

Agree to Disagree: Parent-Child Discrepancies in Adolescent Addiction Treatment

Meghna Raghavan

Department of Psychology, Trent University

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Dr. Jennifer Eastabrook

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Abstract

Diagnoses of mental disorders and substance use disorders often rely on reports from multiple informants. There are often disagreements between these reports, otherwise known as discrepancies. While discrepancies used to be regarded as inconveniences resulting from measurement error, recent research suggests that discrepancies can provide meaningful information and are capable of predicting poor outcomes or problem behaviours. The current study examined discrepancies between parent-adolescent reports of family functioning at an adolescent addiction treatment centre. The purpose of this study was to examine whether discrepancies decreased over treatment, and if parent-adolescent dyads with greater improvements in agreement showed better treatment outcomes. The sample consisted of 32 adolescents (50% female; $M = 17.43$ years of age) and their parents. Participants completed self-report measures of family functioning, parental boundaries, and substance abuse at various time-points before, during and after treatment. Results showed that the expected discrepancies between parent-adolescent reports of family functioning at the beginning of treatment did not exist. The possible reasons for this lack of discrepancies are discussed.

Keywords: adolescent substance abuse, discrepancies, family functioning, addiction treatment

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Overview

Adolescence is the transitional period between childhood and adulthood that is marked by significant cognitive, social, and emotional development (Brown et al., 2008). It is commonly associated with risk-taking and impulsivity (Steinberg, 2007). Some risky behaviours, such as substance use, are a normative aspect of adolescence. Alcohol and cannabinoids are the two substances most commonly used by adolescents (Jacobus & Tapert, 2014), and both have been associated with negative impacts on the developing brain (Jacobus et al., 2019; Meruelo et al., 2017). Substance use during adolescence has been linked to decreased cognitive flexibility and increased anxiety, disinhibition, and risk-taking, as well as deficits in learning and memory that endure into adulthood, long after the drug exposure has subsided (Mooney-Leber & Gould, 2018; Spear, 2018).

Due to the lack of clear biological or behavioural markers to diagnose mental disorders and substance use disorders, assessments are often collected from multiple informants (De Los Reyes, 2011). Achenbach (2005) suggested that multiple informants provide unique reports that are not interchangeable. These informants can include the adolescents themselves, parents, peers, teachers, clinicians, or laboratory observers. Discrepancies between reports are a common occurrence and used to be regarded as inconveniences caused by measurement error. However, more recent efforts have examined the usefulness of informant discrepancies in providing important information related to diagnosis and treatment outcomes.

One particular area of relevance to the treatment of adolescent substance use disorders is the disagreement found in the assessment of family functioning. For instance, De Los Reyes et al. (2010) found that increased delinquent behaviours could be predicted from parents who reported more positive levels of parental monitoring relative to their child. This

finding was not explained by other variables, leading the authors to believe that mother-child discrepancies in levels of parental monitoring could be used as individual differences measurements in developmental psychopathology research. Additionally, an investigation into parent-child discrepancies on measures of child social phobia symptoms found that pre-treatment discrepancy scores predicted post-treatment discrepancy scores, but only for those adolescents classified as non-responders to treatment (De Los Reyes et al., 2009). This indicates that successful treatment may diminish discrepancies between parent and child.

While research on discrepancy scores is growing, to our knowledge there has been no study examining discrepancies in the assessment of family functioning in adolescents with substance use problems. The current study intends to contribute to this field by examining the predictive value of parent and adolescent discrepancy scores to treatment success, as well as whether these discrepancies decrease after treatment.

Adolescence and Addiction

Adolescence is a period of rapid developmental changes that is often associated with risky behaviours, including substance use (Chassin, 2010; Steinberg, 2007). The explanations for engagement in these behaviours are both biological and social. During the process of adolescent brain development, the development of the limbic system precedes that of the pre-frontal cortex. The limbic system is responsible for arousal and sensation-seeking behaviour, while the pre-frontal cortex is responsible for executive function and rational thinking (Arain et al., 2013; Romer, 2012). Reward-seeking behaviour associated with the limbic system appears to be most evident in the mid- to late-adolescent period, before the development of the pre-frontal cortex and the resulting influence on decision-making (Luciana, et al., 2018). This indicates that the drive for pleasure-seeking behaviour develops before the ability to rationally assess the consequences of their actions, leading adolescents to engage in risky behaviours.

Along with experiencing changes in brain development, adolescents experience changes in their relationships. They begin to pull away from their parents and become increasingly reliant on their peers for social support (Luciana, et al., 2018). Peer influence with regards to substance use takes on a number of forms, including actual peer use as modelling, adolescents' perceptions of peer use and peer social norms, and peer pressure to engage in substance use (Liao et al., 2013). Peers acts as a reward source for adolescents, who tend to engage in behaviours that they think will be perceived positively by their peers (Allen et al., 2012). Thus, peer behaviour can act either as a risk factor or a protective factor: having friends who engaged in drug use predicted the adolescent's own drug use, while having peers who shared anti-drug perceptions reduced the adolescent's likelihood to engage in substance use (Leung et al., 2011; Parsai et al. 2019).

A combination of factors explains why adolescence is often associated with risky behaviours, including substance use (Steinberg, 2007). Some level of experimentation with substance use is expected and considered normative during adolescence (Feldstein & Miller, 2006). Alcohol and marijuana use are highly prevalent during this period: in 2017, 57% of adolescents between the ages of 15 and 19 reported alcohol use in the past year while 19% reported marijuana use (Statistics Canada, 2017). While engagement in substance use is considered normative to an extent, Canadian youths aged 15 to 24 have the highest rates of substance use disorders in comparison with all other age groups (Pearson et al., 2012). Additionally, substance use disorders are most prevalent among youth who initiate drug and alcohol use before the age of 18 (Dennis et al., 2003; Pearson et al., 2012). This engagement in substance use can have several negative impacts on the adolescent (Jacobus, 2014; Spear, 2018).

Spear (2018) found that adolescent alcohol users show neural and cognitive differences from non-users. Some of these differences predated the onset of alcohol use and

served as risk factors for alcohol use, while others resulted from it. Adolescent alcohol use can result in changes in attention, learning, and memory, with individuals displaying decreased cognitive flexibility and increased anxiety, disinhibition, and risk-taking (Spear, 2018). This suggests that engagement in alcohol use makes adolescents even more likely to engage in risky behaviours in the future.

After alcohol, marijuana is the second most widely used intoxicant in adolescence (Jacobus, 2014). Teens with heavy marijuana use show disadvantages in brain development and neurocognitive performance, as well as changes in brain functioning. As with alcohol use, it is unclear whether these differences predated drug use and predisposed the adolescents to it, or if they resulted from heavy substance use (Jacobus, 2014; Spear, 2018). Either way, heavy use is associated with differences in the integrity of brain tissue that predict future risky behaviours. Marijuana use is associated with slower processing speed, along with poorer memory and sequencing abilities.

Substance use disorders in adolescence are often observed to be comorbid with mental health disorders such as depression, anxiety, conduct disorder, bipolar disorder, and attention-deficit/hyperactivity disorder (Deas & Brown, 2006). These co-occurring disorders affect both the severity of symptoms and the efficacy of treatment (Lubman et al., 2007). For example, adolescents with comorbid drug use and post-traumatic stress disorder (PTSD) reported more interpersonal problems and health complaints, while adolescents with comorbid depression and drug use reported more academic problems and impaired role functioning. Adolescents with emotional problems displayed higher rates of relapse at a two-year follow up after admission to an inpatient drug treatment program, and depressive symptoms at intake were found to predict non-improvement despite completion of a treatment program (Lubman et al., 2007). Therefore, for a treatment program to be

successful, both the substance use disorder itself and comorbid mental health issues must be treated simultaneously.

Family Functioning

Family functioning is an area of interest in research into adolescent substance use, since aspects of family functioning such as conflict, communication, parental monitoring, and parenting style have been established as risk factors for adolescent substance use (Winters et al., 2008). Gorman-Smith et al. (1998) found that there was more than just a general relationship between family functioning and adolescent delinquent behaviour. Distinct patterns of adolescent deviant behaviour were linked to specific family problems that included neglect, conflict, parent deviant behaviours and disruption. Adolescents who repeatedly displayed delinquent behaviour were more likely to belong to families that also displayed deviant behaviour and had multiple problems (Gorman-Smith et al., 1998).

One factor that has been widely studied is parental history of substance abuse (Chassin et al., 1996). Chassin et al. found that adolescents with alcoholic fathers and drug-using peers experienced a steeper increase in substance use than those without alcoholic fathers or drug-using peers. Explanations for these findings have emphasized alcohol misuse as a hereditary trait, but paternal alcoholism is also linked with lower parental monitoring (Chassin et al., 1996; Steinberg et al., 1994). Parental monitoring, in turn, appears to be a significant predictor of deviant behaviours such as substance abuse (Barnes et al., 2000; Wagner et al., 2010).

Family processes can act as a method of informal social control by limiting the opportunities to engage in deviant behaviour, such as spending time with deviant peers, and thereby reducing the likelihood of deviant behaviour (Wagner et al., 2010). Adolescents who experience lower parental monitoring are more likely to engage in drug use, and to seek like-minded friends (Steinberg et al., 1994). This association with drug using peers in turn causes

the adolescent to increase their own drug use to match the level displayed by their friends. Other factors linked with adolescent substance use include family structure; adolescents who lived with two biological parents reported less substance use than those who lived in any other arrangement (Wagner et al., 2010). Wagner found that living with a single father or a single mother was linked with less parental monitoring, while living with a single father was linked with less family cohesion. Lower parental monitoring and less family cohesion were both linked with increased substance use. Living with neither parent also significantly predicted substance use.

Research on family functioning as it relates to adolescent substance use has demonstrated the importance of parental style (Baumrind, 1991; Barnes et al., 2000). Baumrind (1991) categorised four parental styles based on two dimensions: demandingness or control and responsiveness or warmth. Parents who are highly demanding and highly responsive are categorised as authoritative; this parenting style is considered to be the ideal and linked to positive adolescent outcomes, including protecting children from problematic substance use (Baumrind, 1991). However, the effectiveness of parental control depends on how it is expressed. Coercive control attempts such as yelling or hitting are forms of negative parental support and are positively correlated with substance use and deviant behaviour (Barnes et al., 2000).

Just as negative family relationships are seen to increase the risk of substance use, positive qualities such as family connectedness and secure attachment may decrease this risk (Farrell & White, 1998; Winters et al., 2008). Peer influence is one of the strongest predictors of adolescent drug use, but positive parent-adolescent relationships can serve as protective factors in reducing adolescent substance use (Farrell & White, 1998). Family connectedness and close parent-child attachments are associated with increased parental monitoring and knowledge of the child's whereabouts and peer connections. These factors, along with child's

willingness to seek advice and support from parents are linked with lower drug use (Winters et al., 2008).

Discrepancy Scores

Given the prevalence of adolescent substance use and the increased likelihood of resulting substance use disorders, it is important to identify early substance use (Piehler et al., 2019). The means of detecting substance use disorders are a source of conflict, with some researchers advocating for objectivity and reliability of biological measures, while others argue that self-report measures are more efficient while still being valid (De Los Reyes, 2011). Reports are often collected from multiple informants to gain insight into youth functioning in different contexts and to offset the over- or under-reporting of symptoms that may result from adolescent self-report alone (De Los Reyes, 2011; Piehler et al., 2019). However, there are often inconsistencies across reports that are referred to as discrepancies.

These discrepancies are important in cases where parent reports would usually be used to measure behaviour (Kim et al., 2020). Parents' recognition of emotional distress in their children is a key factor for early detection and treatment of disorders. Kim et al. (2020) sought to examine the agreement between parents and adolescents on adolescents' emotional distress. They found low agreement between parent-adolescent reports of depression, anxiety and anger. Parents tended to underestimate their children's emotional distress, and a significant portion of the adolescents experiencing symptoms were scored in the normal range by their parents.

The parents' inability to recognise symptoms raises concern not only because of the negative impacts of emotional distress, but also because adolescents are dependent on their parents to make judgements for referrals (Kim, 2020). If parent reports alone were collected, then the adolescents' emotional distress would go undiagnosed and untreated. These results highlight the importance of not collecting reports from just a single informant, as well as the

importance of further research into why discrepancies arise between multiple informants' reports.

While these inconsistencies used to be regarded as inconveniences resulting from measurement error, informant discrepancies yield additional important information (De Los Reyes, 2011). For instance, an investigation into discrepancies in the assessment of child disruptive behaviour showed that discrepancies in parent-teacher reports were linked to laboratory observations of the child's behaviour (De Los Reyes, 2009). When disruptive behaviour was only observed with the parent and not the clinical examiner in the laboratory, this predicted disruptive behaviour reported only by the parent and not the teacher. Similarly, laboratory observations of disruptive behaviour with the clinical examiner but not the parent predicted disruptive behaviour reported only by the teacher but not the parent. The discrepancies between parent-teacher reports were indicative of the child behaving differently at home and in school. This difference would not have been observed from either parent or teacher report alone. Therefore, findings such as these further support the claim that discrepancies provide meaningful information not available from individual reports.

Discrepancy Scores in Family-Focused Variables

It has also been observed that parent-child discrepancies in family functioning measures are associated with negative outcomes for adolescents (Abar et al., 2015; De Los Reyes et al., 2010; Lebron et al., 2018). Lebron et al. (2018) examined the relationship between parent-adolescent discrepancies in family functioning and the adolescents' physical activity and diet, both of which are risk factors for obesity. Family functioning is positively correlated with physical activity and dietary intake, but most of the research into this relationship has used reports from either the parent or the adolescent. The results showed a significant association between discrepancies in family functioning reports and both reduced physical activity and fruit and vegetable intake. Larger discrepancies were associated with

less physical activity and worse fruit and vegetable intake. Parents tended to report better family functioning than adolescents. Lebron et al. suggested that interventions focus on the adolescent perception of parent behaviour and aim to reduce these discrepancies by examining the reasons for them.

Parent-child discrepancies have also been associated with adolescent delinquent behaviours. De Los Reyes et al. (2010) conducted a longitudinal investigation into parent-child discrepancies in parental monitoring and delinquent behaviour. While parental monitoring has often been observed as a protective factor against delinquent behaviour, reports are rarely taken from both parent and child. In the instances when both parent and child reports are used, low levels of agreement are often seen. The results showed that when parents reported higher levels of parental monitoring than their children did, this discrepancy predicted child delinquent behaviour two years later. Neither individual report was sufficient to predict this outcome. This discrepancy indicates that when parents were not as aware of their children's activities and whereabouts as they believed they were, they were less able to prevent delinquent behaviour.

Abar et al. (2015) investigated the relationship between parent-child discrepancies in reports of parental monitoring and adolescents' alcohol use, expecting that lower parental monitoring would be associated with greater alcohol use. Consistent with previous findings, they observed that parents reported higher levels of parental monitoring than their children. They suggested that this was either due to parents over-reporting behaviours associated with good parenting, or adolescents under-reporting parental monitoring to appear more autonomous. They also found that adolescent reports were more closely associated with outcomes than parent reports. Larger discrepancies were associated with increased likelihood of alcohol use behaviours. The directionality of these discrepancies is also important, as research indicates that poor outcomes are observed when parents report better family

functioning and higher levels of parental monitoring than the adolescents (Abar et al., 2015; De Los Reyes et al., 2010, Lebron et al., 2018).

Treatment and Discrepancy Scores

Parent-child discrepancies are also linked with negative treatment outcomes (Becker-Haimes et al., 2018; Goolsby et al., 2018). Goolsby et al. (2018) noted that while parent and child reports are both used to make treatment decisions and determine treatment efficacy in child clinical psychology, there are often discrepancies between these reports. They observed a group of children with mixed diagnoses undergoing a cognitive behavioural group therapy program. They found that parents reported more severe symptomatology than their children. Larger discrepancies at the beginning of treatment predicted poorer treatment outcomes. Dyads with higher concordance displayed better treatment outcomes than those with discrepancies, even if both parents and children reported worse symptoms before treatment began.

Similarly, Becker-Haimes et al. (2018) found that parent-youth disagreement predicted various aspects of treatment outcomes. When examining the efficacy of cognitive behaviour therapy (CBT) in the treatment of youth anxiety, they found that larger parent-child discrepancies were associated with factors such as parental psychopathology and poor family functioning that could negatively impact treatment. When youth were receiving CBT alone and not in combination with any other treatment, higher parent report of symptoms prior to treatment indicated that youth were less likely to be diagnosis-free after treatment. Parent-child discrepancies pre-treatment predicted outcomes such as severity of anxiety, youth functioning, and diagnostic remission. Diminishing discrepancies between parents and youth as treatment progressed was associated with improved treatment outcomes across all outcome measures. These results also indicate that discrepancy scores can decrease over treatment.

Research into the nature of discrepancy scores in family functioning and how discrepancy scores can influence treatment is growing. However, to our knowledge there has not been a study examining discrepancies in family functioning as they relate to adolescent addiction treatment.

Pine River Institute

Pine River Institute (PRI) is a residential treatment centre for adolescents with addiction (Pine River Institute, n.d.). PRI's treatment program is designed for adolescents between the ages of 13 and 19 who experience addictive behaviours and comorbid problems, including mental health symptomatology. PRI uses the "Parallel Process" approach wherein parents are involved in the treatment as well; they work with therapists to improve communication, maintain boundaries, and improve their relationships with their children. It is likely that building healthier and more open relationships between the adolescents and their parents will also increase their agreement and therefore reduce discrepancies between their scores of family functioning.

Research Objectives

This study has two research objectives. The first is to examine the change in discrepancy scores for family functioning and parental boundaries over the course of treatment. The second is to determine whether discrepancy scores for family functioning and parental boundaries are linked to treatment outcomes. The following predictions have been made:

Hypothesis 1: It is predicted that parent-adolescent discrepancy scores in family functioning and parental boundaries will decrease after treatment. This is consistent with findings that discrepancies can change over treatment (Becker-Haimes et al., 2018).

Hypothesis 2: It is predicted that the parent-adolescent dyads who experience the greatest change in discrepancy scores across treatment will experience better treatment

outcomes than those who experience less change. Specifically, it is predicted that larger decreases in discrepancy scores will lead to lower rates of substance use (eg: alcohol and marijuana), as well as fewer behavioural and emotional problems (eg: internalising and externalising symptoms) post-treatment. This is consistent with previous results that showed diminishing discrepancies are associated with improved treatment outcomes (Becker-Haimes et al., 2018).

Method

Participants

The current study included a sample of 32 adolescents who had completed treatment, and one of their parents. In instances where both parents responded, the mother's data was used. For three participants, the mothers had not provided responses and so the fathers' scores were used. The adolescents were between the ages of 14 and 20 at admission ($M = 17.43$, $SD = 1.51$) and had all spent at least a year at PRI. Of the 32 participants, 50% identified as male ($n = 16$) and 50% identified as female ($n = 16$). This is consistent with the larger population of PRI attendees, as the average age of admission to the treatment program is 17 and 55% of the adolescents are male. The youth who attend PRI engage in the use of several substances, including alcohol, marijuana, cocaine, ecstasy, and opiates. The most common substances used by the adolescents attending PRI are alcohol and marijuana. They also experienced comorbid problems such as anxiety or depression.

Measures

The study used various questionnaires completed by the adolescents and parents at different time points throughout their treatment to assess family functioning, parental boundaries, drug use and mental health.

Family Functioning

Family functioning was assessed using the 12-item General Functioning subscale of the McMaster Family Assessment Device (FAD; Epstein, Baldwin & Bishop, 1983). The FAD subscale was administered to both parents and adolescents at various points during and after treatment. The items include “We can express feelings to each other”, “We feel accepted for who we are”, “We don’t get along well together” and “There are lots of bad feelings in the family.” Participants rated their agreement with items on a 4-point Likert scale from 1 (Strongly Agree) to 4 (Strongly Disagree) based on their experiences in the past three months. The average of the 12 scores is calculated and compared with a clinical cut off score of 2.0. Higher scores indicate poorer overall family functioning.

Parental Boundaries

Parental boundaries were assessed using the Inadequate Boundaries Questionnaire (IBQ, Maysless & Scharf, 2000). The 35 items are divided into five subscales: Guilt Inducing, No Boundaries, Parentification, Triangulation, and Psychological Control. Parents and adolescents rated their agreement with statements about the parent’s behaviour on a Likert scale with scores ranging from 1 (Never/Almost Never) to 5 (Always/Almost Always), with higher scores indicating higher levels of inadequate boundaries. Items on the parent questionnaire include “If my child does not do what I ask, I am really offended”, “I interrupt my child”, and “If my child hurt my feelings, I stop talking to him/her until s/he pleases me again.” The corresponding items on the adolescent questionnaire are “If I don’t do what my parent asks he/she is offended”, “The parent often interrupts me”, and “If I hurt my parent’s feelings, s/he stops talking to me until I please him/her again.” Adolescents provided responses for two parents.

Mental Health

Adolescent mental health was assessed using a series of assessments that are part of the Achenbach System of Empirically Based Assessments (ASEBA, Achenbach & Rescorla,

2001) including the Youth Self-Report (YSR) and the Adult Self-Report (ASR). These were completed by the adolescent at various time-points before, during and after treatment.

The YSR has 112 items that are scored from 0 (Not True) to 2 (Very/Often True). Items on the YSR include “I argue a lot”, “I cry a lot”, “I try to get a lot of attention”, and “I am jealous of others.” The ASR has 123 items including “I feel lonely”, “I am too dependent on others”, and “I get in many fights.” The ASR and YSR each have nine subscales. They both have Anxious/Depressed, Withdrawn, Somatic Complaints, Thought Problems, Attention Problems, Aggression, Rule-Breaking and Other, while the ASR has an Intrusive subscale and the YSR a Social Problems one.

Lower scores on these measures indicate fewer problems. These results were intended to be used as another indicator of treatment success, as successful treatment should decrease the occurrence of mental health issues that are a common comorbidity.

Substance Use

Substance use was assessed using the Drug History Questionnaire (DHQ; Sobell & Sobell, 2007). Participants recorded details of drug use for several different drugs, including alcohol and marijuana. If they used a specific substance, they reported their age at first use, total years of usage, most typical route of administration, the last year they used it, and the frequency of drug use in the past three months. For the last item, participants chose from a 7-point Likert-type scale with options ranging from “none” to “more than 1x /day.” Higher scores indicate higher frequency of substance use in the last 90 days. Participants completed this questionnaire at admission and at every follow-up post-treatment. Responses to the DHQ demonstrate the efficacy of the treatment program in reducing substance use.

Procedure

The current study used data that was previously collected from adolescents and their parents who had agreed to participate in research at PRI. During the admission phase,

participants completed consent forms explaining the purpose of the research and assuring them that all information would be kept confidential. Adolescents and their parents completed the above questionnaires at various times before, during, and after treatment. For this study, we used data collected before treatment began (either during admission or assessment) and at the last stage of treatment or at the post-treatment follow-up (at stage 5 or 3-months post).

Results

Data Screening

Data screening and analyses were conducted using IBM SPSS Statistics Version 27. The original sample comprised 464 adolescents and their parents. However, when accounting for cases that had youth self-report and parent report for FAD and IBQ before and after treatment, the sample size dropped to 34. Of these 34 participants, only six had the required IBQ data. The IBQ was removed from consideration as this sample would not have been sufficient to draw significant conclusions. Two participants had IBQ data but not FAD data, and so they were removed, bringing the final number of adolescent-parent dyads to 32.

Prior to conducting statistical analyses, the data was screened for normality, skewness, and kurtosis, and all variables met the criteria. The data was also screened for outliers. None of the participants reported scores that would be considered outliers, and thus none of the individuals were excluded from analyses.

Sample Characteristics

Of the 32 participants, 16 (50%) were male and 16 (50%) were female. The mean age at admission was 17.43 years ($SD = 1.51$, $n = 32$, range = 14.51:20.27). The average duration of their stay at PRI was 540 days ($SD = 101.16$, $n = 32$, range = 388:725). The participants' gender, age and length of stay are shown below in Table 1.

Table 1

Participant Gender, Age and Length of Stay

	N	Mean	SD	Min	Max
Gender					
Male	16				
Female	16				
Admission Age	32	17.43	1.51	14.51	20.27
LOS	32	540.41	101.16	388	725

While more specific demographic information was not available, general information about the patient population was accessed through Pine River Institute's 2018 annual report (Mills & Kelly, 2018). The report identified alcohol and marijuana as the most commonly abused substances among participants, although the youth report using a variety of substances. Of the 32 participants, 93.8% ($n = 30$) reported both alcohol and marijuana use. The average age at first use of alcohol was 12.80 ($SD = 2.26$, $n = 25$, range = 5:16), while the average age at first use of marijuana was 13.26 ($SD = 1.66$, $n = 23$, range = 10:16) and the average age at first use of any substance was 12.36 ($SD = 2.53$, $n = 25$, range = 5:16). The youth also reported their frequency of substance use before beginning treatment. Their age at first substance use and frequency of substance use are detailed in Tables 2 and 3 respectively.

Table 2*Age at First Use of Various Substances*

Substance	N	Mean	SD	Min	Max
Alcohol	25	12.8	2.26	5	16
Marijuana	23	13.26	1.66	10	16
All substances	25	12.36	2.53	5	16

Table 3*Frequency of Substance Use*

Substance	N	Frequency	Percent	
Alcohol	30	None	7	21.9
		Less than 1x/month	5	15.6
		1x/month	7	21.9

		1x/week	3	9.4
		2-3x/week	6	18.8
		4-6x/week	2	6.3
		1x/day	0	0
		More than 1x/day	0	0
Marijuana	30	None	7	21.9
		Less than 1x/month	2	6.2
		1x/month	1	3.1
		1x/week	4	12.5
		2-3x/week	0	0
		4-6x/week	1	3.1
		1x/day	5	15.6
		More than 1x/day	10	31.3
All Substances	30	None	5	15.6
		Less than 1x/month	2	6.3
		1x/month	1	3.1
		1x/week	1	3.1
		2-3x/week	5	15.6
		4-6x/week	1	3.1
		1x/day	5	15.6
		More than 1x/day	10	31.3

The majority of youth at PRI meet clinical criteria for a variety of mental health issues, the most common among them being depression, anxiety and ADHD (Mills & Kelly, 2018).

Change in Discrepancies Over Treatment

To determine parent and youth pre-treatment family functioning (FAD) scores, averages of their scores at assessment and admission were taken. If they only had data at one time-point, that score was used. For post-FAD scores, 3-month post data was taken, but stage 5 data was used if those scores were not available. Stage 5 data would have been preferable as it was the last stage of treatment and we would have observed the immediate results of the program. However, an overwhelming majority of parents only had scores at the 3-month time point, so that was prioritised instead. Discrepancy scores for FAD were calculated for pre-

and post-treatment by subtracting youth scores from parent scores. Larger discrepancy scores would indicate greater differences between youth and parent reports, while smaller discrepancy scores would indicate higher agreement. According to De Los Reyes and Kazdin (2004), raw difference scores and standardised difference scores yield similar results when the informant groups' variances are equal. The parent and youth variances of FAD scores were similar both pre- and post-treatment, and so raw scores were used instead of z-scores to calculate discrepancies.

Once pre-treatment and post-treatment discrepancy scores were computed, a dependent t-test was conducted to test the first prediction: to see whether discrepancies had decreased over the course of treatment. The results of the t-test indicated that there was no significant difference in parent-adolescent discrepancies in reports of family functioning before and after treatment, $t(31) = 1.54, p > 0.05$. Upon further examination, it was discovered that discrepancies in parent-child reports were negligible at both time points. The average pre-treatment FAD score reported by the adolescents was 2.44 ($SD = 0.50, n = 32, 1.55:3.67$), while the average parent pre-treatment FAD score was 2.52 ($SD = 0.45, n = 32, 1.50:3.46$). Similarly, the average post-treatment FAD score reported by adolescents was 1.94 ($SD = 0.41, n = 32, 1.17:2.92$), while the average parent post-treatment FAD score was 1.81 ($SD = 0.42, n = 32, 1.00:3.17$). Their FAD scores are also shown below in Table 4. This indicates that while their family functioning scores were maladaptive, and family functioning did improve over treatment, there weren't significant discrepancies between parent and child reports at either time point.

Table 4

Parent and Adolescent Mean FAD Scores

	Pre-Treatment	Post-Treatment
Adolescent	2.44	1.94
Parent	2.52	1.81

In order to examine the second hypothesis, that greater change in discrepancy scores was associated with better treatment outcomes, the intention was to calculate discrepancy change scores by subtracting the dyad's pre-treatment FAD discrepancy score from their post-treatment FAD discrepancy score. Negative scores would have indicated that discrepancies had decreased, and agreement had improved. For example, if the post treatment discrepancy score was 2 and the pre-treatment discrepancy score was 5, the change score would be $2 - 5 = -3$. These change scores would have been examined for correlations with the outcome variables: substance use, internalising behaviours, and externalising behaviours. However, due to a lack of discrepancies at either time point, the second hypothesis was not tested.

Discussion

The present study examined change in discrepancies between parent and youth reports of family functioning over the course of treatment. We hypothesized that agreement between these reports would improve, and that greater improvements would be linked to better treatment outcomes. These hypotheses were both based on the assumption that there would be discrepancies between parent and youth reports before treatment. Instead, we found that while scores of family functioning improved over treatment, there were no discrepancies either before or after treatment.

Lack of Discrepancies

It is important to note why discrepancies were expected to exist between parent and youth reports prior to treatment. Several studies examining discrepancies between parent-child reports discussed the problem behaviours and poor outcomes linked to large discrepancies (Abar et al., 2015; De Los Reyes et al., 2010; Lebron et al., 2018). By extension, it was reasonable to assume that a sample of adolescents exhibiting a problem

behaviour such as substance abuse would yield parent-child discrepancies. We thought this to be particularly true for the measures we selected, family functioning and parental boundaries, as they are so strongly linked to adolescent addiction. Although this assumption was not supported, we were able to identify a number of plausible explanations as to why it didn't yield the expected results.

As previously mentioned, the association between adolescent addiction and poor family functioning has been well-established (Hosseini et al, 2012; Stewart & Brown, 1993). The two have a reciprocal relationship: poor family functioning serves as a risk factor for substance abuse, while substance abuse worsens family functioning. Given that the participants' substance abuse was severe enough to require treatment, it had likely negatively impacted family functioning to an extent that was evident to all family members. Indeed, the mean responses to the FAD reported by both parents and youth were above the clinical cut off and indicated maladaptive family functioning.

It is also important to examine the FAD itself. The 12 items of the General Functioning subscale, including "There are bad feelings in this family" and "We don't get along well together" are quite specific and don't leave much room for personal interpretation. An examination of parent and youth agreement on child symptomatology revealed that the highest agreement was found on items that were concrete, observable, and unambiguous (Herjanic & Reich, 1997). If ambiguity yields discrepancies, it would explain why the FAD did not.

There is also a large difference between this study and other general research into discrepancies. De Los Reyes (2011) pointed to long-standing research on the different ways in which people perceive the same sets of behaviours as one of the explanations for why discrepancies arise. Unlike most other measures used in discrepancy research, the FAD does not measure a single person's behaviour, but the relationship between several people.

Examinations of parental monitoring might yield differences in the way that parents and adolescents perceive the parent's behaviour, and examinations of symptomatology might reflect differences in their perception of the child's behaviour.

The FAD, on the other hand, assesses general family functioning without attributing those behaviours to any one person. Since the items don't seek to attribute issues with family functioning to one specific person, the results are likely less clouded by response bias. If there had been sufficient responses to the IBQ, which is focused on the parent's behaviours, we might have been able to replicate several previous findings of discrepancies in parent-child reports of parental boundaries.

Furthermore, we found an important distinction between this study and others that examined discrepancies in family functioning. Studies usually either employ other measures such as parental monitoring as reflections of overall family functioning (Han et al., 2012), or they use family functioning as a broad umbrella term to describe varied scales that measured different aspects of family functioning (Lebron et al., 2018). To the best of our knowledge, the use of scales such as the FAD that are intended to measure family functioning as a whole, not different aspects of it, is not common in discrepancy research.

An exploration of discrepancy research using the FAD and other similar measures revealed interesting, albeit limited, findings. Noller et al. (1992) compared parent and adolescent reports of family functioning in clinical and non-clinical families and found discrepancies only in the non-clinical families. This led the authors to suggest that some level of discrepancies between parent-child reports might be normative during adolescence. Georgiades et al. (2008) examined discrepancies in family functioning as measured by the FAD. In addition to finding that individual characteristics such as age, sex, education, wellbeing, and child status accounted for some of the differences between parent-child reports, they also found that children's reports of family functioning were much lower than

ratings provided by other family members. This is consistent with their expectations, and Noller's findings, that some level of discrepancy in reports of family functioning is to be expected in non-clinical families during adolescence.

Additionally, the existence of discrepancies in reports of family functioning as measured by the FAD may be linked to the relationship between family functioning and the disorder experienced by the sample. A comparison of family functioning in the families of depressed patients and non-clinical families found significant agreement in all families, but higher correlations between reports (and worse family functioning) in families with a depressed patient (Wang et al., 2013). Depression, like substance abuse, is associated with poor family functioning. Therefore, it's likely that as with our sample, the participants in Wang's research exhibited family functioning was so poor as to be obvious to all family members.

Alternatively, an examination of parent-child discrepancies using a sample of adolescents who exhibited suicidal ideation showed that the adolescents reported significantly worse family functioning scores than their parents (Lipschitz et al., 2012). Suicidal ideation is associated with significantly worse perceptions of family functioning than those held by other family members, and thus these discrepancies were consistent with previous findings. In both cases, the presence or absence of discrepancies in family functioning reports was consistent with pre-established relationships between family functioning and the disorders in the samples being studied.

The previous research on discrepancies in the FAD suggests that some level of discrepancies are normative during adolescence. It also suggests that the nature of the relationship between family functioning, or perceived family functioning, and certain disorders could help determine whether discrepancies in family functioning will be found in those samples. As previously mentioned, adolescent addiction is linked with poor family

functioning and therefore might explain why we didn't find discrepancies in reports of the same.

Implications

Had these results showed the discrepancies we expected to find, the results might have had practical and clinical implications for PRI. However, these findings do show that PRI's treatment is effective in improving family functioning. Parents and adolescents alike reported maladaptive family functioning scores when adolescents were admitted. These scores had decreased greatly by the end of treatment. As mentioned previously, family functioning is an important factor in adolescent substance use. According to Stewart and Brown (1993), families can take time to adapt to teenagers' abstinence following successful treatment for substance abuse: the adolescents develop new roles in their families and, and families must find new ways to deal with issues. The marked improvement in family functioning scores in spite of the accommodations the families must make speaks to the efficacy of PRI's parallel process approach. This, coupled with the fact that there were no discrepancies, would suggest that PRI's treatment process is successful in its current form.

Limitations and Directions for Future Research

Working with archived data presented several challenges, and as such, this study has a number of limitations. The sample was drawn from an adolescent addiction treatment centre, meaning that it has limited generalisability to adolescents in general. In addition, the small sample size limits the generalisability even to other adolescents with substance use issues. There is also the issue of missing data. Several questionnaires are administered to participants and their parents during every stage of treatment and at every follow up time-point, leading to the issue of fatigue. Participants are less likely to continue filling out questionnaires post-treatment. We were not able to test the second prediction due to the lack of discrepancies, but if we had, there would have been a very small sample because of the limited DHQ post data.

The lack of responses led to several program participants being excluded from the study, and a greatly diminished sample size, as well as the IBQ's exclusion. Missing data at different time-points necessitated the creation of pre and post variables, combining assessment and admission data, and stage-5 and 3-month post data respectively.

In addition to addressing these issues, future research could examine discrepancies between parent-child reports on measures of overall family functioning, such as the FAD, in samples without issues such as substance abuse or depression. This could help establish whether some level of discrepancies between parents and their children is normative during adolescence. Additionally, comparisons of clinical and non-clinical families would reveal whether pre-established relationships between family functioning and behaviours such as substance abuse could indicate whether discrepancies will be found.

Conclusion

Overall, our findings show that Pine River Institute's treatment program is effective at improving family functioning as reported by the adolescents and their parents. While the discrepancies we expected to find in this sample did not exist in the measure of family functioning, this appears to be consistent with previous research on discrepancies in family functioning in some clinical samples. An examination of parental boundaries is likely to have led to different results. Previously, we had regarded discrepancies as a negative indicator and concordance as a positive one. However, it appears that this might be an oversimplification. If some level of parent-adolescent discrepancy in reports of family functioning is indeed normative, agreement on measures of family functioning in samples with a problem behaviour such as addiction or depression could be bad. Indeed, even though the parents and youth had extremely similar family functioning scores, those scores indicated maladaptive family functioning. Therefore, it appears that whether or not discrepancies are indicative of poor outcomes might depend on the measure being used and the sample being studied.

References

- Abar, C. C., Jackson, K. M., Colby, S. M., & Barnett, N. P. (2015). Parent-child discrepancies in reports of parental monitoring and their relationship to adolescent alcohol-related behaviours. *Journal of Youth and Adolescence*, *44*(9), 1688-1701. <https://doi.org/10.1007/s10964-014-0143-6>.
- Achenbach, T. M. (2005). Advancing assessment of children and adolescents: Commentary on evidence-based assessment of child and adolescent disorders. *Journal of Clinical Child and Adolescent Psychology*, *34*(3), 541-547. doi: 10.1207/s15374424jccp3403_9
- Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA school-age forms & profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth and Families.
- Allen, J. P., Chango, J., Szwedo, D., Schad, M., & Maston, E. (2012). Predictors of susceptibility to peer influence regarding substance use in adolescence. *Child Development*, *83*(1), 337-350. doi: 10.1111/j.1467-8624.2011.016682.x.
- Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., Sandhu, R., & Sharma, S. (2013). Maturation of the adolescent brain. *Neuropsychiatric Disease and Treatment*, *9*, 449-461. doi: 10.2147/NDT.S39776.
- Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *Journal of Early Adolescence*, *11*(1), 56-95. <https://doi.org/10.1177/02724316911111004>.
- Barnes, G. M., Reifman, A. S., Farrell, M. P., & Dintcheff, B. A. (2000). The effects of parenting on the development of adolescent alcohol misuse: A six-wave latent growth model. *Journal of Marriage and the Family*, *62*(1), 175-186. <https://doi.org/10.1111/j.1741-3737.2000.00175.x>.

- Becker-Haimes, E. M., Jensen-Doss, A., Birmaher, B., Kendall, P. C., & Ginsburg, G. S. (2018). Parent-youth informant disagreement: Implications for youth anxiety treatment. *Clinical Child Psychology and Psychiatry, 23*(1), 42-56. <https://doi.org/10.1177/1359104516689586>.
- Brown, S. A., McGue, M., Maggs., J., Schulenberg, J., Hingson, R., Swartzwelder, S., Martin, C., Chung, T., Tapert, S. F., Sher, K., Winters, K. C., Lowman, C., & Murphy, S. (2008). A developmental perspective on alcohol and youths 16 to 20 years of age. *Pediatrics, 121*(4), 290-310. <https://doi.org/10.1542/peds.2007-2243d>.
- Chassin, L., Curran, P. J., Hussong, A. M., & Colder, C. R. (1996). The relation of parent alcoholism to adolescent substance use: A longitudinal follow-up study. *Journal of Abnormal Psychology, 105*(1), 70-80. <https://doi.org/10.1037/0021-843X.105.1.70>.
- Chassin, L., Dmitrieva, J., Modecki, K., Steinberg, L., Cauffman, E., Piquero, A. R., Knight, G. P., & Losoya, S. H., (2010). Does adolescent alcohol and marijuana use predict suppressed growth in psychosocial maturity among male juvenile offenders? *Psychology of Addictive Behaviors, 24*(1). 48-60. doi: 10.1037/a0017692.
- Deas, D., & Brown, E. S. (2006). Adolescent substance abuse and psychiatric comorbidities. *Journal of Clinical Psychiatry, 67*(7). doi: 10.4088/jcp.0706e02.
- De Los Reyes, A. (2011). Special section: More than measurement error: Discovering meaning behind informant discrepancies in clinical assessments of children and adolescents. *Journal of Clinical Child & Adolescent Psychology, 40*(1), 1-9. doi: 10.1080/15274416.2011.533405.
- De Los Reyes, A., Alfano, C., & Beidel, D. C. (2009). The relations among measurements of informant discrepancies within a multisite trial of treatments for childhood social phobia. *Journal of Abnormal Child Psychology, 38*: 395-404. doi: 10.1007/s10802-009-9373-6.

- De Los Reyes, A., Goodman, K. L., Kliewer, W., & Reid-Quiñones, K. (2010). The longitudinal consistency of mother-child reporting discrepancies of parental monitoring and their ability to predict child delinquent behaviours two years later. *Journal of Youth and Adolescence*, *39*, 1417-1430. doi: 10.1007/s10964-009-9496-7.
- Dennis, M., Babor, T., Roebuck, M., & Donaldson, J. (2003). Changing the focus: The case for recognising and treating cannabis use disorders. *Addiction*, *9*(1), 4-15.
<https://doi.org/10.1046/j.1360-0443.97.s01.10.x>
- Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster Family Assessment Device. *Journal of Marital and Family Therapy*, *9*, 171-180.
- Farrell, A. D., & White, K. S. (1998). Peer influences and drug use among urban adolescents: Family structure and parent-adolescent relationship as protective factors. *Journal of Consulting and Clinical Psychology*, *66*(2), 248-258. <https://doi.org/10.1037/0022-006X.66.2.248>.
- Feldstein, S. W., & Miller, W. R. (2006). Substance use and risk-taking among adolescents. *Journal of Mental Health*, *15*(6), 633-643. doi: 10.1080/09638230600998896
- Georgiades, K., Boyle, M., Jenkins, J., Sanford, M., & Lipman, E. (2008). A multilevel assessment of whole family functioning using the McMaster Family Assessment Device. *Journal of Family Psychology*, *22*(3), 344-354. <https://doi.org/10.1037/0893-3200.22.3.344>
- Goolsby, J., Rich, B. A., Hinnant, B., Habayeb, S., Berghorst, L., De Los Reyes, A., & Alvord, M. K. (2018). Parent-child informant discrepancy is associated with poorer treatment outcome. *Journal of Child and Family Studies*, *27*(4), 1228-1241.
<https://doi.org/10.1007/s10826-017-0946-7>.
- Gorman-Smith, D., Tolan, P. H., Loeber, R., & Henry, D. B. (1998). Relation of family problems to patterns of delinquent involvement among urban youth. *Journal of*

Abnormal Child Psychology, 26(5), 319-333.

<https://doi.org/10.1023/A:1021995621302>.

Han, Y., Grogan-Kaylor, A., Bares, C., Ma, J., Castillo, M., & Delva, J. (2012). Relationship between discordance in parental monitoring and behavioural problems among Chilean adolescents. *Children and Youth Services Review*, 34(4), 783-789.

<https://doi.org/10.1016/j.chilyouth.2012.01.005>

Herjanic, B., & Reich, W. (1997). Development of a structured psychiatric interview for children: Agreement between child and parent on individual symptoms. *Journal of Abnormal Child Psychology*, 25(1), 21-31. <https://doi.org/10.1023/A:1025703323438>.

Hosseinbor, M., Bakhshani, N., & Shakiba, M. (2012). Family functioning of addicted and non-addicted individuals: A comparative study. *International Journal of High Risk Behaviours and Addiction*, 1(3), 109-114. doi: 105812/ijhrba.7514

Jacobus, J., Courtney, K. E., Hodgdon, E. A., & Baca R. (2019). Cannabis and the developing brain: What does the evidence say? *Birth Defects Research*, 111(17), 1302-1307. <https://doi.org/10.1002/bdr2.1572>.

Jacobus, J., & Tapert, S. F. (2014). Effects of cannabis on the adolescent brain. *Current Pharmaceutical Design*, 20(13), 2186-2193.

<https://doi.org/10.2174/13816128113199990426>.

Kim, C., Choi, H., Ko, H., & Park, C. G. (2020). Agreement between parent proxy reports and self-reports of adolescent emotional distress. *The Journal of School Nursing*, 36(2), 104-111. doi: 10.1177/1059840518792073.

Mills, L., & Kelly, E. (2018). *Pine River Institute: 2018 annual evaluation report*. Toronto, Ontario.

- Noller, P., Seth-Smith, M., Bouma, R., & Schweitzer, R. (1992). Parent and adolescent perceptions of family functioning: A comparison of clinic and non-clinic families. *Journal of Adolescence, 15*(2), 101-114. doi: 10.1016/0140-1971(92)90041-3
- Liao, Y., Huang, Z., Huh, J., Pentz, M. A., & Chou, C. P. (2013). Changes in friends' and parental influences on cigarette smoking from early through late adolescence. *Journal of Adolescent Health, 53*, 132-138.
<http://dx.doi.org/10.1016/j.jadohealth.2013.01.020>.
- Lipschitz, J. M., Yen, S., Weinstock, L. M., & Spirito, A. (2012). Adolescent and caregiver perception of family functioning: Relation to suicide ideation and attempts. *Psychiatry Research, 200*(2-3), 400-403.
<https://doi.org/10.1016/j.psychres.2012.07.051>
- Lebron, C. N., Lee, T. K., Park, S. E., St George, S. M., Messiah, S. E., & Prado, G. (2018). Effects of parent-adolescent reported discrepancy of physical activity and diet among Hispanic youth. *Journal of Family Psychology, 32*(3), 333-342. doi: 10.1037/fam0000386.
- Leung, R., Toumbourou, J., & Hemphill, S. (2011). The effect of peer influence and selection processes on adolescent alcohol use: A systematic review of longitudinal studies. *Health Psychology Review, 8*(4), 426-257.
<https://doi.org/10.1080/17437199.2011.587961>
- Lubman, D. I., Allen, N. B., Rogers, N., Cementon, E., & Bonomo, Y. (2007). The impact of co-occurring mood and anxiety disorders among substance-abusing youth. *Journal of Affective Disorders, 103*(1), 105-112. doi: 10.1016/j.jad.2007.01.011.
- Luciana, M., Bjork, J. M., Nagel, B. J., Barch, D. M., Gonzalez, R., Nixon, S. J., & Banich, M. T. (2018). Adolescent neurocognitive development and impacts of substance use: Overview of the adolescent brain cognitive development (ABCD) baseline

neurocognition battery. *Developmental Cognitive Neuroscience*, 32, 67-79.

<https://doi.org/10.1016/j.dcn.2018.02.006>.

Mayselless, O., & Scharf, M. (2000). *Inadequate boundaries questionnaire (IBQ)*. Haifa, IS:

Unpublished Manuscript.

McConaughy, E. A., Prochaska, J. O., & Velicer, W. F. (1983). Stages of change in psychotherapy: Measurement and sample profiles. *Psychotherapy: Theory, Research & Practice*, 20(3), 368-375.

Meruelo, A. D., Castro, N., Cota, C. I., & Tapert, S. F. (2017). Cannabis and alcohol use, and the developing brain. *Behavioural Brain Research*, 325, 44-50.

<https://doi.org/10.1016/j.bbr.2017.02.025>.

Mooney-Leber, S. M., & Gould, T. J. (2018). The long-term cognitive consequences of adolescent exposure to recreational drugs of abuse. *Learning & Memory*, 25, 481-491.

<https://doi.org/10.1101/lm.046672.117>

Parsai, M., Voisine, S., Marsiglia, F. F., Kulis, S., & Nieri, T. (2009). The protective and risk effects of parents and peers on substance use, attitudes and behaviors of Mexican and Mexican American female and male adolescents. *Youth & Society*, 40(3), 353-376.

<https://doi.org/10.1177/0044118X08318117>

Pearson, C., Janz, T., & Ali, J. (2012). *Mental and substance use disorders in Canada*.

(Statistics Canada Catalogue No. 82-624). <https://www150.statcan.gc.ca/n1/pub82-624-x/2013001/article/11855-eng.htm>

Piehler, T. F., Lee, S. K., Stockness, A., & Winters, K. C. (2019). The correspondence of parent-reported measures of adolescent alcohol and cannabis use with adolescent-reported measures: A systematic review. *Substance Abuse*, 41(4), 1-14. doi:

10.1080/08897077.2019.1692123.

- Pine River Institute. (n.d.). About: Our Program. Retrieved October 15, 2020 from <http://pineriverinstitute.com/our-program>
- Romer, D. (2012) Adolescent risk taking, impulsivity, and brain development: Implications for prevention. *Developmental Psychology*, 52(3), 263-376. doi: 10.1002/dev.20442.
- Sobell, L. C., & Sobell, M. B. (2007). The reliability of a drug history questionnaire (DHQ). *Addictive Behaviour*, 20, 233-241.
- Spear, L. (2018). Effects of adolescent alcohol consumption on the brain and behaviour. *Nature Reviews. Neuroscience*, 19(4), 197-214. doi: 10.1038/nrn.2018.10.
- Statistics Canada (2017). *Canadian tobacco, alcohol and drugs survey: Summary of results for 2017*. <https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey/2017-summary.html#n2>
- Steinberg, L. (2007). Risk taking in adolescence: New perspectives from brain and behavioural science. *Current Directions in Psychological Science*, 16(2), 55-59. <https://doi.org/10.1111/j.1467-8721.2007.00475.x>.
- Steinberg, L., Fletcher, A., & Darling, N. (1994). Parental monitoring and peer influences on adolescent substance use. *Pediatrics*, 93(2), 1060-1064.
- Stewart, M. A., & Brown, S. A. (1993). Family functioning following adolescent substance abuse treatment. *Journal of Substance Abuse*, 5(4), 327-339. doi: 10.1016/0899-3289(93)90002-s
- Wagner, K. D., Ritt-Olson, A., Chou, C. P., Pokhrel, P., Duan, L., Baezconde-Garbanati, L., Soto, D. W., & Unger, J. B. (2010). Associations between family structure, family functioning and substance use among Hispanic/Latino adolescents. *Psychology of Addictive Behaviors*, 24(1), 98-108. doi: 10.1037/a0018497.

Wang, J., Mansfield, A., Zhao, X., & Keitner, G. (2013). Family functioning in depressed and non-clinical control families. *International Journal of Social Psychiatry, 59*(6), 561-569. <https://doi.org/10.1177/0020764012445260>

Winters, K. C., Stinchfield, R. D., Lee, S., & Latimer, W. W. (2008). Interplay of psychosocial factors and the long-term course of adolescents with a substance use disorder. *Substance Abuse, 29*(2), 107-119. doi: 10.1080/08897070802093460.