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Peer-promoted prosocial behaviour in adolescents with Mild-to-Borderline Intellectual Disability.

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Abstract

During adolescence the human brain develops in areas of social skills and behaviour. Adolescents with mild to borderline intellectual disabilities develop differently than typically developing adolescents, when it comes to adaptive behaviour and social skills. This makes them more vulnerable to peer influence and makes them struggle to recognize and interpret non-verbal behaviour such as social gestures and emotions.

This current research tested the hypothesis whether adolescents with MBID are more vulnerable to peer promoted pro-social behaviour than typically developing adolescents, using a computerized Publics Good Game (PGG). During four different conditions with feedback, observing peers and without feedback, participants had to choose whether or not to donate coins to the group. This study included 25 female and 16 male adolescents with MBID, and a sample of 35 typically developing boys. A repeated measures ANOVA found a significant effect for both conditions and interaction between subjects and conditions. Also, showed that observing peers and receiving feedback from peers had more impact on adolescents with MBID than on typically developing adolescents.

Adolescents with MBID are more vulnerable to peer promoted prosocial behaviour. Therefore, intervention strategies for these adolescents, targeting limited and dysfunctional social behaviour, would benefit from including peers.

1. Introduction

From birth, human beings learn to maintain relationships and communicate or interact socially. In order to be successful, humans use social behaviour, gestures and interaction. Good social skills help people to increase their self-confidence. Some people are blessed with strong social skills, while others struggle to fit in or to find the right social tool to build relationships with. The adolescent period in general makes adolescents more vulnerable to the influence of their peers (MacLean, Geier, Henry & Wilson, 2013). The influence of peers will be referred to as 'peer promoted (anti/pro) social behaviour'. A research study found that behaviour of typically developing adolescents would be positively influenced after receiving prosocial feedback, and would be negatively influenced after anti-social feedback (van Hoorn, van Dijk, Meuwese, Rieffe & Crone, 2014). It can be expected that adolescents with less social capacities are more vulnerable to peer promoted (anti/pro) social behaviour. These adolescents tend to process information differently and focus more on the negative and emotional contents of information (Embregts & van Nieuwenhuijzen, 2009).

Adolescents with mild to borderline intellectual disability (MBID) are one of the more struggling groups when it comes to social interaction. They have lower intellectual ability (IQ's between 50 and 85), and prominent limitations in adaptive behaviour, in two or more areas of academic-, health, safety, social- and communicational functioning, being able to use community resources and being able to take care of oneself (American Psychiatric Association, 2000; Schalock, 2010). An IQ is a measure of the amount of intellectual capacity a person has and intelligence contains all capacity in one's brains to be able to reason, learn, adapt and solve problems (Schalock et al., 2010). Table 1 shows the four categories of Intellectual Disability, ranged from mild to profound severity (Yeates, Ris, Taylor & Pennington 2010) (See table 1).

Table 1.

The four categories of Intellectual Disability.

Category	IQ Range
Mild	55-70
Moderate	44-55
Severe	25-40
Profound	20-25

Note. Data originates from the research of Bexkens (2013) and Yeates, Ris, Taylor & Pennington (2010).

The overall prevalence of MBID in adolescents between 10 and 14 years is approximately 10% (Yeates et al., 2010). Compared to typically developing adolescents, adolescents with MBID have more learning disabilities, often exhibit more antisocial and psychiatric behaviour than typically developing adolescents (Douma, Dekker, de Ruiter, Tick & Koot, 2007; Dekker & Koot, 2003). Einfeld & Tonge (1996) found that at least 40% of adolescents with MBID showed emotional and

behavioural problems. Douma and colleagues (2007) added that 20% of adolescent boys between the age of 11 and 18 with behavioural problems and with MBID showed delinquent behaviour.

Different environments, role models, life events, levels of support and comorbid problems influence the way in which adolescents with MBID develop and display problems in social behaviour and in which these adolescents are able to function independently in society (Zoon, 2012). The level of social skills and MBID at a young age will predict later academic achievement and delinquency (Fergusson & Horwood, 1995; Nieuwenhuijzen & Vriens, 2012).

There is not a lot of information about how this group with MBID behaves, when targeted with social peer promoted behaviour. What is known is that peer-influence is central to adolescent risk-taking behaviour. Typically developing adolescents as well as adolescents with MBID show more general risk taking behaviour and problematic behaviour when under peer-influence (Bexkens, 2013; Gardner & Steinberg, 2005; Shepherd, Lane, Tapscott & Gentile, 2011; van Hoorn et al., 2014; Wiener, 2004). One study showed that susceptibility to risk taking behaviour promoted by peers is increased in adolescents with MBID (Bexkens, 2013). To be able to understand the behaviour of adolescents with MBID better, it might be beneficial to investigate the interactions and influences of peers in school settings that include adolescents with MBID. Because adolescents with MBID often lack the capacity to build strong efficient relationships, they might place more worth on being included and accepted by their peers than typically developing adolescents (Stortelder & Ploegmakers-Burg, 2010). Adolescents with MBID might benefit more from peer promoted pro-social behaviour than typically developing adolescents or adolescents with more severe intellectual disability (ID). The current research will target the susceptibility to peer promoted social behaviour. The main question in the current study is therefore: *Are adolescents with Mild-to-Borderline Intellectual Disabilities more vulnerable to peer promoted pro-social behaviour than typically developing adolescents?*

Results of this current study could then be used in order to decrease the antisocial and delinquent behaviour and to increase pro-social behaviour, which could add up to better social behaviour, more self-confidence and taking better care of oneself. All these resources indicate the importance of finding out what effect positive peer influence can have on the social behaviour of adolescents with MBID.

In addition, the focus of the current study will be on gender differences in susceptibility to peer influence. What is visible in society is that when boys show disruptive and delinquent behaviour at a young age, it predicts later problematic delinquent behaviour more than it does for girls (Tremblay et al., 1992). This might mean that their problematic characteristics or their vulnerability to bad influences is more stable. It could also mean that they are more involved with problematic behaving friends when compared to girls. However, no research has been done to find out whether this suggest that adolescent boys with MBID are more vulnerable to peer promoted social behaviour than girls with MBID. Therefore, this question will be taken into account during this current study.

1.1 Influence of peers during normal adolescent development.

In order to find out how adolescents with MBID differ from typically developing adolescents in their reaction to peer promoted social behaviour, it is necessary to first shed some light on the development of typically developing adolescents. Areas that develop in adolescence are mostly the areas that are used to interact with others, the 'social brain areas' (Blakemore & Mills, 2013). The 'social brain area' consists of the dorsal medial prefrontal cortex (dmPFC), the temporo-parietal junction (TPJ), posterior superior temporal sulcus (pSTS) and anterior temporal cortex (ATC). During adolescence, the brain shows structural and functional changes in these areas (Blakemore & Mills, 2013). Also, there is a change in the way adolescents interact with their peers, in the way they choose, reject, build and maintain their relationships and in the way they express themselves socially compared to school aged children and adults (Brown & Larson, 2008).

During a study conducted by Steinberg and colleagues, (2008) results showed that adolescent sensation seeking behaviour increases, and impulsivity declines linearly between the age of ten to fifteen. These two processes together are thought to mediate or induce risky behaviour. The socio-emotional system, which is part of the limbic and para-limbic areas of the brain, develops early in adolescence. The cognitive control areas which is part of the prefrontal brain region, develops later in the adolescent period. These two areas are not interacting effectively with each other during adolescence, due to the difference in maturation. This imbalance of these two areas set the adolescent up to and mediate risky, reward seeking behaviour (Steinberg et al., 2008). Albert and Steinberg (2011) reported that adolescents lack the capacity to "anticipate and learn from punishment". This makes them more vulnerable to peer influence than adults. Research showed that peers can directly influence adolescents' risk taking behaviour and social behaviour (Gardner & Steinberg, 2005; van Hoorn et al., 2014). Gardner and Steinberg, (2005) showed that the presence of peers alone could influence the decision making and behaviour of adolescents more than they would influence college students or adults. During a computer game, participants had to choose between stopping at, or running through, red traffic lights with a car. The adolescents participated either during an alone-situation or in the presence of peers. The results showed that on average, adolescents take more risks than adults do and that this behaviour increases in the presence of peers (Gardner & Steinberg, 2005). During a similar study, results showed that pro-risk feedback increased driving speed and anti-risk feedback decreased driving speed compared to neutral feedback (Shepherd et al., 2011).

During adolescence, the opinion of peers will be weighted more heavily while judging themselves, and self-awareness increases (Stortelder & Ploegmakers-Burg, 2010). Also, pro-social behaviour will be influenced in typically developing adolescents (van Hoorn et al., 2014). Prosocial behaviour is behaviour that can be characterized as verbal- and physical co-operation. Anti-social behaviour is behaviour that can be marked as verbal and physical aggression (Slaby & Crowley, 1997). During a study of van Hoorn and colleagues (2014), the Public Goods Game (PGG) was used

to investigate the way in which prosocial behaviour in typical developing adolescents could be influenced. Participants were asked how many 50-eurocent coins they wanted to donate to the group. Donations to the group would be multiplied by two and then divided by all the players. Therefore, donating to the group would benefit everyone, even those who did not donate any coins. But, not donating anything would be the best strategy for the individual. Participants were told that they played against other peers but in reality the peers were computer-controlled players. During the game, participants received no feedback during the alone conditions, thumbs up for donating coins and thumbs down for keeping their coins during the pro-social feedback condition. This feedback was reversed during the anti-social condition. Results showed that peers can influence the pro-social behaviour directly. Typically developing adolescents donated more coins when receiving pro-social feedback and donated less coins when receiving anti-social feedback (van Hoorn et al., 2014).

Other social skills that develop between the ages of approximately eleven and twenty-one are the reflection on, organisation and adjustment of one's own behaviour, such as: self-monitoring, evaluation, self-control, inhibition, cognitive flexibility, appropriate adjustment, increase in autonomy, growth in critical thinking, social communication skills, resilience to peers and changes in social information processing (Jolles, 2007). These skills are necessary to become an independent individual who can for instance, perceive others' intentions, evaluate or make correct decisions and attributions based on received cues of social situations, in order to be able to judge facial expressions (Jolles, 2007). People that do not develop these skills appropriately, often show psychopathology (Miyake et al., (2000); Pennington & Ozonoff, 2006). This makes it very important for adolescents to be able to interpret social cues and to be socially involved in order to develop appropriate skills.

1.2 Influence of peers on adolescents with Mild-to-Borderline Intellectual Disabilities.

To be able to compare the development of typically developing adolescents and adolescents with MBID, it is important to discuss the social-emotional development in this group. Adolescents with MBID develop differently from their typically developing counterparts. This development starts during pregnancy. Intellectual Disability (ID) can, among others, be caused by a genetic abnormality (Zoon, 2012; Yeates et al., 2010). This development has huge consequences for the social and behavioural aspects of children's lives. For instance, it can account for more stress, more depression and more intense feelings during social situations. Also the environment in which the child grows up influences the development of the intellectual disability and therefore increases social discomfort and behavioural difficulties. The environmental factors are as among others: parental intellectual disabilities, parenting skills, parental love and affection, financial funds and social support systems. In general, the life events, environmental factors, protective factors and resources of adolescents with MBID differ from those of typically developing adolescents from the prenatal period.

Furthermore, adolescents with MBID have a slower developing working memory compared to typically developing adolescents. This accounts for a less effective and less efficient use of the executive functions, such as self-awareness, planning, intentional behaviour, attention, response inhibition and response monitoring. These functions influence the social behaviour and meta-cognitive skills (Zoon, 2012). These adolescents develop only basic emotional skills. They have trouble expressing and reacting with adequate emotions and empathy, and their conscience is less well developed or limited compared to typically developing adolescents. Due to the lack of well-developed social skills and lower IQ's, adolescents with MBID have trouble with social information processing (encoding, interpreting, recognizing social and emotional information and facial expressions) and do not solve social problems appropriately on their own (Embregts & van Nieuwenhuijzen, 2009; Nieuwenhuijzen & Vriens, 2012). This can lead to awkward inappropriate and inefficient social behaviour, fear of rejection and low self-esteem. Besides the context in which a child grows up, the love and affection it receives from its parents and the self-worth it develops, the IQ is one of the most important risk factors for developing anti-social behaviour (Church et al., 2012; Kandel et al., 1988). Hart, Lahey, Loeber, Applegate and Frick, (1995) also point out that IQ is the most predicting factor for developing conduct disorders. Expected is that the lack of development in social skills and being able to process social information in combination with a low intelligence might make adolescents with MBID less able to act on or benefit from pro-social peer influence. Because of the fact that they want to feel accepted by peers, they are probably more susceptible to peer influences. Which might also mean that adolescents with (MB)ID have an elevated propensity for anti-social peer promoted behaviour and for juvenile delinquency.

Gresham and MacMillan, (1997) found that adolescents with MBID had lower self-esteems and were less accepted by classmates when placed in regular classes. Adolescents with MBID often do not like to admit or accept the fact that they are limited in their capacities or competencies, nor that they find themselves being rejected or being different from the other adolescents. The feeling of academically failing and not being able to fit in influences the self-concept of adolescents with MBID profoundly. For instance, Gresham and MacMillan, (1997) found that adolescents with MBID that were often actively rejected in regular classes showed problematic adjustments in teacher-, and peer-related contact. Being rejected by other adolescents also often leads to more internalizing problems. Studies found that typically developing adolescents who were rejected in class were less sociable and cognitively skilled and showed more off task behaviour, more negative interaction, more social adjustment problems in adulthood (Kupersmidt, Coie & Dodge, 1990). These problems are less present in classes with more similar developing and similar performing peers. This might suggest that adolescents benefit from immediate correct school placement, which might decrease the additional social and psychological problems which adolescents with MBID face when placed in normal schools, due to peer induced anti-social behaviour (Prinstein, Boergers & Spirito, 2001). Being placed in a

classroom with similar peers may thus increase the feeling of similarity and therefore increase the level of self-confidence and cognitive development. The same thing might be true for the development of social capacities of these adolescents, when confronted with peers that show adaptive pro-social behaviour. Unfortunately, there is not a lot of research concerning the topic 'adolescents with MBID and peer influence'. However, there are some studies that found interesting behavioural results when testing adolescents with MBID. For instance, during a study on risk taking behaviour in adolescents with MBID. Bexkens (2013) used the Balloon Analogue Risk Task (BART) computer game in which adolescents with MBID participated and could earn coins for filling a balloon with the right amount of air. Participants viewed pictures of peers and received encouraging audio feedback what seemed to come from those peers. At a certain point, the balloon that was filled with air by the participants, popped and thereby the earned coins were lost. Results showed that adolescents with MBID were more sensitive to this risk encouraging peer-influence manipulation than typically developing adolescents were (Bexkens, 2013). Thus adolescents with MBID are more prone to risk taking behaviour than typically developing adolescents. This might also be true for peer promoted pro-social behaviour.

Steinberg and Monahan (2007) found that there was an increase in resistance to peers between the age of 14 and 18 years. The study included adolescent participants from juvenile facilities. Steinberg and Monahan, (2007) showed a significant positive relationship between IQ and the resistance to peers. The higher the IQ, the more capable someone was in resisting peer influences. The study of Mofitt and Silva (1988) adds to the study of Steinberg and Monahan (2007) with the result that shows a negative relationship between juvenile delinquency and IQ scores. The lower the IQ, the more juvenile delinquency was found. This might mean that adolescents with higher IQ's are more capable to resist feedback and general behavioural influences from peers.

Greenspan, Loughlin and Black, (2001) pointed out that people with a cognitive impairment had a less effective way of trusting others and showed more vulnerable to manipulation by others. They described this socially devastating factor as 'gullibility': Without the ability to evaluate someone's intentions or without being resilient to bad proposals, relationships are doomed to be unjust. Executive functions need to be intact to be able to perceive the right intentions or make correct decisions about social cues or facial expressions (Jolles, 2007). Adolescents with MBID have difficulty to recognize the right emotion or social gesture, to interpret that in the correct way and to be able to act on it with the suitable attitude in social situations (van Gemert & Minderaa 1997; Van Nieuwenhuijzen & Vriens, 2011). The single-risk model of Wiener (2004) was used and adjusted in order to visualise the social internalizing and externalizing risks accompanied with the social developmental delays and difficulties of adolescents with MBID (Figure 1. Single risk model). This highlights the importance of the current study.

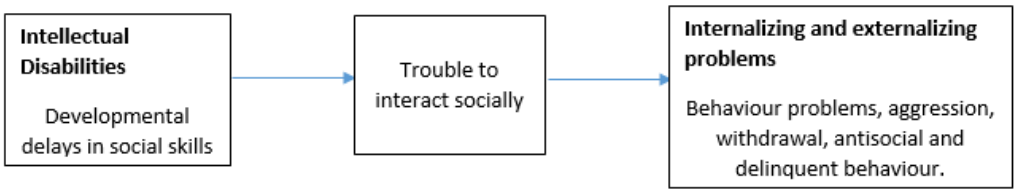

Figure 1. Single risk model. Adapted taken from *Do peer relationships foster behavioural adjustment in children with learning disabilities?* (pg. 26) by J. Wiener, 2004, Learning disability quarterly, 27, 21-30.

Studies with 'typically developing peers and peer influence' will be used in order to set up relevant hypothesis for the current study. From the previous stated conclusions and the result of the study conducted by Steinberg and Monahan (2007) it might be presumed that adolescents with MBID are overall less capable to resist peer feedback and peer promoted (risky) behaviour. The current study will focus on whether this presumption may also be accepted when it concerns pro-social behaviour. If this current study finds that prosocial peer promoted behaviour has a strong direct relation to the behaviour of adolescents with MBID, this would have important implications for future intervention strategies.

1.3 Present study

Research questions that have been investigated during this current research were:

1. Does peer promoted pro-social behaviour influence adolescents with MBID?
2. Are adolescents with MBID more vulnerable to peer influence on pro-social behaviour than typically developing adolescents?
3. Are adolescents with MBID aware of their vulnerability, can the level of vulnerability shown in the PGG game therefore be predicted based on the answers of the self reports?
4. Is there a difference in responses from boys compared to girls with MBID, during FB and OP conditions?

It was expected that the peer manipulation would have a larger effect on pro-social behaviour in adolescents with MBID than on typically developing adolescents. The first hypothesis (between subjects) was therefore, "The peer promoted pro-social behaviour has a large positive effect on the social behaviour of adolescents with MBID". Also, expectations were that adolescents with MBID would be less influenced by the feedback condition compared to the observing peers condition. But feedback would influence their response more than the conditions without feedback. Typically developing adolescents develop better social skills than adolescents with MBID **(**Embregts & van Nieuwenhuijzen, 2009; van Gemert & Minderaa 1997; Nieuwenhuijzen & Vriens, 2012; Jolles, 2007) Which probably make them better at understanding games like the PGG and at understanding peer promoted feedback in comparison to adolescents with MBID. Adolescents with MBID have more trouble interpreting gestures and social feedback when compared to typically developing adolescents, therefore they were expected to be more influenced by present peers instead of peer promoted feedback.

The second hypothesis (within subjects) was that "Adolescents with MBID are more vulnerable to peer promoted pro-social behaviour than typically developing adolescents". This hypothesis was also expected to be true. It was assumed that adolescents with MBID would be more vulnerable to peer influence on pro-social behaviour than typically developing adolescents. Typical developing adolescents were found to be more resistant to peers from of the age of 14 (Steinberg & Monahan, 2007; Pfeifer et al., 2011). This, added to the fact that adolescents with MBID lack development in cognitive, social and emotional skills (van Gemert & Minderaa, 1997; Van Nieuwenhuijzen & Vriens, 2011), supported the expectation that adolescents with MBID would weigh the opinion and judgement of their peers more heavily than typically developing adolescents. This made it seem reasonable to believe that adolescents with MBID would be more susceptible to peer promoted behaviour of peers that did not reject them (Gresham & MacMillan, 1997).

Regarding the other two research questions, expectations were that this present study would find adolescents with MBID to be less able to reflect on themselves and therefore, less able to rate themselves correctly when it came to capabilities and self-worth (Gresham & MacMillan, 2997; Kupersmidt, Coie & Dodge, 1990). Therefore, expected was to find no significant correlations between the self -reported scores and the PGG scores. Also expected was to find that boys with MBID would be more influenced in their behaviour than girls with MBID during conditions with feedback and observing peers. Boys seem to be more prone to behavioural problems and weigh more importance to the emotional state of peers than girls do (Douma et al., 2007; Leyds, 2012). Boys tend to become more involved in delinquent and disruptive behaviour than girls (Douma et al., 2007; Einfeld & Tonge, 1996). Also generally, adolescent girls were found to be more capable of resisting influential peers than boys (Sumter, Bokhorst, Steinberg & Westenberg, 2009). These findings suggested that the result would probably indicate that boys with MBID would show more vulnerability to peer promoted anti-social behaviour than girls. This could also be true for peer promoted pro-social behaviour. Therefore, the result of this hypothesis would be of great importance, in order to find out whether prosocial peer promoted behaviour would also have more influence on adolescent boys with MBID than on adolescent girls with MBID.

2. Methods

2.1 Sample and participant selection

The main question for this current study was "*Are adolescents with Mild-to-Borderline Intellectual Disabilities more vulnerable to peer influence on pro-social behaviour than typically developing adolescents?"*. Effect sizes from comparable studies were collected in order to calculate the relevant sample size for this current study. Based on a medium mean sample size in previous studies of peer-influence effects, the necessary sample size was estimated at 40 participants. The practical school in Ridderkerk accommodates adolescents with mild to borderline IQ scores. These adolescents have learning difficulties that are often accompanied with social and or behavioural

problems. Therefore, participants were selected from this type of education. The experimenter informed the director and teachers about the study. Then, the teachers informed parents and collected parental consent letters which were made available to them by the experimenter. The adolescents and the director also signed informed consent letters prior to participating in the research. The ethical committee approved the research set up and informed consent papers prior to the study. The principal of the practical school was also asked to support teachers and the experimenter in their attempts to recruit participants. Students from practical schools have, on average, IQ scores between 55 and 80 and additionally lag behind in 2 or more academic areas. In order to make sure the current study included the correct sample for the experimental group, IQ scores from all participating students were obtained from the student files at school. Because externalizing psychopathology is common in adolescents attending practical schools and the present study aimed at adolescents with MBID without externalizing psychopathology, some questionnaires were presented to participants (Douma, Dekker, de Ruiter, Tick & Koot, 2003; Einfeld & Tonge, 2007). Also, parents and teachers of participating adolescents were asked to fill out the Strength and Difficulty Questionnaire (SDQ) which targets problematic behaviour in adolescents. SDQ scores were then checked on extreme deviations when compared to the group mean of the participants. If the SDQ scores of a participant deviated more than 10% from the mean results, data of this particular participant was excluded from analysis.

After excluding the participants with reported problematic behaviour, the demography of the dataset was examined. The whole dataset with which the analysis was done consisted of seventy-two participants. The experimental group of this study included thirty-seven adolescents with MBID between twelve and eighteen years old with Mild-to-Borderline Intellectual Disabilities M = 13.97, SD = 1.21, range 12-17 (see table 2). Of which, twenty-three were girls (62.2%) and fourteen were boys (37.8%). The mean IQ scores differed significantly among the participants with MBID (M = 71.24, SD = 6.61, t (36) = 65.563, $p < .001$). The control group, a group of thirty-five typically developing boys (100%) aged between 12 and 17 years old (M =14.86, SD = 1.33; see table 2) had an average intelligence (M = 104.89, SD = 8.92). Data from this group for typically developing adolescents (TD) was recently collected by Van Hoorn, Van Dijk, Güroğlu and Crone (2016). All set up procedures, methods and techniques of the current research reflected the ones used during the research of Van Hoorn and colleagues (2016), which was used as control data. IQ scores and ages for the TD group compared to those of the MBID group differed significantly (Table 2: demographic variables).

Table 2.

Demographic variables

Variable	Female MBID	Male MBID	Total MBID	Total TD	Total Dataset
Sex	23 (62.2%)	14 (37.8%)	37 (100%)	35 (100%)	72 (68.1% M, 31.9% F)
Age (*SD*)	14 (*1.48*)	13.93 (*0.62*)	13.97 (*1.21*)	14.86 (*1.33*)	14.4 (*1.34*)*
IQ scores (*SD*)	69.35 (*5.97*)	74.36 (6.62)	71.24 (*6.61*)	104.89 (*8.92*)	87.6 (18.63)**

* t (72) = 2.943 p = .004

** t (72) = 18.246, $p < .001$

Note. Data shows the amount of demographic variable per group, per gender and for the whole dataset.

Also a Chi Square test was done in order to find differences between the two groups on gender. This showed a Pearson Chi-Square $\chi 2$ (1, N = 72) = 31.969, p = <.001. This means, there is a 95% probability that the there is a statistical significance relation between the two groups on the variable 'gender'.

The socioeconomic status of the sample was measured using information about parental income and education. Some parents preferred not to specify their annual income or educational level. Means and differences were calculated with the data that was available. Because the results do not reflect the whole dataset, some caution needs to be taken when interpreting the significant results. The average annual income for parent 1 and for parent 2 for typically developing adolescents was between 20.000 and 30.000 euro. Parent 1 and parent 2 from the adolescent group with MBID earned an average annual income between 10.000 and 20.000 euro. The two average annual incomes for both groups were compared with each other. The two groups showed no significant Pearson Chi-Square scores for parental income Income^parent1 $\chi 2$ (7, N = 72) = 7.633, p = .336, Income^parent2 $\chi 2$ (7, N = 72) = 13.491, p = .061. This means both groups earnings were comparable.

The TD-data showed an average education level of MBO/HBO for parent 1 and HBO for parent 2. The MBID-data showed an average education level of high school ('middelbare school')/MBO for both parents. The level of education for both parents was found to be significantly different when the two groups were compared with each other (Education^parent1 $\chi 2$ (6, N = 72) = 12.634, p = .049, Education^parent2 $\chi 2$ (6, N = 72) = 21.875, p = .001). This means that the educational level of both groups differed significantly. In this study, parents from typically developing adolescents were higher educated than those of adolescents with MBID. The average level of education for parent 1 of the complete dataset was also found to be significantly different for males when compared to females (Education^parent1 $\chi 2$ (6, N = 72) = 13.445, p = .036). The mean level of education for boys' parents was MBO/HBO, the mean level of education for girls' parents was high school/MBO. This could be explained on the basis of the control group. This group was consisted of boys with average IQ scores. The adolescent group with MBID consisted of more girls than boys and all had less than average IQ scores. For the data of MBID only, the average education of parents was not found to be significantly different when males were compared to females. The variables education parent 1, education parent 2 and age of participants were used as covariant when analysing the data.

When comparing the scores on the questionnaires (RPI and SRQ) of the adolescents with MBID and the typically developing adolescents with a t-test for individual differences, it showed significant differences (see Table 3: Group Statistics: Mean of subtests per group). The TD-group and MBID-group differed significantly on their scores for self-reported RPI t (70) = 4.861, p < .001, two-tailed, 95% CI [0.347, 0.829], SRQ-admiration t (70) = 4.500, p < .001, two-tailed, 95% CI [0.657, 0.704] and SRQ-Sociability t (70) = 3.790, p < .001, two-tailed, 95% CI [0.491, 1.592]. The TD-group rated

themselves significantly higher on these items than the MBID-group.

Table 3.
Group Statistics total dataset

Subtest	Group	N	M	Std. Deviation	St. Error of Mean
RPI	TD	35	2.9714	.50210	.08487
	MBID	37	2.3838	.52255	.08591
SRQ admiration	TD	35	5.0929	.92571	.15647
	MBID	37	3.9122	1.26411	.20782
SRQ Sociability	TD	35	5.7714	.78257	.13233
	MBID	37	4.7297	1.46531	.24090

Note. Data shows statistics of subtest that were significantly different scored by the MBID and TD groups.

2.2 Measures

Prosocial behaviour: The computerized PGG was used in order to measure peer promoted prosocial behaviour influences (Harbaugh & Krause, 2000; Van Hoorn et al., 2014; Ledyard, 1995). During the PGG, adolescents were informed that they would participate in a game concerning "Decision making in groups" (Van Hoorn et al., 2014). During this game, each adolescent would receive five coins worth 50 Eurocents. Prior to the game, the experimenter explained the rules of the game to the participant using an instruction protocol and five 50 eurocent paper coins. These paper coins made the game more tangible for them. Participants were told that these coins resembled coins with which they were about to play during the game. In the instruction phase, they were also told that they could choose independently and anonymously to keep their coins or to donate them to the group. During the instruction phase, adolescents could practice a few times with playing the game. Having touchable 50 eurocent coins in front of them, made it easier for the adolescents with MBID to decide what to do with the virtual coins. The adolescents were told that all donations would be multiplied and divided by all four players after each trial, irrespective of the amount of coins they donated themselves. They were informed that when all group members would donate all their coins to the group in each round, the group would benefit more, but that if the adolescents did not donate anything, they would still receive their share of multiplied group donations. Thus, that the best way for them to play the game for themselves would be not to donate any coins.

After the explanation the adolescent was asked whether or not he had any questions or uncertainties. Then they had to answer a few quiz questions concerning the rules of the game, to make sure the adolescents understood the explanation. It was explained to them that the three other players were virtual players, which might induce the feeling of playing against real peers. Each trial, the adolescent had to choose between donating money to the group, which would be beneficial for the whole group (pro-social choice) or to keep the money for himself and still benefit from group earnings (anti-social option). This might inflict a social dilemma upon the adolescent. Participants were told that at the end of the game, the computer would randomly pick one trial. With the money earned in that particular trial, the adolescent was allowed to choose some presents that were displayed on the

table in the room. At the end of the game, donated coins-scores of all adolescents were collected to see whether the adolescents made more or less pro-social decisions when observed by peers or when receiving feedback from them. Data was also used to find out whether the 'peer influence manipulation', which was used during this game, had more influence on the adolescents with or without MBID.

Peer influence manipulation: This game consisted of thirty-five trials. Some of the trials were manipulated in order to check reactions when induced peer influence was present. The first five trials were called the 'alone1 condition', in which the participant could make his own decisions anonymously without any (virtual) peers influencing him. The second phase (trial six to fifteen) was a peer influence manipulation phase called 'spectator condition' (or observing peers), in which the participants was observed by peers. During this phase, pictures of peers would appear on the screen after each decision was made. Then ten trials (sixteen to twenty-five) with peer promoted pro-social feedback was presented to the participants, which was called 'feedback condition', in which the participant would receive zero to five thumbs up for their donations to the group. The more the participants donated to the group, the more thumbs up they would receive. Then, during the last phase (trial twenty-six to thirty-five) participants would donate or keep their coins again without any (virtual) peers influencing him. This last phase was called 'alone2 condition' Comparison of these trials would shed light on the manipulability of participants' pro-social actions.

The game was played on a laptop with fixed keyboard, in a meeting room at the PRO school. During the questionnaire, adolescents could use a computer mouse, which made it easier for them to check the boxes of the appropriate answers. The adolescents with MBID were, if necessary, guided through the game by an experimenter after explaining the above mentioned points. The experimenter stayed in the room, and worked on an individual task, away from the participant. She minded her own business without distracting the participant, when the game was played. All adolescents were presented with all four conditions 'prosocial feedback' (thumbs up for donating money), 'observant peers' (audience present with no feedback) and 'no-feedback' (alone1 and alone2 conditions). In the instruction phase, participants learned that two groups of five peers would sometimes observe their decisions. And that these peers would also evaluate their decisions. They were told that they would be able to see the evaluations of five peers in the shape of 'thumbs up'. But the other groups' evaluation would not be made visible to them. The adolescents were not able to see the donations of other players, nor would they be able to see the amount of money they themselves collected during trials. The experiment would take up to forty-five minutes per person. The stimulus was the feedback that the adolescents received (FB, NF, or OP) and the response measured was the amount of coins donated to the group, by the adolescent per trial. Figure 2 shows a PPG trial without any feedback or observing peers, thus the No-Feedback condition.

Figure 2. Data originates from the Publics Good Game, adapted by J. van Hoorn and colleagues, 2014.

Social and emotional problems: The Strength and Difficulty Questionnaire is often used to screen for psychopathology in adolescents from the age of three up to sixteen years. This questionnaire contains twenty-five questions that can be scored as 'true', 'somewhat true' or 'not true'. The questions concern five different topics (emotional, behavioural, social, hyperactive and attentional problems) one of which focuses on pro-social behaviour (Kievit, Tak & Bosch, 2009). The Dutch committee of test matters (COTAN) evaluated the SDQ overall with sufficient and good scores, except for the norms and the quality of the user's manual (Kievit, Tak & Bosch, 2009). Usually, to find psychopathological problems, parents are asked to fill out the Child Behaviour Checklist (CBCL). The CBCL is a more extensive version to find behavioural problems. The CBCL and SDQ were compared by Klasen and colleagues (2000) and found to be equally valid. The SDQ is being used more often in sectors with adolescents with MBID (Van Widenfelt, Goedhart, Treffers & Goodman, 2003). Also, the SDQ is shorter and made available in a teacher- and a parental version. Due to all these findings the SDQ was presented to parents and teachers during this current study.

The *Resistance to Peer Influence Scale* was used to screen for individual differences. It consists of ten pairs of neutral statements concerning peer influence situations used to measure the ability to which someone is able to resist social influences. When filling in the RPI, people need to choose one of two statements given, that is applicable to them the most and rate it with 'really true for me' or 'sort of true for me' (Sumter et al., 2009; Steinberg & Monahan, 2007). The higher someone's score on the RPI-scale, the more he is likely to be able to resist peer influences. This scale was designed in 2007 and was nog evaluated by the COTAN. During a research with the RPI the scale was found equally reliable at all ages and at all educational levels (Sumter et al., 2009). Psychometric properties of the RPI were also tested during that research. They found eight of the ten items with a sufficient factor loading, which is necessary in order to be able to interpret the scores on this item with reliability (Sumter et al., 2009). The RPI was presented to adolescents with MBID during this current study.

Social reward sensitivity: The Social Reward Questionnaire was designed by Foulkes, Viding, McCrory and Neumann, (2014) and was used to screen for differences in values of social rewards between participants. The test consists of twenty-five items concerning six social subscales (Admiration, Negative Social Potency, Passivity, Prosocial interactions, Sexual Relationships and Sociability) An example of an item in the SRQ is "I enjoy treating others fairly" or "I enjoy going to

parties". The subscales all correlate with personal social constructs. For instance, admiration correlates with narcissism, Negative Social Potency with (among others) hostility, Passivity with submissiveness, Prosocial interactions with dominance, Sexual Relationships with Machiavellianism and Sociability with friendliness. The test was evaluated by the team (Foulkes, Viding, McCrory & Neumann, 2014) with good reliability, internal consistency and construct validity. The SRQ was presented to adolescents with MBID to check for individual differences between the participants.

Social reward behaviour was used in order to check for social reward behaviour and aggressive behaviour the participants were also tested using the Behavioural Avoidance and Inhibition Scales (BISBAS). The behavioural inhibition system (BIS) is the system that accounts for inhibition or avoidance, which make up the base for anxiety and hesitation. The BAS system accounts for behaviour that is positive, impulsive and active (Carver & White, 1994; Gray, 1990). Studies found that the BIS is negatively correlated with aggressive behaviour while the BAS is positively correlated with this type of behaviour. This might suggest that a higher BIS score will also show more pro-social, inhibited, thoughtful actions and behaviour during the game. The questionnaire with twenty questions, was presented to the participants. They had to choose between four options ranging from 'very true for me' to 'very false for me'.

2.3 Procedures

An appointment was made with the teachers in order to test the adolescents of his/her class from which parents gave their permission. Participants of this study, were picked up from the classroom by the experimenter and taken into a meeting room at the PRO school. Prior to commencing with the test administration, the adolescents with MBID were checked to see whether or not they had participated in a similar study earlier. These adolescents were then excluded from participation. In order to check this, the director of the school was asked whether or not his school participated in a similar study, and participants were asked if they recognized the game or played it before, prior to commencement with the PGG. The adolescent was informed that he was allowed to ask questions when something was not clear to him. After a signed informed consent paper was collected and checked, the instruction phase would start. The participant was explained that he would be playing with three other players and that each player could donate coins to the group or keep them to themselves. Furthermore, they were told that after each trial all donations would be multiplied and divided among all players regardless of how many coins they donated to the group. Then the participant was asked a few quiz questions about the game in order to check whether he really understood the explanation. One of the quiz questions was "What happens to the money donated to the group?". When the adolescents' answers were correct, the game would commence. If the adolescent did not know the answer, the question would be discussed.

After the game had finished, the experimenter informed the adolescent about the questionnaires and opened the webpage where the participant could start to fill in the answers. If a participant was not

able to fill in the questionnaires by himself, the experimenter could read the questions out loud or explain the meaning of unfamiliar words. At all times, the adolescent would rate the questions himself without being influenced by the experimenter. An instruction sheet was made prior to test administration, with 'what to do'-topics applicable to any problem that the adolescent could come across while filling in the questionnaire. This way each participant would receive standardized help and instructions. Finally, the adolescent was debriefed, thanked for its cooperation and brought back to the classroom. Data was saved on the laptop in a file which was numbered per participant. The scores of the BISBAS, SRQ, RPI filled out by participants and the scores of the SDQ filled out by teachers and parents were saved as one file, using this particular number. If there was a large deviation between an adolescent and the mean scores on one of the questionnaires, participants' data were excluded from the analysis.

Prior to the experiment, adolescents were only told that they would be participating in a research that would focus on social behaviour in adolescents of the practical school. During the experiment they only received information about the PGG and about how to fill out the online questionnaires. The exact purpose of the study was revealed to all participants later during an in-class debriefing presentation.

2.4 Statistical analyses

Hypothesis 1: "The peer promoted pro-social behaviour (FB, OP) has a large positive effect on the social behaviour of adolescents with MBID".
Hypothesis 2: "Adolescents with MBID are more vulnerable to peer promoted pro-social behaviour than typically developing adolescents".
Hypothesis 3: "Peer promoted prosocial behaviour influences boys with MBID differently than girls with MBID".
Hypothesis 4: "The achieved scores on the PGG game cannot be predicted by scores achieved on the self-report questionnaires of adolescents with MBID".

To test whether adolescents with MBID are susceptible to the peer-influence manipulation (within) a repeated measures ANOVA (RMA) was set up. The number of donated coins which adolescents with MBID gave on the different conditions during the trials of the game were used as the dependent variable. The conditions with which the adolescents were faced during the trials (pro-social feedback, no feedback and observing peers) was used as independent variable. If the RMA would result into an interaction effect, it would show that the f peer induced pro-social behaviour manipulation was influential for the actions of adolescents with MBID. This result was expected to be found.

In order to find the main effect on the question whether adolescents with MBID are more susceptible to peer influence than typically developing adolescents a between subjects mixed ANOVA

was performed. The same RMA was performed as the one that was used to answer the first hypothesis question. Thereafter, a t-test for independent samples was performed to find out if there were any differences between the donations of typically developing adolescents compared to the donations of adolescents with MBID on the four conditions. In order to test the gender differences, an RMA was performed using the number of donated coins from boys and girls separately during the trials of the game as the dependent variable and the conditions with which the adolescents were faced during the trials (pro-social feedback, no feedback and observing peers) as independent variable. Finally, Pearson correlations were made in order to find significant correlations between the scores on the PGG game and the scores on the self-report questionnaires.

This study had a mixed experimental design (within and between) with a two by four repeated measures ANOVA. Two subject groups were compared on four conditions. In addition, participants and their parents were screened for individual differences and behavioural problems with questionnaires.

After the study was conducted participants were excluded from analysis when they did not complete the PGG or when they obtained scores which deviated at least 10% from the mean SDQ scores. Data from adolescents that were not able to finish the computer task due to physical developmental issues, visual or auditory deficits have also been excluded from the data set.

3. Results

From the forty-one participating adolescents, three parents were not able to complete or fill in the online questionnaires due to technical error. The response rate for parental questionnaires was 92.7%. All teachers filled out the SDQ for their students. Therefore, a response rate of 100% was obtained for teacher questionnaires.

The assumptions of linearity, normality and homoscedasticity were checked for the dataset to control for any outliers. A P-P Plot, which made the deviation from normal probability visible, showed that the residuals were randomly distributed across the P-P Plot. The assumption of homoscedasticity for this data was therefore accepted. The normal P-P Plot showed the expected probability linearly distributed. This meant that the assumption of linearity could be accepted. Finally, a histogram was made to check normality. Through the histogram a normal distribution curve was drawn. This revealed that the data was normally distributed. Therefore, the assumption of normality was also accepted.

3.1 The effect of peer promoted prosocial behaviour on behaviour of adolescents with MBID

The first hypothesis that will be assessed, concerned the question whether peer promoted prosocial feedback or observing peers had any influence on the amount of donated coins of adolescents with MBID. Expectations were to find a large positive difference between the coins donated in the alone1 and alone2 conditions and the conditions with observing peers and feedback from peers. The observing peers were expected to have more influence on the increase of coin

donations from participating adolescents with MBID than feedback, but feedback would have more influence than no feedback at all. An RMA was conducted for the whole dataset with the amount of coins donated as dependent variable and the prosocial experimental conditions (feedback, observers, alone1 and alone2 trials) as independent variable. Then, a plot was made to check whether there was a difference in response between the four conditions of the game (see Figure 3: Differences in response on the four conditions of adolescents with MBID; see Table 4: RMA for MBID and TD groups on

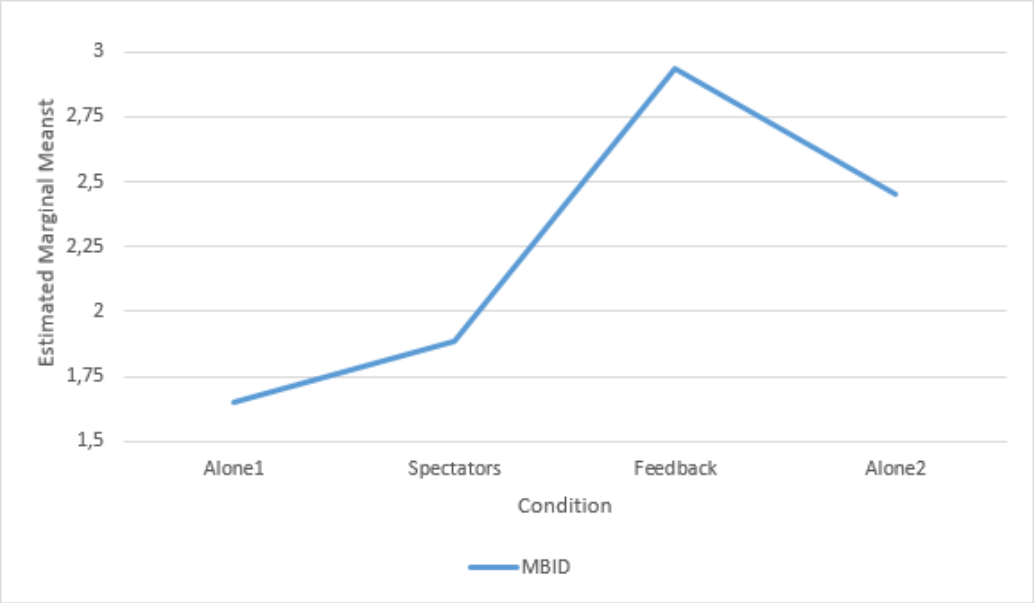

Figure 3. Differences in response on the four conditions of adolescents with MBID.

PGG conditions).

The RMA showed a significant result on the conditions of the PGG F (3, 72) = 32,147, p < ,001. The interaction effect of both groups on the condition was also significant F (3, 72) = 4.723, p = ,005. The between groups RMA showed no significant result F (1, 72) = 0.20, p < .889, η^2 <*0.001*. Thus, both groups were not significantly different. A follow up test checked to see whether there were any significant effects on the conditions when using solely data of the MBID group. This RMA showed a significant result F (3,37) = 31.910, p < ,000, η^2= 0.738. Next, descriptive statistics were investigated in order to compare differences in the mean donated coins per condition of the MBID group.

Table 4.
RMA for MBID and TD groups on PGG conditions

Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.
Condition	Pillai's Trace	0.586	32.147b	3.000	68.000	.000
	Wilks'Lambda	0.414	32.147b	3.000	68.000	.000
	Hotelling's Trace	1.418	32.147b	3.000	68.000	.000
	Roy's Largest Root	1.418	32.147b	3.000	68.000	.000
Condition*Subjects	Pillai's Trace	0.172	4.723b	3.000	68.000	.005
	Wilks'Lambda	0.828	4.723b	3.000	68.000	.005
	Hotelling's Trace	0.208	4.723b	3.000	68.000	.005
	Roy's Largest Root	0.208	4.723b	3.000	68.000	.005

b. exact statistic

Note. Data shows a Repeated Measures ANOVA with the two groups (TD and MBID) as between subjects variable and the conditions of PGG as within variable.

Compared to the alone1 condition (M1), means of donated coins per condition showed that the MBID-group increased their donations by +13% while being observed (M2) by peers (M1 = 1.653, SD1 = 0.91; M2 = 1.884, SD2 = 0.911) and by +77,6% after receiving feedback (M3 = 2.935, SD3 = 0.773). The alone2 (M4) condition showed an increase of 48.5% in donations in comparison to the alone1 condition (M4 = 2.454, SD1 = 1.151).

The hypothesis that peer promoted pro-social behaviour has a positive effect on the social behaviour of Adolescents with MBID can be accepted. The data showed large positive differences between the alone1 condition and the other conditions involving peer promoted prosocial behaviour and between the alone1 and the alone2 condition.

3.2 Peer promoted prosocial behaviour and the effect on adolescents with and without MBID

The second result that will be looked at, is the expected difference in effect that peer promoted pro-social behaviour has on adolescents with and without MBID. The effect was expected to be larger for adolescents with MBID, than for typical developing adolescents. The RMA analysis for hypothesis 1 (see section 3.1) was used to view whether it would show a significant difference between MBID and the control group (TD) on the different conditions (see Figure 4: Differences in response on the four conditions of adolescents with MBID and of typically developing adolescents; see table 3: RMA for MBID and TD groups on PGG conditions). The donated coins of the groups were used as dependent variable and the conditions were used as independent variable.

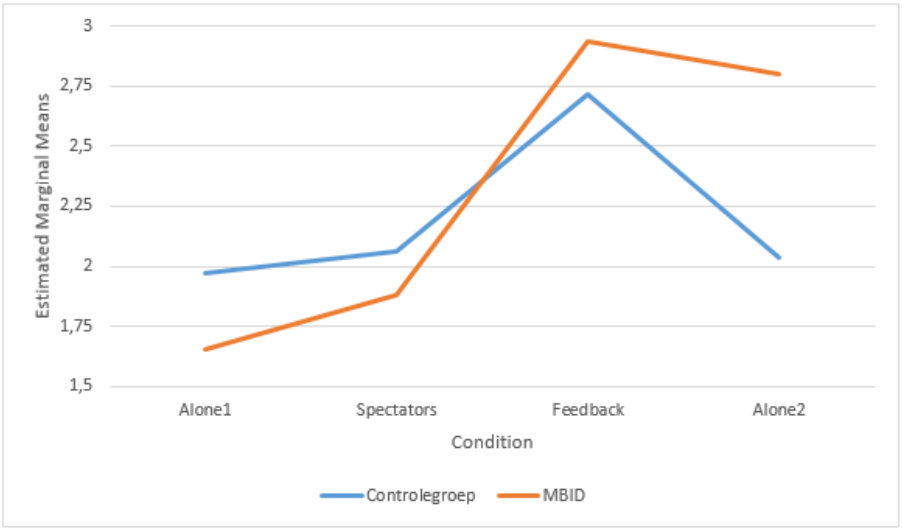

Figure 4. Differences in response on the four conditions of adolescents with MBID and of typically developing adolescents.

The RMA showed a significant effect for condition (F (3, 72) = 32.147, p < .001) and a significant interaction effect between condition and the two participating groups of adolescents (F (3, 72) = 4.723, p = .005). The between groups RMA showed no significant result F (1, 72) = 0.20, p < .889, *SSbetween* = 0.086. A follow up test showed a significant result for both MBID and TD groups: *Fmbid* (3,37) = 31.910, p < ,000, η^2= 0.738 and *Ftd* (3,35) = 6.448, p = 0,002, η^2= 0.377. Second, an independent samples t-test was performed to find out what the exact difference was in donations

between the two groups per condition. There means of the amount of donated coins was higher for adolescents with MBID than for adolescents without MBID after receiving feedback and after being observed by peers (see table 4: Group Statistics MBID and TD per condition). The differences between the two groups were not significantly meaningful. On average, adolescents with MBID donated less coins than the TD group in the Alone1 condition. During the condition with observing peers, the TD group donated a little more than the MBID group (+0.23 versus +0.09). Also the MBID group increased their donations with 1.29 compared to an increase of 0.74 coins donated by the TD group, when comparing the condition feedback to the alone1 condition. In the last PGG condition,

Table 5.

Group Statistics MBID and TD per condition

Condition	Boy/Girl	N	M	Std. Deviation	St. Error of Mean
Mean Alone	TD	35	1.9729	1.24861	.21105
	MBID	37	1.6527	.91058	.14970
Mean Spec	TD	35	2.0629	1.27996	.21635
	MBID	37	1.8838	.91149	.14985
Mean FB	TD	35	2.7149	1.52306	.25744
	MBID	37	2.9351	.77252	.12700
Mean Alone2	TD	35	2.0371	1.57033	.26543
	MBID	37	2.4541	1.15147	.18930

Note. Data shows the statistics per condition for adolescents with MBID.

typically developing adolescents decreased their donations by 0.67 coins and ended the game with 2.9% more coins compared to what they donated at the beginning of the game, during the alone1 condition (alone1 ≈ alone2). Adolescent with MBID decreased their donations with 0.49 coins. The donations of adolescents with MBID on the alone2 condition, at the end of the game, was 49% higher than the donations on the alone1 condition, at the beginning of the game (alone1 ≠ alone2).

Third, the RMA analysis was repeated, this time using age, education parent1 were used as covariates in the RMA. When controlling for age and the educational level of parent1, none of the effects were significant (condition F (3, 72) = 1.351, p = 267; condition*subjects F (3, 72) = 2.574, p = 0.063).

Based on these results, the hypothesis cannot be accepted. The RMA showed a significant difference between the conditions and a significant interaction effect of the groups on the conditions. However, using the RMA, no significant differences were found between the two groups. The difference in effect of peer promoted prosocial behaviour between the two groups is not significant. However, the effect size for the MBID-group was found to be larger than for TD-group.

3.3 Self-reported awareness of vulnerability to peer influences of adolescents with MBID

The correlation between the questionnaires that participants with MBID filled out and their scores on the PGG will be studied next. Expected was to find no significant correlations between the self - reported scores and the PGG scores, due to the fact that adolescents with MBID are thought to be less capable of reflecting on themselves (Gresham & MacMillan, 2997; Kupersmidt, Coie & Dodge, 1990). First correlations between the scores of the MBID-group on the BISBAS, RPI and SRQ questionnaire and the scores on the PGG were examined. The Pearson R was used to find any correlations between the BISBAS scores and the PGG scores. No significant correlations were revealed between the questionnaires and the PGG conditions.

Finally, to make a comparison between the self-reported data of the adolescents with MBID and how they were viewed by others, the correlations between the scores on the PGG and the scores of all scales of the SDQ reported by parents and teachers were calculated. To find out whether the self-reported scores of parents and teachers could help predict scores on the PGG game, correlation calculations were made between the total scores and the subscale scores of the SDQ and the PGG conditions. No significant correlation was found for the total scores on SDQ-parent or SDQ-teacher. However, when measuring the subscale scores of the SDQ against the PGG scores, low, but positively directed, significant correlations were found. The subscale ’emotional problems’ on the condition alone2, reported by parents showed a significant correlation r (37) = 0.379, p = .027. An increase in emotional problems correlates with persistent higher donations during the final phase of the game. A significant correlation was also found for subscale ‘peer problems’ on the condition alone2, reported by parents r (71) = 0.357, p = .038. An increase in peer problems correlates with an increase in donations during the final phase of the game. Finally, the correlation between subscale ’peer problems’ reported by teachers and the condition alone1 and observing peers was also found to be significant r (71) = 0.429, p = .008. An increase in peer problems correlates with an increase in donations when starting the game as the PGG and when being viewed by peers. The subscale peer problems reported by teachers showed to be significant on a two-tailed significance level 0.01.

Based on these correlations, the hypothesis can be accepted. There are no significant correlations found between self-reported questionnaires of adolescents with MBID and their scores on the PGG conditions. Scores on self-reported questionnaires of adolescents with MBID cannot predict the scores on the PGG conditions. However, significant correlations were revealed between some subtest scores on the SDQ of parents and teachers on the PGG scores of participants.

3.4 Gender and the effect of peer promoted prosocial behaviour

The results that will be looked at finally, will shed light on the hypothesis that peer promoted prosocial behaviour might be effecting different genders with MBID differently. A larger effect for boys than for girls with MBID was expected. First, an analysis was conducted to find a difference in

response between boys and girls with MBID before and after receiving peer promoted prosocial feedback or after being observed by peers (independent variable). A two by four RMA was used to compare donated coins per group, the boys and girls with MBID (dependent variable), on the peer promoted prosocial conditions of the PGG (independent variable). The RMA showed a significant effect for condition (F (3, 37) = 33.511, $p < .001$). The interaction effect for condition and gender was also found to be significant F (3, 37) = 3.328, $p = .031$. However, the between subjects RMA showed no significant result F (1, 37) = 1.517, $p = .226$, $\eta^2 = 0.042$ (see Figure 5: Differences in response on the four conditions of boys and girls with MBID).

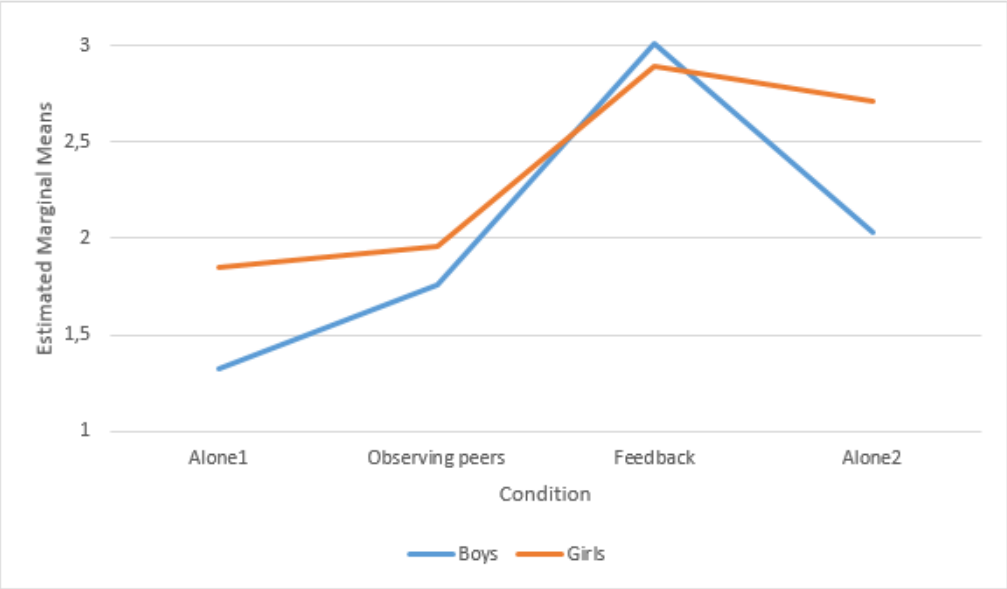

Figure 5. Differences in response on the four conditions of boys and girls with MBID.

Next the difference in donated coins between boys and girls with MBID on each condition was compared with an independent samples t-test (see table 6: Group Statistics MBID). With the performance of an independent samples t-test, the differences between boys and girls on each condition was made visible. This test showed no significant differences between mean donations from boys compared to mean donations from girls on the different conditions.

Table 6.

Group Statistics MBID

Condition	Boy/Girl	N	M	Std. Deviation	St. Error of Mean
Mean Alone	Boy	14	1.3250	.89995	.24052
	Girl	23	1.8522	.87652	.18277
Mean Spec	Boy	14	1.7571	1.06534	.28472
	Girl	23	1.9609	.82002	.17099
Mean FB	Boy	14	3.0071	.84532	.17099
	Girl	23	2.8913	.74095	.15450
Mean Alone2	Boy	14	2.0286	1.36067	.36365
	Girl	23	2.7130	.94354	0.19674

Note. Data shows the statistics per condition for adolescents with MBID.

When looking at the mean group statistics, which were not significantly different, it was visible that donations of girls increased more after being observed by peers than the donations of boys. But boys donated slightly more coins to the group when given feedback from peers than girls did. Boys started the game with lower donations than girls, but their donations increased more compared to donations of girls when being observed or when given feedback. After receiving feedback, boys donated 126% more coins compared to the alone1 condition. Girls donated 'only' 56% more compared to the alone1 condition. When comparing the final condition (alone2) with the feedback condition, it was visible that boys decreased their donation more than girls (-0.979 versus -0.179). Based on the results, the hypothesis cannot be accepted. There is not a significant difference in donations from adolescents with MBID when comparing genders. Peer promoted prosocial behaviour does effect the genders in a slightly different way, but the differences were not significant.

4. Discussion

The main aim of the present study was to find out whether or not adolescents with MBID would be more or less vulnerable to peer promoted pro-social behaviour than typically developing adolescents. This result was found to be significant. Adolescents with MBID were more influenced by peers than their typically developing counterparts. Donations of adolescents with MBID especially increased after receiving positive feedback from their peers. As expected, the amount of donations differed between the first and last alone trial. Thus the impact of peer influences was also persistent after the peers disappeared.

The first effect that will be discussed addresses the hypotheses that peer promoted prosocial behaviour that will have a large positive effect on the prosocial behaviour of adolescents with MBID. It was assumed that for these adolescents, observing peers were more effective than prosocial feedback from peers when the aim was to change the prosocial behaviour. Data showed that all conditions differed significantly from one another and the interaction effect was also significant. Also the follow up test showed a significant large effect size for MBID ($\eta^2 = 0.738$). The adolescents with MBID almost doubled (+48,5%) their donations in the final condition compared to the donations on the first condition, after the conditions with observed peers and feedback giving peers. The increase in donations after receiving feedback from peers was larger than after being observed by peers. Thus, it can be concluded that adolescents with MBID can be largely and positively influenced by peers who promote prosocial behaviour. And the behaviour of adolescents with MBID is more positively affected by peers' disapproving of donations than by being observed by peers. It can be concluded that observing peers have less effect on the positive behaviour of adolescents with MBID than peers that are actively telling them to behave more prosocial.

The conclusions can be explained using the theory on adolescent changes. During adolescence, the opinion of peers will become more important to typically developing adolescents (Stortelder &

Ploegmakers-Burg, 2010). Looking at the results of this current study, this change in adolescence is found to be true for adolescents with MBID as well. Adolescents with MBID are often rejected by typically developing adolescent classes and have trouble using cognitive social and emotional skills (Gresham & MacMillan (1997); van Gemert & Minderaa 1997; Van Nieuwenhuijzen & Vriens, 2011). This explains why behaviour from adolescents with MBID are strongly affected by peer promoted prosocial behaviour. It also explains why they increase their prosocial behaviour so much after being endorsed by peers for giving many coins to the group, and why there is less change visible in their behaviour when observed by peers.

An alternative explanation for this result could be that adolescents with MBID pick up on social learning cues just as quick as typically developing adolescents when it involves active feedback on their behaviour. We know now that they behave somewhat similar to peer induced prosocial behaviour, even though they are less well capable of using social or non-verbal information. Maybe, adolescents with MBID are better in unintentional learning from social cues in a time limited and setting, where the peer-feedback is directed at them personally, than during other settings. However, more research is necessary in order to acquire more knowledge about this type of social learning in adolescents with MBID. Therefore, future research on un-intentional learning in adolescents with MBID is necessary.

During this research, 37 adolescents with MBID from one school in the area of Rotterdam were included. This might suggest that the results of this study can only be generalized to PRO schools in the area of Rotterdam. Also more girls than boys participated to this research. The control data consisted of only boys. Research showed that boys develop differently than girls when it comes to delinquent behaviour. Maybe this is also true for the influence of peers. Girls might be more influenced in their decision making process than boys are, when they know that the game is played with multiple players. Therefore, a new study should be set up including a question concerning whether or not boys and girls differ in donations when playing the game without any other (virtual) players than when playing it with other players. In summary, the research design might not have been as efficient as it should have been. Therefore, the data might have been too different to be compared to each other and will not be generalizable to all of the PRO-school attending adolescents. Current research does suggest that there is a difference between vulnerability of adolescents with MBID and adolescents without MBID. This makes it an interesting next research step to investigate how adolescents with MBID of other PRO schools in the Netherlands react to the manipulated peer promoted pro-social behaviour. In order to use this to the advantage of adolescents with MBID, the next step in research would be to set up a balanced study. First it is necessary to find out how many boys and girls participate in PRO schools, take a percentage of this amount and test them while setting up a similar design with the same ratio of boys/girls with ‘normal’ IQ scores. Current sample size may

have been too small to find decent significant differences. Therefore, during the next research the amount of participants need to be larger in order to find significant differences.

The second expectation was that the peer promoted prosocial influence would have a larger, more positive effect on adolescents with MBID than on typically developing adolescents. Data shows a significant result for the groups and a significant result for the conditions. Which means there is an interaction effect between the groups and the conditions and which also means the conditions are all similar compared to each other. The between subjects test was not significant, which means that the differences between the groups on the PGG scores were not large enough to be significant. The adolescents with MBID did show a larger effect size than the typically developing adolescents (η^2= 0.377) and a more positive mean donation after being observed by peers and after receiving feedback from peers than the donations of typically developing adolescents. These results suggest that, if the sample size would have been larger, the peer promoted prosocial behaviour would have had significantly more influential and persistent effect on the prosocial behaviour of adolescents with MBID than on the prosocial behaviour of typically developing adolescents. Which would probably have resulted into a significant difference between subjects.

Although there were no significant differences, there were some variations in the donations of adolescents with and without MBID. The effect size was larger and the mean donations were larger for adolescents with MBID. Adolescents with MBID are thus probably not as able as the typically developing adolescents to resist peer influences during adolescence. This was also suggested by Steinberg and Monahan (2007). Also, adolescents with MBID are more susceptible to peers that do not reject them (Gresham & MacMillan, 1997). This also explains why adolescents with MBID increase their donations after receiving disapproving feedback from peers on keeping coins to themselves (a few thumbs up instead of many thumbs up). Adolescents with MBID try to get peers not to reject them and to receive more positive feedback by changing their prosocial behaviour (the amount of donated coins). Probably during current research, the groups were too small to be able to result into significant differences. It could be possible that if the groups were somewhat larger, data would have shown significant differences in mean donations. Also, adolescents with MBID had a mean age of 13,97 and the adolescents without MBID have a mean age of 14,86. Adolescents develop quickly during the adolescent period, therefore, it might be suggested that age might have had some impact on the decision making of the two groups. Research showed that adolescents developed more resistance to peers from of the age of 14 (Steinberg & Monahan, 2007). This might suggest that if the groups differed more in age, there would have been significant differences in their mean scores too. A new investigation could be designed comparing young adolescents and older adolescents with MBID and the data of this study could then be compared to typically developing adolescents. Expected is to find larger differences between older adolescents with and without MBID than between younger

adolescents with and without MBID. This difference might then be used to set up new intervention strategies in order to make adolescents with MBID abler to resist peer (anti-social) influences.

Third, it was expected that scores on the self-reported questionnaires (RPI, BISBAS and SRQ) could not be used as valid predictors for the level of vulnerability shown in the PGG. Results showed no significant correlations between the RPI, BISBAS and SRQ scores from adolescents with MBID and their donated coins on the PGG. Which means that the reported answers from adolescents with MBID could not predict any outcome on the PGG. Parents and teachers had a little more insight in the vulnerability of the adolescents with MBID. Some of their reported questionnaire scores were significantly correlated with the scores on the PGG of adolescents. It can be concluded that adolescents with MBID assessed by parents and teachers as having emotional- and peer problems make higher donations on conditions of the PGG. Therefore, it can be concluded that adolescents with MBID will not report the correct vulnerability on self-reported questionnaires which will therefore not help in predicting the outcome on a prosocial game such as the PGG. Studies of Gresham and MacMillan (1997) and Kupersmidt, Coie and Dodge (1990) support this expectation.
An alternative explanation might be that adolescents with MBID have more emotional- and peer problems than typically developing adolescents and therefore score higher on the PGG. This could be an interesting subject for further research.

Follow up testing revealed a remarkable difference between the typical developing adolescents and the adolescents with MBID on a few subscales of the RPI and SRQ questionnaires. The typically developing adolescents showed more resistance to peer influence and weight more importance on being admired and socially invited and accepted than adolescents with MBID showed. Earlier research suggests that adolescents with MBID have more trouble with social skills and behave more as they think is socially desirable by others than typically developing adolescents (Mutsaers, Blekman & Schipper, 2007; Stoll, Bruinsma & Konijn, 2004). Adolescents with MBID often do not like to admit that they behave differently during social situations (Gresham & MacMillan, 1997). This might imply that the adolescents with MBID have chosen statements and answers least applicable to them in order to mask their deviant behaviour, if and when they were able to self-reflect. This might explain a large difference in self-reported questionnaire scores of adolescents with and without MBID. This also suggests that if adolescents with MBID would be able to reflect on themselves better, they would be better able to resist peer influences. Therefore, in order to help adolescents with MBID to reflect on themselves better, it could be an interesting research to see how adolescents with MBID behave prior and after a peer-induced training on how to reflect on themselves.

Another explanation for the differences in self-reported questionnaires would be that the questionnaires used were too difficult for adolescents with MBID to comprehend fully. Zoon (2012) discussed that adolescents with MBID had trouble with executive functions which were necessary to

be self-aware, to judge others' intentions and to monitor responses and thus influences self-reflections. An SRQ admiration question was: "I enjoy it if others look up to me" and an RPI statement was "some people change the way they act so much when they are with their friends that they wonder who they really are". Some questions, like these two, thus required self-reflection and were therefore very difficult for adolescents with MBID to answer. Next research should try to find out whether or not these questionnaires are suitable for adolescents with MBID or if they need to be tested in a different way (for instance, by filling out the self-report using interview techniques). This result would be of great importance to all psychological organisations working with adolescents with MBID.

Fourth and finally, the effect of peer influence was found to be active for both genders. Both boys and girls increased their donations on conditions alone2 compared to alone1. During the feedback condition donations were the highest of all. Thus, active peer induced feedback on boys' and girls' personal decisions increased the prosocial behaviour of these adolescents. The difference between donations of boys and girls was not significant. However, when looking at the means of the donations per gender, boys donated almost two and a half times more coins than girls did, after receiving feedback. Earlier researchers found that typically developing boys would be less able to resist peer influences and would weigh the emotional state of others as more important than girls would. Therefore, boys with MBID will probably also be more vulnerable to peer promoted behaviour (Douma et al., 2007; Leyds, 2012; Sumter, Bokhorst, Steinberg & Westenberg, 2009). This suggests that if the sample size would have been larger, the difference in effect of PGG conditions on gender would probably be significant. This expectation was not met, but current research shed some light on the probability of it being true. Therefore, more research on this gender difference is needed.

The amount of donated coins from girls with MBID at the beginning and at the end of the game was remarkable. Girls started and ended the PGG with higher mean donations than boys did. This may imply a few things: Either, girls with MBID are more focussed on the well-being of the group and therefore play the game with more social involvement than boys do, or playing a game with multiple players will have a stronger effect on the prosocial behaviour of girls with MBID, than receiving peer promoted prosocial feedback or being observed by peers during the game. The current research was probably too small to find a significant difference between boys and girls. During new research the aim must be to investigate a larger sample with an equal amount of boys and girls. Another aim must be to investigate the focus of girls with MBID during social play in order to find out whether girls are influenced by social play, by the well-being of the group or by social involvement than by peer induced behaviour. The findings of those researches can have great influence on the intervention strategies of psychology.

In conclusion, during current research the aim was to investigate whether or not adolescents with MBID were able to benefit from peer induced prosocial behaviour. Due to the sample size, some

results were not found to be significant, such as a significant difference between genders and a significant difference between adolescents with and without MBID. However, results did raise the expectation that follow up studies including larger sample sizes and more boys, will be able to demonstrate significant results. This current study sheds more light on the vulnerability to peer influences in adolescents with MBID during their development from childhood to adulthood. The peer promoted prosocial behaviour manipulation used during current research influences adolescents with MBID directly and positively. This means that peers with well adapted pro-social behaviour should be used in new intervention techniques using strategies of imitation and cooperative play in order to improve the limited and dysfunctional, problematic social behaviours of adolescents with MBID. Adolescents with MBID must be shown how to act more prosocial, their anti-social behaviour must be disapproved of and positive behaviour should be reinforced by their peers personally and directly. They therefore, may adapt better social strategies which will help them to be more successful in the community and in life.

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Appendix 1. Instruction protocol.

Questionnaire protocol for adolescents with MBID

Standard instruction questionnaire	
Explain: - How to fill out the questionnaire. - Explain that there are no wrong answers and that they should choose the answer most applicable to them - Click on the >> button at the end of every page. - Questions concerning the questionnaire? Feel free to ask them. - At the bottom of the page you see how far along you are with the questionnaire. - Finished? Tell it to the experimentor.	
What if..	**What to do…**
Adolescent struggles with reading a question.	Read the question to him. Participant needs to answer the question and check the applicable box himself.
Adolescent is struggling with every question.	Help by reading the questions. If necessary, help by rephrasing the question. Participant needs to answer the question and check the applicable box himself.
Adolescent has trouble understanding a word in the sentence.	Explain the meaning of the word. If the participant still does not understand, use an example that has no connection to the game what so ever.
Adolescent has trouble understanding a question.	Explain the question by rephrasing it. Without deviating from the original question.
Adolescent cannot choose between two answers.	Indicate that there is no wrong answer and that they should choose the answer most applicable to them
Adolescent has a very slow tempo, dyslexia, shows tiredness or has other reasons why he cannot or does not want to fill out the questionnaire by himself.	Suggest to help him by reading out the questions and answers. Let the adolescent answer on his own and let him check the applicable box himself.

Appendix 2: Relevant SPSS output.

1. Case summaries of the total dataset.

Case Summaries

meisje = 2 jongen =1		Leeftijd	1 = controle 2 = mbid	WISC/WAIS TIQ
jongen	Mean	14,5913	1,29	96,16
	Std. Deviation	1,24144	,456	16,200
	Sum	714,97	63	4712
meisje	Mean	14,0000	2,00	69,35
	Std. Deviation	1,47710	,000	5,974
	Sum	322,00	46	1595
Total	Mean	14,4024	1,51	87,60
	Std. Deviation	1,33980	,503	18,628
	Sum	1036,97	109	6307

2. Case summaries per group.

Case Summaries

1 = controle 2 = mbid		Leeftijd	WISC/WAIS TIQ	meisje = 2 jongen =1
controlegroep	Mean	14,8563	104,89	1,00
	Std. Deviation	1,33329	8,924	,000
	Sum	519,97	3671	35
MBID	Mean	13,9730	71,24	1,62
	Std. Deviation	1,21304	6,610	,492
	Sum	517,00	2636	60
Total	Mean	14,4024	87,60	1,32
	Std. Deviation	1,33980	18,628	,470
	Sum	1036,97	6307	95

3. Case summaries of the MBID-group per gender.

Case Summaries

meisje = 2 jongen =1		Leeftijd	WISC/WAIS TIQ
jongen	Mean	13,9286	74,36
	Std. Deviation	,61573	6,617
	Sum	195,00	1041
meisje	Mean	14,0000	69,35
	Std. Deviation	1,47710	5,974
	Sum	322,00	1595

Total	Mean	13,9730	71,24
	Std. Deviation	1,21304	6,610
	Sum	517,00	2636

4. Frequency table of boys and girls for the MBID-group.

meisje = 2 jongen =1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	jongen	14	37,8	37,8	37,8
	meisje	23	62,2	62,2	100,0
	Total	37	100,0	100,0	

5. Frequency of the TD-group (only boys included).

Statistics

		meisje = 2 jongen =1	Leeftijd	WISC/WAIS TIQ
N	Valid	35	35	35
	Missing	0	0	0
Mean		1,00	14,8563	104,89
Std. Deviation		,000	1,33329	8,924
Sum		35	519,97	3671

6. T-test with individual samples for age and gender between the two groups (TD and MBID).

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Leeftijd	Equal variances assumed	1,969	,165	2,943	70	,004	,88338	,30013	,28478	1,48197
	Equal variances not assumed			2,935	68,453	,005	,88338	,30093	,28295	1,48380
WISC/WAIS TIQ	Equal variances assumed	1,387	,243	18,246	70	,000	33,642	1,844	29,965	37,320
	Equal variances not assumed			18,097	62,539	,000	33,642	1,859	29,927	37,358

Group Statistics

	1 = controle 2 = mbid	N	Mean	Std. Deviation	Std. Error Mean
Leeftijd	controlegroep	35	14,8563	1,33329	,22537
	MBID	37	13,9730	1,21304	,19942
WISC/WAIS TIQ	controlegroep	35	104,89	8,924	1,508
	MBID	37	71,24	6,610	1,087

7. One sample t-test for IQ in the MBID-group only.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
WISC/WAIS TIQ	37	71,24	6,610	1,087

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
WISC/WAIS TIQ	65,563	36	,000	71,243	69,04	73,45

8. Chi square test for gender * Group (MDIB and TD)

meisje = 2 jongen =1 * 1 = controle 2 = mbid Crosstabulation

Count

		1 = controle 2 = mbid		
		controlegroep	MBID	Total
meisje = 2 jongen =1	jongen	35	14	49
	meisje	0	23	23
Total		35	37	72

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	31,969[a]	1	,000		
Continuity Correction[b]	29,174	1	,000		
Likelihood Ratio	41,127	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	31,525	1	,000		
N of Valid Cases	72				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 11,18.

b. Computed only for a 2x2 table

9. Chi square test for annual income parent 1 on the MBID-group only.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent

1 = controle 2 = mbid * Inkomenouder1	62	86,1%	10	13,9%	72	100,0%
1 = controle 2 = mbid * Inkomenouder2	61	84,7%	11	15,3%	72	100,0%
1 = controle 2 = mbid * Opleidingouder1	64	88,9%	8	11,1%	72	100,0%
1 = controle 2 = mbid * Opleidingouder2	61	84,7%	11	15,3%	72	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7,633[a]	7	,366
Likelihood Ratio	8,585	7	,284
Linear-by-Linear Association	,058	1	,809
N of Valid Cases	62		

a. 14 cells (87,5%) have expected count less than 5. The minimum expected count is ,47.

10. Chi square test for annual income parent 2 on the MBID-group only.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13,491[a]	7	,061
Likelihood Ratio	15,496	7	,030
Linear-by-Linear Association	,002	1	,969
N of Valid Cases	61		

a. 12 cells (75,0%) have expected count less than 5. The minimum expected count is ,48.

11. Chi square test for education parent 1 on the MBID-group only.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12,634[a]	6	,049
Likelihood Ratio	14,354	6	,026
Linear-by-Linear Association	5,160	1	,023

N of Valid Cases	64		

a. 8 cells (57,1%) have expected count less than 5. The minimum expected count is ,45.

12. Chi square test for education parent 2 on the MBID-group only.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21,875[a]	6	,001
Likelihood Ratio	26,767	6	,000
Linear-by-Linear Association	9,533	1	,002
N of Valid Cases	61		

a. 8 cells (57,1%) have expected count less than 5. The minimum expected count is ,48.

13. Chi square test for education parent 1 on the MBID-group only.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13,445[a]	6	,036
Likelihood Ratio	16,723	6	,010
Linear-by-Linear Association	6,270	1	,012
N of Valid Cases	64		

a. 9 cells (64,3%) have expected count less than 5. The minimum expected count is ,33.

14. Means of donated coins for both groups per condition.

Group Statistics

	1 = controle 2 = mbid	N	Mean	Std. Deviation	Std. Error Mean
Mean_Alone1	controlegroep	35	1,9729	1,24861	,21105
	MBID	37	1,6527	,91058	,14970
Mean_Spec	controlegroep	35	2,0629	1,27996	,21635
	MBID	37	1,8838	,91149	,14985
Mean_FB	controlegroep	35	2,7149	1,52306	,25744
	MBID	37	2,9351	,77252	,12700
Mean_Alone2	controlegroep	35	2,0371	1,57033	,26543
	MBID	37	2,4541	1,15147	,18930

15. RMA for MBID and TD with covariates age, educational level parent 1.

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
conditie	Pillai's Trace	,065	1,351[b]	3,000	58,000	,267
	Wilks' Lambda	,935	1,351[b]	3,000	58,000	,267
	Hotelling's Trace	,070	1,351[b]	3,000	58,000	,267
	Roy's Largest Root	,070	1,351[b]	3,000	58,000	,267
conditie * Leeftijd	Pillai's Trace	,045	,914[b]	3,000	58,000	,440
	Wilks' Lambda	,955	,914[b]	3,000	58,000	,440
	Hotelling's Trace	,047	,914[b]	3,000	58,000	,440
	Roy's Largest Root	,047	,914[b]	3,000	58,000	,440
conditie * Opleidingouder1	Pillai's Trace	,017	,335[b]	3,000	58,000	,800
	Wilks' Lambda	,983	,335[b]	3,000	58,000	,800
	Hotelling's Trace	,017	,335[b]	3,000	58,000	,800
	Roy's Largest Root	,017	,335[b]	3,000	58,000	,800
conditie * subjects	Pillai's Trace	,117	2,574[b]	3,000	58,000	,063
	Wilks' Lambda	,883	2,574[b]	3,000	58,000	,063
	Hotelling's Trace	,133	2,574[b]	3,000	58,000	,063
	Roy's Largest Root	,133	2,574[b]	3,000	58,000	,063

a. Design: Intercept + Leeftijd + Opleidingouder1 + subjects

Within Subjects Design: conditie

b. Exact statistic

16. Independent samples T-test for both groups on the SRQ and RPI.

Group Statistics

	1 = controle 2 = mbid	N	Mean	Std. Deviation	Std. Error Mean
Resistance to Peer Influence	controlegroep	35	2,9714	,50210	,08487
	MBID	37	2,3838	,52255	,08591
SRQ Admiration	controlegroep	35	5,0929	,92571	,15647
	MBID	37	3,9122	1,26411	,20782
SRQ Negative Social Potency	controlegroep	35	2,4114	,81015	,13694
	MBID	37	2,2270	,91550	,15051
SRQ Passivity	controlegroep	35	2,4667	,86395	,14603
	MBID	37	2,5766	1,36003	,22359
SRQ Prosocial	controlegroep	35	5,7200	,68976	,11659
	MBID	37	5,3081	1,37969	,22682
SRQ Sociability	controlegroep	35	5,7714	,78287	,13233
	MBID	37	4,7297	1,46531	,24090

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Resistance to Peer Influence	Equal variances assumed	,067	,797	4,861	70	,000	,58764	,12090	,34653	,82876
	Equal variances not assumed			4,866	69,981	,000	,58764	,12076	,34680	,82849
SRQ Admiration	Equal variances assumed	1,959	,166	4,500	70	,000	1,18069	,26236	,65743	1,70396
	Equal variances not assumed			4,539	65,946	,000	1,18069	,26014	,66130	1,70009
SRQ Negative Social Potency	Equal variances assumed	,096	,757	,903	70	,370	,18440	,20418	-,22282	,59163
	Equal variances not assumed			,906	69,700	,368	,18440	,20348	-,22146	,59026
SRQ Passivity	Equal variances assumed	7,564	,008	-,407	70	,685	-,10991	,27027	-,64895	,42913
	Equal variances not assumed			-,412	61,429	,682	-,10991	,26705	-,64384	,42402
SRQ Prosocial	Equal variances assumed	6,522	,013	1,588	70	,117	,41189	,25938	-,10542	,92921
	Equal variances not assumed			1,615	53,577	,112	,41189	,25503	-,09951	,92329
SRQ Sociability	Equal variances assumed	11,126	,001	3,731	70	,000	1,04170	,27919	,48488	1,59852
	Equal variances not assumed			3,790	55,640	,000	1,04170	,27485	,49103	1,59237

17. Correlations total scores of parental questionnaires on the PGG game.

Correlations

		Mean_Alone1	Mean_Spec	Mean_FB	Mean_Alone2	Totaal Ouders alle schalen zonder Prosoc	Totaal Docent alle schalen zonder Prosoc
Mean_Alone1	Pearson Correlation	1	,852**	,498**	,536**	,198	,315
	Sig. (2-tailed)		,000	,002	,001	,262	,058
	Sum of Squares and Cross-products	29,850	25,455	12,601	20,235	42,325	46,895
	Covariance	,829	,707	,350	,562	1,283	1,303
	N	37	37	37	37	34	37
Mean_Spec	Pearson Correlation	,852**	1	,661**	,642**	,157	,179
	Sig. (2-tailed)	,000		,000	,000	,376	,289
	Sum of Squares and Cross-products	25,455	29,909	16,751	24,246	33,794	26,688
	Covariance	,707	,831	,465	,673	1,024	,741
	N	37	37	37	37	34	37
Mean_FB	Pearson Correlation	,498**	,661**	1	,411*	-,016	,153
	Sig. (2-tailed)	,002	,000		,011	,926	,366
	Sum of Squares and Cross-products	12,601	16,751	21,484	13,170	-3,050	19,330
	Covariance	,350	,465	,597	,366	-,092	,537
	N	37	37	37	37	34	37
Mean_Alone2	Pearson Correlation	,536**	,642**	,411*	1	,260	,056
	Sig. (2-tailed)	,001	,000	,011		,138	,743
	Sum of Squares and Cross-products	20,235	24,246	13,170	47,732	70,800	10,492
	Covariance	,562	,673	,366	1,326	2,145	,291
	N	37	37	37	37	34	37
Totaal Ouders alle schalen zonder Prosoc	Pearson Correlation	,198	,157	-,016	,260	1	-,111
	Sig. (2-tailed)	,262	,376	,926	,138		,530
	Sum of Squares and Cross-products	42,325	33,794	-3,050	70,800	1812,500	-120,000
	Covariance	1,283	1,024	-,092	2,145	54,924	-3,636
	N	34	34	34	34	34	34
Totaal Docent alle schalen zonder Prosoc	Pearson Correlation	,315	,179	,153	,056	-,111	1
	Sig. (2-tailed)	,058	,289	,366	,743	,530	
	Sum of Squares and Cross-products	46,895	26,688	19,330	10,492	-120,000	743,892
	Covariance	1,303	,741	,537	,291	-3,636	20,664
	N	37	37	37	37	34	37

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

18. Significant correlations of subscale scores of parental questionnaires on the PGG game.

Correlations

		Mean_Alone1	Mean_Spec	Mean_FB	Mean_Alone2	Ouder subschaal emotionele problemen	Ouder subschaal peer problemen	Docent subschaal peer problemen
Mean_Alone1	Pearson Correlation	1	,852**	,498**	,536**	,240	,287	,429**
	Sig. (2-tailed)		,000	,002	,001	,172	,100	,008
	Sum of Squares and Cross-products	29,850	25,455	12,601	20,235	18,513	15,760	23,524
	Covariance	,829	,707	,350	,562	,561	,478	,653
	N	37	37	37	37	34	34	37
Mean_Spec	Pearson Correlation	,852**	1	,661**	,642**	,219	,204	,380*
	Sig. (2-tailed)	,000		,000	,000	,213	,248	,020
	Sum of Squares and Cross-products	25,455	29,909	16,751	24,246	17,069	11,282	20,854
	Covariance	,707	,831	,465	,673	,517	,342	,579
	N	37	37	37	37	34	34	37
Mean_FB	Pearson Correlation	,498**	,661**	1	,411*	,008	-,070	,194
	Sig. (2-tailed)	,002	,000		,011	,964	,694	,251
	Sum of Squares and Cross-products	12,601	16,751	21,484	13,170	,544	-3,332	9,016
	Covariance	,350	,465	,597	,366	,016	-,101	,250
	N	37	37	37	37	34	34	37
Mean_Alone2	Pearson Correlation	,536**	,642**	,411*	1	,379*	,357*	,177
	Sig. (2-tailed)	,001	,000	,011		,027	,038	,294
	Sum of Squares and Cross-products	20,235	24,246	13,170	47,732	37,341	24,976	12,286
	Covariance	,562	,673	,366	1,326	1,132	,757	,341
	N	37	37	37	37	34	34	37
Ouder subschaal emotionele problemen	Pearson Correlation	,240	,219	,008	,379*	1	,267	,159
	Sig. (2-tailed)	,172	,213	,964	,027		,127	,370
	Sum of Squares and Cross-products	18,513	17,069	,544	37,341	236,382	44,853	23,853
	Covariance	,561	,517	,016	1,132	7,163	1,359	,723
	N	34	34	34	34	34	34	34
Ouder subschaal peer problemen	Pearson Correlation	,287	,204	-,070	,357*	,267	1	,229
	Sig. (2-tailed)	,100	,248	,694	,038	,127		,193
	Sum of Squares and Cross-products	15,760	11,282	-3,332	24,976	44,853	119,441	24,441
	Covariance	,478	,342	-,101	,757	1,359	3,619	,741
	N	34	34	34	34	34	34	34
Docent subschaal peer problemen	Pearson Correlation	,429**	,380*	,194	,177	,159	,229	1
	Sig. (2-tailed)	,008	,020	,251	,294	,370	,193	
	Sum of Squares and Cross-products	23,524	20,854	9,016	12,286	23,853	24,441	100,811
	Covariance	,653	,579	,250	,341	,723	,741	2,800
	N	37	37	37	37	34	34	37

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

19. RMA TD and MBID between subjects test effects.

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1410,859	1	1410,859	324,530	,000
subjects	,086	1	,086	,020	,889
Error	304,317	70	4,347		

20. Follow up RMA for MBID on effect size.

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
conditie	Pillai's Trace	,738	31,910[b]	3,000	34,000	,000	,738
	Wilks' Lambda	,262	31,910[b]	3,000	34,000	,000	,738
	Hotelling's Trace	2,816	31,910[b]	3,000	34,000	,000	,738
	Roy's Largest Root	2,816	31,910[b]	3,000	34,000	,000	,738
conditie * subjects	Pillai's Trace	,000	.[b]	,000	,000	.	.
	Wilks' Lambda	1,000	.[b]	,000	35,000	.	.
	Hotelling's Trace	,000	.[b]	,000	2,000	.	.
	Roy's Largest Root	,000	,000[b]	3,000	33,000	1,000	,000

a. Design: Intercept + subjects

Within Subjects Design: conditie

b. Exact statistic

21. Follow up RMA for TD on effect size

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
conditie	Pillai's Trace	,377	6,448[b]	3,000	32,000	,002	,377
	Wilks' Lambda	,623	6,448[b]	3,000	32,000	,002	,377
	Hotelling's Trace	,605	6,448[b]	3,000	32,000	,002	,377
	Roy's Largest Root	,605	6,448[b]	3,000	32,000	,002	,377
conditie * subjects	Pillai's Trace	,000	.[b]	,000	,000	.	.
	Wilks' Lambda	1,000	.[b]	,000	33,000	.	.
	Hotelling's Trace	,000	.[b]	,000	2,000	.	.
	Roy's Largest Root	,000	,000[b]	3,000	31,000	1,000	,000

a. Design: Intercept + subjects

Within Subjects Design: conditie

b. Exact statistic

22. RMA for boys versus girls on the different conditions

Between-Subjects Factors

		Value Label	N
meisje = 2 jongen =1	1	Jongen	14
	2	Meisje	23

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
conditie	Pillai's Trace	,753	33,511[b]	3,000	33,000	,000
	Wilks' Lambda	,247	33,511[b]	3,000	33,000	,000
	Hotelling's Trace	3,046	33,511[b]	3,000	33,000	,000
	Roy's Largest Root	3,046	33,511[b]	3,000	33,000	,000
conditie * Geslacht	Pillai's Trace	,232	3,328[b]	3,000	33,000	,031
	Wilks' Lambda	,768	3,328[b]	3,000	33,000	,031
	Hotelling's Trace	,303	3,328[b]	3,000	33,000	,031
	Roy's Largest Root	,303	3,328[b]	3,000	33,000	,031

a. Design: Intercept + Geslacht

Within Subjects Design: conditie

b. Exact statistic

23. Test of between subjects for Boys and Girls including the effect size.

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	668,988	1	668,988	276,121	,000	,888
Geslacht	3,674	1	3,674	1,517	,226	,042
Error	84,798	35	2,423			

24. Independent Samples T-test for boys versus girls mean scores on the different conditions

Group Statistics

	meisje = 2 jongen =1	N	Mean	Std. Deviation	Std. Error Mean
Mean_Alone1	jongen	14	1,3250	,89995	,24052
	meisje	23	1,8522	,87652	,18277
Mean_Spec	jongen	14	1,7571	1,06534	,28472
	meisje	23	1,9609	,82002	,17099
Mean_FB	jongen	14	3,0071	,84532	,22592
	meisje	23	2,8913	,74095	,15450
Mean_Alone2	jongen	14	2,0286	1,36067	,36365
	meisje	23	2,7130	,94354	,19674