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Peer Relationship Difficulties among Children with ADHD: A Systematic Review

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Abstract
Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders among children. The symptoms of ADHD may lead to several impairments in children who experience them and that includes difficulties with peers. The purpose of this study is to review previous research concerning peer relationships among children with ADHD. In this review, six papers were selected from the database Google Scholar using the keywords peer relationships, peer problems, ADHD, and ADHD symptoms. The studies were conducted on several aspects of peer relationships, including peer problems, quality of friendships, sociometric status, peer victimization, and peer rejection among children with ADHD. Based on the review, it was concluded that children with ADHD are more likely to have peer problems and be rejected and victimized by peers. The findings also showed that children with ADHD had lower friendship quality and sociometric status compared to children without ADHD. The impairments in peer relationships may lead to numerous negative outcomes including internalized distress, academic issues, and long-term behavioral outcomes. However, these adverse effects may be prevented through early interventions that were proven effective for children with ADHD with peer difficulties. While the implication of the current study may raise awareness and provide information on peer relationships among children with ADHD, it is suggested for future studies conduct reviews that cover more aspects of peer relationships among children with ADHD.

Keywords: ADHD, Attention-Deficit/Hyperactivity Disorder, Peer Relationships, Peer Difficulties, Children

Introduction
Social relationships and interactions are one of the most important aspects in the development of children, as part of their learning experience are through socializing and connecting with peers (Berk, 2017). The importance of peers begins to increase even more when the child emerges into middle childhood (Berk, 2017) and as children progress through middle and late childhood, the size of their peer group will grow bigger (Santrock, 2017). Apart from that, involvement with peers also plays a crucial role among adolescents as they start to
develop a sense of self and identity (Zendarski et al., 2020). This is because adolescents tend
to spend more time with peers compared to their family members (Berk, 2017) thus peer
relationships become progressively more important (Zendarski et al., 2020). However, peer
relationships can be adversely affected among children with interference in psychopathology
(Dryburgh et al., 2020) and including children with Attention-Deficit/Hyperactivity Disorder or
ADHD (Hoza, 2007). Children with ADHD are commonly known for their impairments in
attention and hyperactivity, but apart from that, it also affects many other functional aspects
of their lives (Bunford et al., 2018). Such impairments include impairments in peer
relationships (Hoza, 2007; Ros & Graziano, 2017). This paper will first put into context regard
peer relationships, ADHD, and the correspondence between the two. Next, the main content
will include a review of the correlational research on peer relationships among children with
ADHD. Finally, the outcomes of the impairments in peer relationships among children with
ADHD and the effective interventions will be discussed.

Peer Relationship in Children's Development

In childhood, friendships play an important role in their social development as it is a
phase where they would start to develop trust, sensitivity, and emotional commitment (Berk,
2017). The quality of friendships is fundamental as it will affect children’s psychosocial
adjustments (Freitas et al., 2018). Apart from that, children will also emerge with a strong
need to feel belonged and this may be attained by having peer groups (Berk, 2017). An
important function of having peer groups is to provide a source of information and
comparison about the world outside the family, receive feedback about their abilities and be
able to evaluate themselves (Santrock, 2017). Children’s functioning in a peer group can be
discovered by evaluating their social status which is called the sociometric status (Cillessen,
2020). A sociometric status refers to the degree to of children are likable among their
classmates and is categorized as popular children, average children, rejected children,
controversial children, and neglected children (Santrock, 2017). Sociometric status is
considered important in the development of children as it is correlated with their later
outcomes in the future (Cillessen, 2020).

Defining ADHD

According to the Diagnostic Statistical Manual (DSM-5; American Psychological
Association; APA, 2013), there are two main criteria for ADHD which are inattention and
hyperactivity-impulsivity. A child diagnosed with ADHD will be specified as a predominantly
inattentive presentation or predominantly hyperactive/impulsive presentation when at least
6 symptoms from either one of the criteria are met. If a child fulfills both criteria, he or she
will be specified with the combined presentation, where both symptoms of inattentive and
hyperactive-impulsive are present. Globally, the prevalence of ADHD among children and
adolescents between 5-19 years old is estimated to be 2.9% and was found to be more
common among boys compared to girls (Erskine et al., 2013). Based on DSM-5, among the
struggles of children with ADHD include being easily distracted, appearing to not listen when
others are talking, talking excessively, and often interrupting others (APA, 2013).

Peer Relationship in Children with ADHD

With regards to peer relationships among children with ADHD, there is sufficient
evidence from past literature that children with ADHD have significant difficulties with social
functioning skills (Feldman et al., 2017; Zendarski et al., 2020). In children with ADHD, social
skills difficulties can include not paying attention while others are talking, cutting conversations (Faradilla, 2019), and the inability to understand social cues (Faradilla, 2019; Ragnarsdottir et al., 2017). These impairments can be explained due to the symptoms of inattention and hyperactivity-impulsivity in ADHD that affect their functioning with peers (Ragnarsdottir et al., 2017). The symptoms can also appear in the form of intrusive behaviors that would prevent peers from interacting with them (Holland, 2019). Consequently, the problems with peer relationships in ADHD may increase the likelihood of them being involved in peer victimization (Zendarski et al., 2020) and receiving low social acceptance among peers (Forner et al., 2017). Hence, knowing that difficulties in social functioning display an important issue among children with ADHD (Ros & Graziano, 2017), raises the need to address the concern as problems with social skills imply major adverse effects on children with ADHD (Holland, 2019).

Correlational Research on Peer Relationships among ADHD Children

One of the main purposes of the current study is to provide a review of past research conducted on peer relationships among children with ADHD (Table 1). Six papers were selected using the keywords peer relationships, peer functioning, ADHD, and ADHD symptoms between the year 2016-2021 through the Google Scholar database. The abstracts were reviewed following the order of pages displayed in the results until six papers that matched closely with the current study were chosen. The major findings specifically related to peer relationships among children with ADHD will be focused on in this review.

The selected studies conducted correlational research among children with ADHD to investigate peer problems (Forner et al., 2017; Milledge et al., 2018; Ragnarsdottir et al., 2018), peer rejection and peer victimization (Evans et al., 2019), sociometric status and social integrations (Grygiel et al., 2018) and quality of friendships (Rokeach & Wiener, 2017). The sample from the studies includes children aged between 5-12 years old (Forner et al., 2017, Evans et al., 2019, Grygiel et al., 2018, Ragnarsdottir et al., 2018) and adolescents aged 13-18 years old (Rokeach & Wiener, 2017). Meanwhile, only one study adopted a sample of both children and adolescents where the age of participants was between 5-17 years old (Milledge et al., 2018). Three studies included a comparison group without the diagnosis or symptoms of ADHD (Forner et al., 2017; Rokeach & Wiener, 2017; Ragnarsdottir et al., 2018) while the rest of the studies recruited only participants with ADHD diagnosis or ADHD symptoms. The methodology applied for data collection was through self-report measures (Rokeach & Wiener, 2017), both self-report measures and peer nominations (Grygiel et al., 2018), and both parent- and teacher report measures (Forner et al., 2017; Milledge et al., 2019) and both teacher- and self-report measures (Evans et al., 2019).

Peer Problems in ADHD

Forner et al (2017) compared typically developing children (n=37) with children with ADHD (n=35) on their executive functioning, theory of mind, and peer problems. The results from the parent-report measure showed that children with ADHD had higher peer problems compared to typically developing children. Interestingly, executive function on behavior regulation was found to be partially mediating the relationship between peer problems and ADHD symptoms. This indicated that executive function may act as one of the mediating factors in children with ADHD to experience problems with peers. On the other hand, Milledge et al (2019) investigated peer relationship problems and social integration among children and adolescents aged between 5-17 years old (n=147) with symptoms of ADHD, Oppositional
<table>
<thead>
<tr>
<th>Objective</th>
<th>Method</th>
<th>Major Findings</th>
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| To examine differences between children with ADHD and children with TD on executive functioning, theory of mind, components, and peer functioning | Teacher-report and parent-report | - ADHD symptoms were related to difficulties in relationships with peers and low social acceptance.  
- ADHD show higher peer problems compared to TD |
| To investigate if oppositional defiant disorder (ODD) and ADHD symptoms predict academic performance, depressive symptoms, and peer functioning in middle childhood | Longitudinal study, teacher-report and self-report |  
- Inattention predicted higher levels of peer victimization  
- Hyperactivity impulsivity predicted future peer rejection and victimization  
- Hyperactivity-impulsivity was a strong predictor of teacher-reported peer rejection and victimization  
- Inattention predicted higher levels of peer rejection and prosocial behavior |
| To study sex differences and symptoms of ADHD on peer relationships and prosocial behavior | Teacher-report and parent-report |  
- Parent-reported ADHD inattentive symptoms significantly related to increased peer relationship problems  
- Teacher-reported hyperactive-impulsive behavior significantly related to decreased peer relationship problems when controlling for other variables  
- ADHD had significantly decreased peer problems among the children when other variables were controlled. It was concluded that symptoms of hyperactivity-impulsivity in ADHD may act as a protective factor in peer problems if other psychopathology symptoms are controlled. |
<table>
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<th>Objective</th>
<th>Method</th>
<th>Major Findings</th>
</tr>
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<tbody>
<tr>
<td>To investigate the relationship between ADHD diagnosis and the social</td>
<td>Peer nominations and self-report</td>
<td>- Children with ADHD had lower levels of satisfaction with their peer networks when compared with other children.</td>
</tr>
<tr>
<td>relationships among children</td>
<td></td>
<td>- Children with ADHD received fewer positive and more negative</td>
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<td></td>
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<td>- Younger adolescents with and without ADHD had similar ratings on social support in their friendships.</td>
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<td>- Levels of perceived social support diminished in the friendships of older adolescents with ADHD but increased in the group of older adolescents without ADHD</td>
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<td></td>
<td></td>
<td>- Children with and without ADHD had similar scores on negative</td>
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<tr>
<td>To compare the quality of friendships (same- and other-sex) in adolescents with and without ADHD, across age and gender.</td>
<td>Self-report</td>
<td>- Parent-report showed more peer problems in children with ADHD</td>
</tr>
<tr>
<td></td>
<td>Teacher-report and parent-report</td>
<td>- Parent and teacher reports showed girls with ADHD appear to be struggling socially more than boys with ADHD</td>
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<td></td>
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<td>- Parent-report showed more peer problems among the older girls</td>
</tr>
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<td></td>
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<td>- Teacher-report showed younger</td>
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Table 1. Review

<table>
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<tr>
<th>Author</th>
<th>Sample</th>
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<tr>
<td>Forner et al. (2017)</td>
<td>ADHD and children with typical development (TD), aged between 7 and 11</td>
</tr>
<tr>
<td>Evans et al. (2019)</td>
<td>Teachers and 346 children with ADHD, aged between 5–8 years</td>
</tr>
<tr>
<td>Milledge et al. (2019)</td>
<td>Teachers, parents, and 147 children and adolescents with ADHD, aged 5–17 years</td>
</tr>
</tbody>
</table>
Another study by Ragnarsdottir et al. (2018) aimed to investigate if there is a difference in gender with regards to the social functioning among children with ADHD and to see if the social difficulties vary according to age. The sample involved 592 children who were diagnosed with ADHD and a total of 215 typically developing children as a comparison group. It was found that children with ADHD have higher peer problems compared to children without ADHD based on parent-report. PerAboute of the main objectives in one study, gender differences among children with ADHD indicated that girls encounter higher levels of social difficulties than boys. Furthermore, the parent-report findings also revealed that older girls with ADHD showed greater problems with peers compared to younger girls with ADHD. However, the results are in contrast to teacher reports which recorded no difference in terms of age among girls with ADHD.

One similarity was found in the studies by Milledge et al. (2019) and Ragnarsdottir et al. (2018) where there were contradictions in the findings between parent-report and teacher-report with regards to the children’s peer problems. This can be explained that the association between problems in peer relationships and symptoms of ADHD can differ depending on the resources (Milledge et al., 2019) which in this case, parents and teachers. In comparing these three studies, one of the differences identified is regarding the ADHD criteria considered to be the sample. The studies by Forner et al. (2017); Ragnarsdottir et al. (2018) determined the sample of children with ADHD through a clinical diagnosis while Milledge et al. (2019) only analyzed symptoms of ADHD through parent- and teacher-report measures.

**Friendships and Sociometric Status in ADHD**

The study by Rokeach & Wiener (2017) aimed to investigate the differences in age and gender concerning the quality of friendship among children with ADHD. A total of 115 adolescents were recruited for the study, including a comparison group without ADHD diagnosis (n=54). The data on the adolescents’ friendship quality were collected through self-report measures. In this study, friendship quality was assessed from two indicators which are social support and negative interactions of the adolescents, with same- and other-sex friendships. Contrary to the hypothesis, similar scores were found regarding perceived social support in friendships among young adolescents both with and without ADHD. However, scores on perceived social support in friendships were lower among older adolescents with ADHD compared to older adolescents without ADHD. Therefore, this finding indicated that there is a significant association between age and friendship quality among adolescents with ADHD. A past study that supported this result discovered that older adolescents with ADHD...
symptoms experience negative friendship quality when transitioning to high school (Meinzer et al., 2021). Apart from that, results showed that negative interactions in friendships were indifferent regardless of age and gender, among adolescents both with and without ADHD. Similar to the first result mentioned, this finding also contradicted the prediction. With regards to gender, it was reported that female adolescents had higher perceived social support in friendships as compared to males. In this case, no differences were also noted between adolescents with and without ADHD. This can be due to the data collected only through self-report measures hence information gained may not be fully comprehensive.

On the other hand, Grygiel et al (2018) conducted research to identify the objective and subjective social relationship dimensions among children with ADHD by measuring their sociometric status and perceived social integrations. Similar to the study done by Rokeach and Wiener (2017), the sample in this study included both children with ADHD (n=38) and without ADHD (n=718). The sociometric status of the children was determined through peer nominations where the children would select their most and least favorite classmates to play with. Meanwhile, self-report measures were used to evaluate perceived social integration where higher scores would demonstrate higher levels of peer relationship satisfaction. The findings revealed that in comparison with other children, children with ADHD received greater negative nominations and lesser positive nominations on sociometric status. With regards to social integration, children with ADHD had lower levels of satisfaction in peer relationships than children without ADHD.

**Peer Victimization and Peer Rejection in ADHD**

Evans et al (2019) carried out a study to find out if the symptoms of ADHD act as predictors in peer functioning, academic performance, and depressive symptoms among children. The children’s peer functioning was determined by measuring the children’s level of peer rejection and peer victimization. A longitudinal method was applied where the children were examined on seven occasions between the years 2012 and 2016. Both teacher- and self-report measures were utilized to collect the data. The teacher-report on symptoms of ADHD among the children were collected at the beginning of the research while peer functioning and other variables were evaluated on all the occasions. Self-report measures on peer rejection and peer victimization were applied to the children after three years from the research baseline. It was discovered that symptoms of inattention in ADHD among grade K-2 (7 years) children predicted higher peer victimization. Meanwhile, symptoms of hyperactivity-impulsivity act as a predictor of children in grades 3-5 (8-11 years) getting higher peer rejection and peer victimization based on teacher reports. Another important finding is the symptoms of inattention in ADHD appeared to be a stronger predictor of peer rejection and peer victimization, both relational and physical as compared to symptoms of hyperactivity-impulsivity. One previous study that is in line with these findings discovered that compared to other children, children with ADHD encountered more peer victimization based on parent- and teacher-report (Efron et al., 2021).

**Summary of Results from Correlational Research**

Overall, this review indicated that children with ADHD experience more difficulties concerning peer relationships. The findings provided evidence that children with ADHD had more peer problems, less friendship quality, and lower sociometric status. Apart from that, findings also showed that children with ADHD had higher peer victimization and peer
rejection. These impairments in peer relationships may lead to a more serious negative outcome later in the children’s development (Holland, 2019; Mrug et al., 2012).

**Outcomes of Peer Relationships Difficulties in ADHD**

Generally, it has been well established that ADHD symptoms may cause difficulties in the outcomes of the children (Bunford et al., 2018). In the current section, the negative outcomes among children with ADHD specifically due to the impairments in peer relationships will be highlighted. According to Mrug et al (2012), frequent negative experiences with peers and increased social skills deficiency may lead to deterioration in various areas of functioning throughout children’s lifetime, and such impairments include consequences in terms of internalizing distress. Particularly among children with ADHD, previous studies had found that problems with peers in childhood mediated further depressive symptoms during adolescents (Feldman et al., 2017; Powell et al., 2019). Furthermore, adolescents with ADHD were reported to have higher levels of anxiety due to relational and physical peer victimization (Becker et al., 2017) as well as peer rejection during childhood (Mrug et al., 2012). Another study concluded that children with ADHD are more likely to have increased levels of loneliness resulting from poor friendship quality (Smit et al., 2020).

Apart from psychological impacts, peer relationship problems may also affect children with ADHD academically (Efron et al., 2018). A study conducted by Zendarski et al (2020) showed that adolescents with ADHD who were peer victimized had poorer academic achievement, lower teacher-report academic competence, and low self-report on school attitudes. In addition, children with ADHD who had high peer rejection were more prone to truancy (Molina et al., 2012). Other than that, difficulties in peer relationships among children and adolescents with ADHD may also lead to negative outcomes in the longer term. It was reported that peer impairments act as a mediator between childhood ADHD experience and substance abuse when they become adolescents (Elskin et al., 2018). Meanwhile, children with ADHD who were rejected by peers were found to be highly involved with delinquency and smoking behavior (Mrug et al., 2012) and are more likely to be associated with destructive behaviors and drinking (Molina et al., 2012). These negative outcomes due to peer difficulties, however, are possible be prevented if early interventions are implemented among children with ADHD.

**Interventions for Peer Relationship Difficulties in ADHD**

It is suggested to include diverse interventions for children with ADHD depending on the difficulty areas experienced by the child (Holland, 2019). With regards to difficulties in peer relationships, several treatments and interventions can assist children with ADHD. Firstly, psychosocial treatment through Cognitive-behavioral therapy (CBT) in recognizing the interrelation between thoughts, feelings, and behavior may help children with ADHD improve their social skills (Holland, 2019). One research by Coelho et al (2017) that conducted a group-based CBT found a significant improvement in social skills among children with ADHD, in comparison with the control group that did not receive the treatment. While also focusing on several other elements, the group CBT that was implemented on social skills includes addressing appropriate daily behaviors with peers and teachers (Coelho et al., 2017). Apart from that, a study on play-based intervention carried out by Barnes et al (2017) was proven effective for long-term outcomes in social skills among children with ADHD. The results showed that following 12 months of the intervention, the social skills among children with ADHD were found to be developmentally appropriate and were maintained (Barnes et al.,
2017). Lastly, classroom strategies intervention indicated that the influence of teachers is effective in helping peer relationship difficulties among children with ADHD (Mikami et al., 2019). It was suggested that classroom strategies can be conducted by teachers to improve peer inclusiveness in terms of the children’s liking of one another (Mikami et al., 2019). Alternatively, this will result in a more positive sociometric status among children with ADHD which may improve their peer relationships as a whole.

Conclusion
The purpose of the current study is to provide a systematic review of the previous studies conducted about impairments in peer relationships among children with ADHD. One of the limitations identified in the papers reviewed may not include all aspects of peer relationships. It is recommended for future reviews to include more aspects of peer relationships to address this issue of peer difficulties among children with ADHD in a further comprehensive way. Nonetheless, the implications of the current study may raise awareness among various parties to ensure that children with ADHD can receive adequate support. It is important to provide early interventions for children with ADHD who struggle with peer difficulties as it will prevent them from affecting other aspects of development, as well as negative outcomes later in life.

Contribution
This study makes a vital contribution to articulating the underlying of the role of peer relationship difficulties among children with ADHD. We make a theoretical contribution by explaining relevant studies on ADHD and relationship difficulties. As far as, the theoretical contributions of this paper are concerned, the study contributes to our understanding of some factors that have not been explored in-depth in previous literatures relating to relationship difficulties, rejection, and victimization among children with ADHD. Hence, helping in developing a better understanding of the factors in which directly and indirectly impact on relationship difficulties among children with ADHD is the key theoretical contribution of our research. This study would help practitioners and researchers in the field of child psychology, education, and psychology to concentrate their efforts and investments better. This is particularly significant since existing literature is almost silent on the investigation essential psychological theories among children with ADHD.

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