This interdisciplinary approach helps to elucidate the interplay between individual psychological processes, social dynamics, cultural contexts, and structural inequalities. The fist discipline which is involved in understanding the current problems is Psychology. Psychology provides insights into the emotional and cognitive processes which TGD youth undergo, and which may lead to problems like substance use and emotional problems. Secondly, Sociology offers an understanding of the social structures, norms, and interactions that impact the experiences of trans and gender diverse youth. Another discipline that is involved is Gender Studies, which examines the impact of gender identity and the social construction of gender on the well-being of trans and gender diverse individuals. Lastly, Public Health focuses on the prevalence, prevention, and intervention strategies for substance use and mental health issues. Drawing on all these disciplines is meaningful because it enables a comprehensive analysis of the problem. Each discipline contributes unique insights that together provide a more nuanced understanding of the factors contributing to substance use and the role of social support in mitigating these issues.

Stakeholder perspectives from outside academia are valuable in understanding the lived experiences of trans and gender diverse youth. These perspectives can include input from: 1) Healthcare providers, as they provide insights into the barriers and facilitators in accessing

mental health care. 2) Community organizations, as they can help with understanding the support networks and resources available within the community of the TGD individuals. 3) Families and Caregivers, as they create perspectives on the home environment and familial support. Lastly, obviously, 4) TGD individuals themselves, to create insight into direct experiences that highlight the everyday stressors and challenges faced. Engaging with these stakeholders ensures that research findings are grounded in real-world experiences, making the results more applicable. It helps bridge the gap between academic research and practical interventions, ensuring that the solutions proposed are feasible and sensitive to the needs of the target population.

Employing multiple research methods, such as qualitative interviews, quantitative surveys, and longitudinal studies, can lead to a deeper understanding of the research problem. Each method offers different strengths. Qualitative methods provide rich, detailed narratives and insights into personal experiences and social contexts of TGD youth, whereas quantitative methods allow for the measurement of prevalence and the identification of statistical relationships between variables in a large representative population. Lastly, longitudinal studies track changes over time, offering insights into causal relationships and changes over time. Using these methods in combination can validate findings across different types of data and ensure a more robust and comprehensive analysis.

Investigating the problem at multiple analytical levels, such as individual, interpersonal, and societal levels, can provide a more comprehensive understanding of the factors at play. The individual level gives insights into personal factors and experiences in terms of gender identity, mental health, and substance use behaviours. The interpersonal level looks at relationships with family, peers, and social support networks, which is important in understanding the proactive nature of social support in TGD youth. Furthermore, the societal level analyses broader social

and cultural norms, policies, and structural inequalities, which play a role in the stressors and mental health disparities TGD youth experience. A joint analysis of these levels allows for the identification of interactions and dependencies between different factors, providing a richer, more holistic understanding of the issues and informing more effective and targeted interventions for TGD youth.