

Mental Problems and Impulsivity Reported by Adolescents: an Epidemiological Study



Özgür ÖNER¹, Toker ERGÜDER², Banu ÇAKIR³, Uğur ERGUN⁴, Yılmaz ERŞAHİN⁵,
Nilay EROL⁶, Hilal ÖZCEBE⁷

INTRODUCTION

Adolescence is not a simple transitional period from childhood to adulthood, but a time of great maturational change during which important foundations of adult behaviors and emotions are formed. According to Ronald Dahl, the period of adolescence also signifies a health paradox—with increases in both physical and cognitive capacity, and associated increases in morbidity and mortality related to misjudgments in decision making under stressful and emotion-laden conditions (Dahl 2004). Many of the stresses that confront high-risk youth in particular, in concert with ensuing problems in reasoning are the basis of studies on the neurobiological underpinnings of adolescent behaviors and emotions.

Impulsivity is behavior in the absence of careful consideration of all alternatives and consequences, and a predisposition toward rapid unplanned reactions to internal and/or external stimuli without regard to negative consequences (Moeller et al. 2001a). Impulsivity is a primary feature of attention deficit-hyperactivity disorder (ADHD), and is also important in a range of other disorders, including conduct disorder (CD) and antisocial personality disorder. Self-injurious behaviors may also be associated with impulsivity (Gorlyn 2005; Sanislow et al. 2003; Horesh 2001). Additionally, impulsivity is a major risk factor for smoking, alcohol and substance abuse, and violence (both as perpetrator and victim) (Gullo and Dawe 2008; von Diemen et al. 2008; Tarter et al. 2007; Ögel et al. 2006; Moeller et al. 2001b; Allen et al. 1998; Masse and Tremblay 1997; Sher and Trull 1994; von

Knorr et al. 1987). Impulsive behaviors may lead to relationship problems. Partly due to its association with hyperactivity and attention problems, impulsivity is also associated with poor academic performance and school absenteeism (Shiner et al. 2003, 2000).

One important limitation of some of the previous studies is the use of small, clinically referred samples. For example, while the association between impulsivity and substance use has been studied intensively in clinical samples, less evidence is available in nonclinical samples. Moreover, large non-clinical samples can provide data necessary for investigating the association between a number of symptoms and various outcomes. In fact, 1 study reported that symptoms of hyperactivity-impulsivity (HI) predicted substance use outcomes better than a categorical diagnosis of ADHD (Elkins et al. 2007). Elkins et al. also reported that the number of conduct disorder (CD) symptoms was important—even having a single HI or CD symptom significantly increased the risk of substance use disorder (SUD) and the risk increased with the number of symptoms.

The present study, which was supported by Turkish Grand National Assembly, aimed to investigate the prevalence of violent behavior, and several risk and protective factors in a nationally representative sample of Turkish high-school students. As indicated in the main report, the prevalence of exposure in the last 3 months to physical violence was 22%, to verbal violence was 53%, and to sexual violence was 15.8%. The study also observed that the most common source of violence was friends (TBMM Research Report 2009). As impulsivity

Received: 05.07.2011 - Accepted: 07.04.2012

¹Doç. Dr., Sami Ulus Çocuk Hastanesi, Child and Adolescent Psychiatry, ²Uzm. Bloomberg Initiative WHO Turkey Office, Tobacco Control Program., ^{3,7}Prof., Hacettepe Üniv. Department of Public Health., Staff, Mental Health Dispensary., ⁴Mathematician., ⁶Statistical Expert, TÜİK Ankara, Turkey.

E-mail: ozgur.oner@yahoo.com

and ADHD have been reported to be associated with physical violence and conduct problems, questions probing impulsive behaviors in adolescents were included in the survey. The aim of the present study was to investigate the association between the number of definitive impulsivity symptoms, and involvement in physical violence, frequent smoking and alcohol use, carrying weapons, gang membership, and self-injurious behaviors in a nationally representative population of high-school students. Our hypothesis was that there would be a strong association between the number of self-reported symptoms of impulsivity and antisocial behaviors, smoking, and alcohol use in the adolescent study population.

MATERIALS and METHODS

Sampling

The sampling pool included all high schools in Turkey other than special education schools, and foreign and international schools. We used school and class registries obtained from the Turkish Ministry of Education as a framework. There were 6294 schools and 3,028,092 students in the schools that were eligible to participate in the study. The sample was selected by the Turkish Statistical Institute, which is responsible for sample selection for every epidemiological study conducted in Turkey. For sample selection the lowest expected prevalence of violence was estimated as 10%, absolute sensitivity (d) as 0.0007, α as 0.05, and the design effect as 2. These estimates resulted in a target sample of 29,162.

In order to obtain a representative sample we used 2-stage, stratified and clustered sampling. The plan was to select students from 261 schools. For the first stage (school selection) equal probability, systematic random sampling was used, and for the second stage (class selection) simple random selection was used. For each school, the target was to select 2 classes from each of the 5 grades (preparation and grades 9-12); however, after systematic random sampling, all of the selected schools did not have all 5 grades and as such we could select only 26,677 students from the selected schools. All students in the selected classes were invited to complete the study questionnaire on a voluntary basis. The statistical analysis included the completed and usable questionnaires obtained from 26,009 students (97.5% of the invited sample).

Questionnaire

The study questionnaire was developed by survey experts from the Turkish Ministry of Education and Ministry of Health, as well as public health experts from Hacettepe University, School of Medicine, Department of Public Health. In order to prevent contamination, particularly in small cities and towns, the questionnaire was administered on 5 d nationwide

and on 1 or 2 d in a given city or town. All the questionnaires were completed anonymously and participation was voluntary. The questionnaire included 188 items in 8 categories: sociodemographic, economic, and family factors; way of life and social environment; perception of violence; exposure to violence; attitudes and responses to violence; use of violence; attitudes towards measures to decrease violence; behaviors and interpersonal attitudes. Three items regarding impulsivity were included in the questionnaire: 1. I lose my temper easily; 2. I do not think about the consequences of my actions thoroughly before I act; 3. I find it difficult to wait; I am very impatient. There were also 2 questions covering attention problems and hyperactivity.

Data Analysis

Odds ratios (ORs) were calculated to compare the frequency of various outcomes among students that had 0-3 definitive symptoms of impulsivity. Logistic regression analysis was used to evaluate the relative contribution of gender, age, maternal and paternal level of education (none, literate, first-grade, second grade, high-school, college), maternal and paternal employment (unemployed, employed, retired), adolescent's perception of family economic status (poor vs. others), number of definitive symptoms of impulsivity, gang membership, history of self-injurious behaviors (SIB), and exposure to physical violence (never, occasionally, frequently). Gang membership, frequent use of physical violence towards others, daily smoking, alcohol use (at least once weekly), and carrying weapons (guns, knives, etc.) were dependent variables. P values <0.001 were considered statistically significant.

RESULTS

In all, 68.5% ($n = 17819$) of the students had 0 definitive symptoms of impulsivity, whereas 21.6% ($n = 5620$) had 1, 8.5% ($n = 2208$) had 2, and 0.8% ($n = 210$) had 3. The study included 13,908 males (53.5%) and 12,010 females (46.5%). Among the students, 6.2% engaged in frequent (daily or almost daily) physical violence towards others during the previous 3 months, 11.0% smoked daily and 6.4% used alcohol at least once weekly during the previous month, 2.4% used other substances more than once during the previous 3 months, 10.3% engaged in self-injurious behaviors, 6.9% had frequent school absenteeism, and 8.4% were pessimistic about the future.

Table 1 shows the percentage of risk outcomes in adolescents with no definitive symptoms of impulsivity and for those with 1, 2, and 3 definitive symptoms. The corresponding unadjusted ORs and 95% confidence intervals (CIs) for each symptom level are also provided in Table 1. Having only 1 self-reported definitive symptom of impulsivity increased the risk of all outcomes by a factor of 1.7-3.1. Adolescents with

DISCUSSION

3 definitive symptoms of impulsivity had a very high risk of using physical violence [OR: 11.7 (CI: 8.7-15.8)], carrying a gun [OR: 8.1 (CI: 6.1-10.8)], gang membership [OR: 9.5 (CI: 7.0-13.0)], smoking [OR: 5.0 (CI: 3.7-6.7)], alcohol use [OR: 8.9 (CI: 6.5-12.0)], substance use [OR: 19.1 (CI: 13.9-27.4)], school absenteeism [OR: 3.8 (CI: 2.6-5.4)], interpersonal problems (CI: 8.7-10.9), and exposure to physical violence [OR: 7.2 (CI: 4.8-10.9)], as compared to the adolescents without no impulsivity symptoms. There was a dose-response effect between increased risk and the number of self-reported definitive symptoms of impulsivity; the risk increased with the number of symptoms (Table 1).

Logistic regression analysis showed that when the effects of gender, age, parental level of education level and employment status, family economic status, school absenteeism, gang membership, history of SIB, and exposure to physical violence were controlled for, the number of definitive symptoms of impulsivity were strongly associated with frequent physical violence against others, daily smoking, alcohol use more than once weekly, gang membership, and carrying weapons (Tables 2 and 3). The findings showed that for several variables the association increased in strength as the number of self-reported definitive symptoms of impulsivity increased.

Variables other than the number of definitive symptoms of impulsivity were also associated with several outcomes; Tables 2 and 3 summarize these findings. Use of physical violence, gang membership, and poor academic performance decrease with age, whereas smoking, alcohol and substance use, SIB, and carrying guns increased with age. SIB, relationship problems with mothers and fathers, and "feeling bad" were more common among the female students. Among the male students, use of physical violence, smoking, alcohol and substance use, gang membership, carrying weapons, exposure to physical violence, poor relationships with teachers, and poor academic performance were more common. School absenteeism was associated with smoking, alcohol use, gang membership, SIB, carrying weapons, poor relationships with teachers, and poor academic performance.

Use of physical violence, smoking, alcohol and substance use, gang membership, and SIB were associated. In particular, there was a very strong association between gang membership, carrying weapons, and substance use. Exposure to physical violence was associated with gang membership, substance use, SIB, low economic status, and use of physical violence. There was a strong relationship between maternal level of education and alcohol use among the students. On the other hand, poor academic performance was more common among the students whose parents had a low level of education. Academic performance was better among the students whose mothers were employed.

In the present study the risk of conduct problems, frequent smoking, and alcohol use increased as the self-reported number of definitive symptoms of impulsivity increased. Logistic regression analysis showed that when other important sociodemographic factors, such as parental level of education, parental employment status and economic status, and age, and exposure to physical violence were controlled for, the significance of definitive symptoms of impulsivity remained. For most of the multivariate comparisons the relative risk of the outcome was associated with the number of definitive symptoms of impulsivity, as with univariate analysis. The large number of participants facilitated comparison of the subgroup of students with 3 self-reported definitive symptoms of impulsivity symptoms to the other students. The non-clinical nature of the sample was also an advantage.

The present results are consistent with those previously reported. Ogel et al. (2006) reported that among 3483 high-school students physical violence, carrying weapons, and gang membership were more common in males and that perpetrating physical violence decreased with age. The prevalence of carrying weapons and gang membership were similar in both studies. The present findings are also consistent with those of previous studies that observed an association between impulsivity, and SIB (Gorlyn 2005; Sanislow et al. 2003; Horesh 2001.), smoking, alcohol and substance abuse, violence, and exposure to violence (Gullo and Dawe 2008; von Diemen et al. 2008; Tarter et al. 2007; Biederman et al. 2006; Moeller et al. 2001b; Allen et al. 1998; Masse and Tremblay 1997; Sher and Trull 1994; von Knorring et al. 1987). Impulsivity was strongly associated with frequent smoking and alcohol use in the present study, which is consistent with previous studies that reported uncomplicated ADHD was associated with a higher risk of SUD (Fontaine et al. 2008; Elkins et al. 2007; Gau et al. 2007; Biederman et al. 2006; Burke et al. 2001; Milberger et al. 1997), although the available data are not conclusive. As in the present study, several studies reported that CD and HI are independent risk factors for several outcomes; therefore, comorbidity of the 2 conditions may lead to more frequent and severe complications (Fontaine et al. 2007; Mannuzza et al. 2004).

Impulsivity seems to be a factor associated with the health paradox of adolescence. It is clear that frequent smoking and alcohol use, carrying weapons, and engaging in physical violence regularly, exposure to physical violence, and self-injurious behaviors are direct threats to the physical and mental health of adolescents, as well as others. The present results add to previous findings by illustrating that the association between impulsivity and various outcomes increased with the number of self-reported symptoms of impulsivity, which is consistent with the findings of Elkins et al., who reported

that even having 1 symptom of HI or CD significantly elevated the risk of SUD and that the risk increased with the number of symptoms (Elkins et al. 2007). The present study's population was larger than that used by Elkins et al. and we also studied the association between the number of symptoms of impulsivity, and behaviors and problems other than SUD; therefore, the present results supported and elaborated the conclusions drawn by Elkins et al. (2007).

Impulsivity did not only lead to conduct problems, but also to relationship problems, even when the presence of other conditions, including conduct problems, smoking, alcohol use, poor academic performance, were controlled for. It has long been known that there are reciprocal interactions between parenting and disruptive behaviors in children (Patterson and Reid 1970). Relationship problems—resulting in less parental involvement and mentoring, or harsh punishment—may also increase the behavioral and emotional problems and delinquency (Laird et al. 2003; Stormshak et al. 2000). Regression analysis in the present study showed that along with symptoms of impulsivity, low economic status, exposure to physical violence, alcohol and substance use, gang membership, SIB, and pessimism were strongly associated with relationship problems between the students and their parents. These findings are generally consistent with previous studies (Huh et al. 2006). The association between SIB and pessimism, and relationship problems may be consistent with the studies that reported an association between parental practice deficits and internalizing problems (Hipwell et al. 2008; Blatt and Homann 1992). Economic problems may also increase existing relationship problems by adding a significant burden to parents (Baer 1999). It is important to remember that a child's behavior may be more predictive of parental behavior than vice versa (Burke et al. 2008; Huh et al. 2006).

We observed that while male gender was associated with antisocial behaviors, female gender was a risk factor for relationship problems, which may agree with previously reported findings suggesting that girls are more vulnerable to relationship problems because they are more relationship oriented than males (Gabriel and Gardner 1999). SIB and poor self-perceived mental health were also more common in the present study's female students, which may be consistent with reports linking sensitivity to relationship problems and a higher prevalence of depression in adolescent females (Rudolph 2002).

Poor academic performance may lead to unemployment or low-income employment, in addition to delinquency, and social and marital problems in adulthood (McShane et al. 2004). In the present study poor academic performance was associated with younger age, male gender, school absenteeism, low-level parental education, low self-perceived economic status, and frequent exposure to physical violence, as well as impulsivity. School absenteeism was reported to be

associated with SIB, violence, impulsivity, high-risk behaviors, and alcohol, tobacco and substance use, leading to poor academic performance, economic disadvantage, and marital and relationship problems (Kearney 2008). Physical and psychiatric illness, as well as contextual risk factors, such as poverty, school climate and violence, parental involvement, are risk factor for absenteeism. The present findings are consistent with those indicating that frequent school absenteeism is associated with poor academic performance, poor quality relationships with teachers, poor self-perceived mental health, frequent smoking and alcohol use, SIB, carrying weapons, and gang membership.

The present study observed associations between various risk factors other than the number of definitive symptoms of impulsivity and outcomes. Consistent with previous research, we observed that exposure to physical violence was associated most strongly with use of physical violence, and to a lesser extent smoking, alcohol and substance use, SIB, school absenteeism, low economic status (Paradis et al. 2009; Wilson et al. 2009; The US Centers for Disease Control and Prevention, National Center for Injury Prevention and Control 2006). Boykins et al. suggested that adolescents exposed to community violence are more likely to belong to a deviant peer group (2001); the present findings are in agreement, as gang membership was strongly correlated with exposure to violence.

Conduct problems and behaviors associated with delinquency, such as frequent use of physical violence, carrying guns, and gang membership, are closely associated not only with each other, but also with smoking, alcohol and substance use, and academic and relationship problems (Elkins et al. 2007; Biederman et al. 2006; Mannuzza et al. 2004; Brook et al. 2003). Deviant peer relations are very important, as being a member of a group of delinquent adolescents significantly increases delinquency and conduct problems (Thornberry and Krohn 1997; Warr 1996; Dishion et al. 1995). Consistent with the present findings, peer delinquency was strongly correlated with individual antisocial behaviors (Warr 2002; Pratt and Cullen 2000; Elliot and Menard 1996). Frequent smoking and alcohol use in the present study were strongly associated with each other, as well as with substance abuse, as previously reported. Older age and male gender were also strongly associated with frequent smoking, and alcohol and substance use.

In the present study pessimism and SIB were independent risk factors for several behavioral problems, as well as smoking, and alcohol and substance use, which is consistent with previous research that reported children with comorbid conduct and internalization problems were at increased risk for criminal, psychiatric, and functional problems in early adulthood (Sourander et al. 2007; Plutchik and van Praag 1997). It was also reported that both suicidal behavior and violence are associated with internalizing problems, impulsivity, and

substance abuse (Vermeiren et al. 2003). These authors reported that the violent-suicidal group was high in depression, aggression, all forms of risk taking behavior and impulsivity. Regression analysis in the present study supported this finding, as SIB and pessimism, as well as violent behavior, carrying weapons, and alcohol and substance use, were correlated.

The present study has some limitations, the first of which is inherent to survey studies in general. We collected data only from the adolescents and did not collect data from other sources, such as parents and teachers; however, most of the study sample was aged 14-17 years and previous studies have shown that adolescents are capable of self-reporting their symptoms and behaviors accurately. Additionally, it is difficult to obtain data for some behaviors, such as frequent use of alcohol and substances, and conduct problems, from others because they may not be aware of such behaviors. Another limitation is the study's cross-sectional design, which precluded investigating the causality of the risk factors; therefore, the present findings only show associations—not causality. For example, with this design it is impossible to conclude if relationship problems were a cause of or result of symptoms of impulsivity. Another limitation of the present study is that the sample included only adolescents that were attending school; adolescents with the most severe problems and those from the most disadvantaged backgrounds may not attend high school, which is not mandatory in Turkey. Additionally, this might have created a more homogenous sample. For instance, it can be assumed that the adolescents with severe intellectual or learning disabilities were not included in this mainstream high-school sample. Another limitation of the study is a standard socioeconomic status scale was not used. We evaluated socioeconomic status based on parental level of education, employment status, and student self-perceived economic status. We evaluated impulsive behaviors based on only 3 questions. Although even with 3 symptoms the additive effect of impulsive behaviors was clear, a different behavioral picture might have emerged if more questions were used; however, even with 3 questions, the number of participants with 3 definitive symptoms was quite low, suggesting that adding more questions might not have resulted in better classification, although with more questions a more dimensional approach might be possible. We investigated such variables as smoking, and alcohol and substance use only crudely; we are aware that valid clinical diagnosis of substance abuse or dependence requires a more detailed investigation.

The present findings have several practical implications. First, the results indicate that even 1 definitive symptom of impulsivity must be addressed, as it is associated with serious behavioral and relationship problems. Secondly, there were some significant differences between the students with ≥ 1 definitive symptoms of impulsivity, which suggests that there was a dose-response interaction between the number of

definitive symptoms of impulsivity, and behavioral and relationship problems; however, this was not true for poor academic performance or school absenteeism, which might be more closely associated with attention or learning problems. Thirdly, symptoms of impulsivity were clearly and strongly associated with self-injurious behavior and poor mental health. SIB and pessimism were independent risk factors for several risky behaviors; therefore, the present findings imply that adolescents with both impulsivity and SIB are at great risk. We think that intervention and prevention programs for students with symptoms of impulsivity must also address self-injurious behavior, as suicide and para-suicide are important causes of morbidity and mortality among adolescents.

Acknowledgement: This study was conducted by the Turkish Grand National Assembly Investigation Committee 10/337,343,356,357). We are very grateful to Halide İncekara and Mustafa Atas for their leadership and to Prof Dr Kerim Munir for his contribution.

REFERENCES

- Allen TJ, Moeller FG, Rhoades HM et al. (1998) Impulsivity and history of drug dependence. *Drug Alcohol Depend*, 50:137–45.
- Baer J (1999) Family relationships, parenting behavior and adolescent deviance in three ethnic groups. *Fam Soc*, 80:279–85.
- Biederman J, Monuteaux MC, Mick E et al. (2006) Young adult outcome of attention deficit hyperactivity disorder: a controlled 10-year follow-up study. *Psychol Med*, 36:167–79.
- Blatt SJ, Homann E (1992) Parent child interaction in the etiology of dependent and self-critical depression. *Clin Psychol Rev*, 12: 47–91.
- Boykins CA, Graham S (2001) At both ends of the gun: Testing the relationship between community violence exposure and youth violent behavior. *J Abnorm Child Psychol*, 29:383–402.
- Brook DW, Brook JS, Rosen Z et al. (2003) Early risk factors for violence in Colombian adolescents. *Am J Psychiatry*, 160:1470–8.
- Burke JD, Loeber R, Lahey BB (2001) Which aspects of ADHD are associated with tobacco use in early adolescence. *J Child Psychol Psychiatry*, 42:493–502.
- Burke JD, Pardini DA, Loeber R (2008) Reciprocal relationships between parenting behavior and disruptive psychopathology from childhood through adolescence. *J Abnorm Child Psychol*, 36:679–92.
- Center for Disease Control and Prevention National Center for Injury Prevention and Control. Youth Violence Fact Sheet. <http://www.cdc.gov/ncipc/factsheets/yvfacts.htm>, 2006.
- Dahl RE (2004) Adolescent brain development: A period of vulnerabilities and opportunities. *Ann NY Acad Sci*, 1021:1–22.
- Dishion TJ, Andrews DW, Crosby L (1995) Antisocial boys and their friends in early adolescence: Relationship characteristics, quality, and interactional process. *Child Dev*, 66:139–51.
- Elkins IJ, McGue M, Iacono WG (2007) Prospective effects of attention-deficit/hyperactivity disorder, conduct disorder, and sex on adolescent substance use and abuse. *Arch Gen Psychiatry*, 64:1145–52.
- Elliot DS, Menard S (1996) Delinquent friends and delinquent behavior: temporal and developmental patterns. *Delinquency and Crime: Current Theories*, JD Hawkins (Ed), New York. Cambridge University Press, s.28–67.
- Fontaine N, Carbonneau R, Barker ED et al. (2008) Girls' hyperactivity and physical aggression during childhood and adjustment problems in early adulthood. *Arch Gen Psychiatry*, 65:320–8.

- Gabriel S, Gardner WL (1999) Are there "his" and "hers" types of interdependence? The implications of gender differences in collective versus relational interdependence for affect, behavior, and cognition. *J Pers Soc Psychol*, 77: 642–55.
- Gau SS, Chong MY, Yang P et al. (2007) Psychiatric and psychosocial predictors of substance use disorders among adolescents: longitudinal study. *Br J Psychiatry*, 190:42–8.
- Gorlyn M (2005) Impulsivity in the prediction of suicidal behavior in adolescent populations. *Int J Adolesc Med Health*, 17:205–9.
- Gullo JM, Dawe S (2008) Impulsivity and adolescent substance use: Rashly dismissed as all bad? *Neurosci Biobehav Rev*, 32:1507–18.
- Hipwell A, Keenan K, Kasza K et al. (2008) Reciprocal influences between girls' conduct problems and depression, and parental punishment and warmth: a six year prospective analysis. *J Abnorm Child Psychol*, 36:663–77.
- Horesh N (2001) Self-report vs. computerized measures of impulsivity as a correlate of suicidal behavior. *Crisis*, 22:27–31.
- Huh D, Tristan J, Wade E et al. (2006) Does problem behavior elicit poor parenting? A prospective study of adolescent girls. *J Adolesc Res*, 21:185–204.
- Kearney CA (2008) School absenteeism and school refusal behavior in youth: A contemporary review. *Clin Psychol Rev*, 28:451–71.
- Laird RD, Pettit GS, Bates JE et al. (2003) Parents' monitoring-relevant knowledge and adolescents' delinquent behavior: Evidence of correlated developmental changes and reciprocal influences. *Child Dev*, 74:752–68.
- Mannuzza S, Klein RG, Abikoff H et al. (2004) Significance of childhood conduct problems to later development of conduct disorder among children with ADHD: A prospective follow-up study. *J Abnorm Child Psychol*, 32: 565–73.
- Masse LC, Tremblay RE (1997) Behavior of boys in kindergarten and the onset of substance use during adolescence. *Arch Gen Psychiatry*, 54:62–8.
- McShane G, Walter G, Rey JM (2004) Functional outcome of adolescents with 'school refusal'. *Clin Child Psychol Psychiatry*, 9:53–60.
- Milberger S, Biederman J, Faraone S et al. (1997) ADHD is associated with early initiation of cigarette smoking in children and adolescent. Moeller FG, Barratt ES, Dougherty DM et al. (2001a) Psychiatric aspects of impulsivity. *Am J Psychiatry*, 158:1783–93.
- Moeller FG, Dougherty DM, Barratt ES et al. (2001b) The impact of impulsivity on cocaine use and retention in treatment. *J Subst Abuse Treat* 21:193–8.
- Ögel K, Tarı I, Eke CY (2006) Okullarda Suç ve Şiddeti Önleme. Yeniden Yayınları, İstanbul.
- Paradis AD, Reinherz HZ, Giaconia RM et al. (2009) Long-term impact of family arguments and physical violence on adult functioning at age 30 years: Findings from the Simmons Longitudinal Study. *J Am Acad Child Adolesc Psychiatry*. 48:290–8.
- Patterson GR, Reid JB (1970) Reciprocity and coercion: Two facets of social systems. *Behavior Modification in Clinical Psychology*, C Neuringer, J Michael (Ed), New York. Appleton-Century-Crofts.
- Plutchik R, van Praag HM (1997), Suicide, impulsivity, and antisocial behavior. *Handbook of Antisocial Behavior*, DM Stoff, J Breiling, JD Maser (Ed), New York. Wiley, s. 101–8.
- Pratt TC, Cullen FT (2000) The empirical status of Gottfredson and Hirschi's general theory of crime: A meta-analysis. *Criminol*, 38:931.
- Rudolph KD (2002) Gender differences in emotional responses to interpersonal stress during adolescence. *J Adolesc Health*.30:3–13.
- Sanislow CA, Grilo CM, Fehon DC et al. (2003) Correlates of suicide risk in juvenile detainees and adolescent inpatients. *J Am Acad Child Adolesc Psychiatry*, 42:234–40.
- Sher KJ, Trull TJ (1994) Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. *J Abnorm Psychology*, 103:92–102.
- Shiner RL (2000) Linking childhood personality with adaptation: Evidence for continuity and change across time into late adolescence. *J Pers Soc Psychology*, 78:310–25.
- Shiner RL, Masten AS, Roberts JM (2003) Childhood personality foreshadows adult personality and life outcomes two decades later. *J Pers*, 71:1145–70.
- Sourander A, Jensen P, Davies M et al. (2007) Who is at greatest risk of adverse long-term outcomes? The Finnish From a Boy to a Man study. *J Am Acad Child Adolesc Psychiatry*, 46:1148–61.
- Stormshak EA, Bierman KL, McMahon RJ et al. (2000) Parenting practices and child disruptive behavior problems in early elementary school. *J Clin Child Psychol*, 29: 17–29.
- Tarter RE, Kirisci L, Feske U et al. (2007) Modeling the pathways linking childhood hyperactivity and substance use disorder in young adulthood. *Psychol Addict Behav*, 21:266–71.
- Thornberry TP, Krohn MD (1997) Peers, drug use, and delinquency. *Handbook of Antisocial Behavior*, DM Stoff, J Breiling, JD Maser (Ed), New York. Wiley, s.218–33.
- Türkiye Büyük Millet Meclisi (2009) Türkiye'de Ortaöğretime Devam Eden Öğrencilerde ve Ceza ve İnfaz Kurumlarında Bulunan Tutuklu ve Hükümlü Çocuklarda Şiddet ve Bunu Etkileyen Etkenlerin Saptanması. Araştırma Raporu. Nisan 2007. TBMM Basımevi, Ankara.
- Vermeiren R, Schwab-Stone M, Ruchkin VV et al. (2003) Suicidal behavior and violence in male adolescents: A school-based study. *J Am Acad Child Adolesc Psychiatry*, 42:41–8.
- von Diemen L, Bassani DG, Fuchs SC et al. (2008) Impulsivity, age of first alcohol use and substance use disorders among male adolescents: A population based case-control study. *Addict*, 103:1198–205.
- von Knorring L, Orelund L, von Knorring AL (1987) Personality traits and platelet MAO activity in alcohol and drug abusing teenage boys. *Acta Psychiatrica Scandinavica*, 75:307–14.
- Warr M (1996) Organization and instigation in delinquent groups. *Criminology*, 34:11–37.
- Warr M. (2002) *Companions in crime. The social aspects of criminal conduct.* New York, Cambridge University Press.
- Wilson HW, Stover CS, Berkowitz SJ (2009) Research Review: The relationship between childhood violence exposure and juvenile antisocial behavior: A meta-analytic review. *J Child Psychol Psychiatry*, 50:769–79.