



The effectiveness of a training program based on Dodge's Social Information Processing Model on social competence of children with ADHD

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Abstract

The purpose of the current study was to explore the effectiveness of a training program based on Dodge's social information processing model on social competence of children with ADHD. 54 students in grades five who had been identified as having ADHD and were experiencing social problems were chosen. The sample was randomly divided into two groups; experimental (n= 27; 20 boys and 7 girls) and control (n= 27, 22 boys, 5 girls). Attention-Deficit Hyperactivity Disorder Test (ADHDT), and Social Competency Rating Form were used. ANCOVA and Repeated Measures Analyses were employed for data analysis. Results from this study indicated the effectiveness of the program employed in improving social competency of the students in the experimental group.

Keywords. Dodge's social information processing model, social competence, children with ADHD

Introduction

Many children with ADHD exhibit severe social problems. These social problems often result in their being overtly rejected by their peers. Such rejection is a strong predictor of poor long-term outcomes (Parker & Asher, 1987). Children with hyperactivity appear to manifest a greater amount of aggression and resort to more aggressive solutions to social situations than normal children (Stormont, 2001).

As stated previously, hostile or reactive aggression has been documented to be less socially acceptable among the peer group and affect peer reputation status. Maladjustment of early school-age peer relationships may potentially increase a child's risk for later maladjustment in a number of different areas (e.g. social skills, relationships, self-esteem), even for those individuals who no longer meet criteria for behavioral disorders in adolescence and adulthood (DeWolfe, Byrne, & Bawden, 2000).

Research in the area of social cognition has not provided much definitive evidence of deficits in children with ADHD. However, some specific findings from this research may assist in planning interventions for children with social problems. First, children with externalizing problems have been found to exhibit a hostility bias (Dodge & Feldman, 1990). That is, following an ambiguous act by another child, these children are likely to infer a hostile intent by that person while also underestimating their own responsibility for outcomes. Aggressive boys tend to underestimate their own aggressiveness, making it less likely that they will make an effort to use self-control and more likely that they will use similar responses in future interactions (Lochman, 1987).

Children with social problems also have difficulty generating behavioral solutions to interpersonal problems (Evans & Short, 1991; Guerra & Slaby, 1989). Although they can choose an appropriate first solution, when the first solution is ineffective, these children seem to have difficulty coming up with alternative solutions.

Although numerous of studies have examined the effectiveness social information processing in other children, little is known about the effect on social competence of children with ADHD.

So, the present study seeks to explore the effectiveness of a training program based on Dodge's social information processing model on social competence of children with ADHD. It addresses the following questions:

- 1- Are there statistically significant differences in post-test scores mean between control and experimental groups on Social Competency Rating Form?
- 2- If the program is effective, is this effect still evident a month later?

Literature review

Social Competence in children with ADHD

Social competence has previously been defined as: the ability to engage effectively in interpersonal interaction (Custrini & Feldman, 1989; Oppenheimer, 1989; Weinstein, 1991); the ability to employ environmental and personal resources to attain advantageous developmental outcomes (Waters & Stroufe, 1983); normative or socially sanctioned interpersonal behaviors (Bellack & Hersen, 1979); and as an evaluative term based on the judgments of others with regards to the adequacy of task performance (Gresham, 1997; McFall, 1982).

It is widely accepted that children with ADHD have deficits in many areas of social functioning (Barkley et al., 1988). The inappropriate behaviors and poor social skills characteristic of many children with ADHD are commonly met with negative reactions by others in their environment (Campbell, 1990; Guevremont & Dumas, 1994; Hubbard & Newcomb, 1991). Investigations of the relationships of children with ADHD clearly demonstrate that when compared with their peers, these children have lower sociometric status on the average and are at a greater risk for social rejection (Flicek, 1992; Landau & Moore, 1991; Pope, Bierman, & Mumma, 1989; Wheeler & Carlson, 1994).

It was estimated that more than 50% of children with ADHD have significant problems in social relationships with other children (Pelham & Bender, 1982). As mentioned above, the interpersonal behavior of children with ADHD is often characterized as more impulsive, intrusive, excessive, disorganized, engaging, aggressive, intense, and emotional. This behavior disrupts the smoothness of the ongoing stream of social interactions, reciprocity and cooperation that may constitute the children's daily life with others (Whalen & Henker, 1992).

Crick and Dodge's Information Processing Model of Social Competence in children with ADHD

The social information processing model has been applied to understanding the development of social competence among certain children, including children with ADHD (e.g., Andrade, 2007; MacBrayer et al., 2003; Dodge & Pettit, 2003; Orobio de Castro et al., 2002; Yoon, Hughes, Gaur, & Thompson, 1999). According to Crick and Dodge's (1994) reformulated Social Information-Processing Model, children come to social situations with a set of biologically determined capabilities and a "database" of memories of past experiences. The child selectively attends to particular situational and internal cues and encodes them. The child then interprets the encoded cues using filters, causal analyses, and inferences about others' intent. After the child interprets the situation, he/she selects a goal or desired outcome (i.e., focused arousal state) for the situation. Goals are revised or changed as a result of immediate social stimuli. The next step involves recalling possible responses to the situation from past experiences; however, if the situation is novel, the child may construct new behaviors as a response to the social cues. The child then evaluates all possible responses based on outcome expectations and chooses a behavioral response.

In their model, Crick and Dodge (1994) hypothesize that there are six sequential processes which lie behind competent performance in any social situation. These six processing "steps" are hypothesized to occur in "real-time", or in other words, occur simultaneously within the context of different kinds of social situations. The six processes or "steps" are 1) encoding of relevant stimulus cues 2) accurate interpretation of those cues 3) goal selection based on an interpretation of the situation as well as memory of past experiences 4) response generation 5) response evaluation and 6) behavioral enactment of

a selected response. Consistent with tenets of schema theory and contextualism (though not necessarily drawing from these theories), children are seen as coming into social situations with different sets of past experiences, as well as differential representations or memories of these experiences. These past experiences, along with prior knowledge, constitute latent mental structures that interact with and influence on-line or "real-time" processing (Crick & Dodge, 1994). To illustrate Crick and Dodge's Social Information Processing model, consider the following scenario taken from Arsenio and Lemerise (2004):

"...Imagine a child trips on a classmate's foot when getting up to sharpen a pencil. The child must figure out what happened ("I tripped on his feet") and why it might have happened ("he tripped me" or "it was an accident"). In the next step of the model, guided by his or her understanding or misunderstanding of the situation and 'latent mental structures' [sic], the child must clarify and select goals for the situation ("I just want to get my work done" or "I'm going to show that kid he can't do this to me"). Then...the child generates possible responses to the situation and evaluates them in terms of his or her self-efficacy and the likely consequences of performing the response. Finally...the child enacts his or her selected response." (p.989).

Characteristic patterns at each step of this model have been empirically tested and were found to significantly correlate with extreme-group differences in socially competent behavior including levels of aggression (Dodge, 1986; Rubin & Krasnor, 1986). At the first step, encoding, Dodge and Tomlin (1987) found that socially rejected, aggressive children are less attentive to relevant social cues than are their less aggressive peers. At the second step, interpretation, aggressive children have been found to make significantly less accurate depictions of peer intentions than their nonaggressive peers (Dodge, Murphy & Buchsbaum, 1984; Waldman, 1988), and show a marked bias toward hostile attributions in ambiguous situations (Dodge, 1980). When forming responses, socially rejected and incompetent children have been found to access more aggressive responses and fewer competent responses to interpersonal problems (Renshaw & Asher, 1983). When evaluating their responses, aggressive children anticipate more positive interpersonal and instrumental outcomes from aggressing, than do their nonaggressive, more competent peers (Crick & Ladd, 1990). Finally, at the last Social Information Processing step, response generation, aggressive children have been found to display relatively poor skills at performing competent behavioral responses to interpersonal situations (Dodge, McClaskey & Feldman, 1985).

However, little definitive evidence exists to support the notion that children with ADHD have social cognition deficits. However, some specific findings may be useful in intervention planning efforts. One strand of research focuses on attributional reasoning. That is, how children explain events to themselves. Children with externalizing problems, such as ADHD, are especially likely to exhibit a hostility bias (Dodge & Feldman, 1990). Following an ambiguous act by another child, these children are likely to infer a hostile intent by that person. In addition, they tend to underestimate their own responsibility for outcomes. Aggressive boys tend to underestimate their own aggressiveness, while nonaggressive boys assume greater responsibility for aggressive encounters in the early stages of a conflict (Lochman, 1987). This tendency for aggressive boys to deny their aggressiveness makes it less likely that they will make an effort to use self-control and more likely that they will use similar responses in future interactions.

Children with social problems have difficulty generating behavioral solutions to interpersonal problems. Although they can do as well as others at identifying the first possible solution, the differences show up when they are asked to give alternative

responses. Furthermore, youth with ADHD are known to have trouble attending to important social information (Mikami, Huang-Pollock, Pfiffner, McBurnett, & Hangai, 2007). In a study by Guerra and Slaby (1989), 24 high aggressive and 24 low aggressive elementary school aged boys were given three different problems and asked to generate two solutions to each. Although both groups did equally well at choosing a first solution, high aggressive boys were less likely than low aggressive boys to choose an appropriate (i.e., non-aggressive and effective) second solution. Evans and Short (1991) had 14 high aggressive, 16 low aggressive and 15 socially withdrawn boys between ages 8 and 11 generate up to 7 potential solutions each to 6 problems presented. Again, it was found that differences in generating solutions were not found for the first solution, but were for alternative solutions. Nonaggressive and nonwithdrawn boys generated a higher percentage of effective second solutions than did their aggressive and withdrawn peers. In both of these studies, aggressive boys were able to generate a first solution as well as other children; however, they were less successful than nonaggressive children at generating alternative solutions.

Research has shown that interventions using social skills training and problem solving discussions, both of which were used in the behavioural treatment, may help improve social competence in aggressive and hard to manage children (King et al., 2009). For Example, Amori et al. (2008) investigated the relationship between social information processing and both relational and physical aggression in a longitudinally-followed sample of 228 adolescent girls (ages 11–18; 140 with ADHD and 88 comparison girls). During childhood, girls participated in naturalistic summer camps where peer rejection, overt physical aggression, and relational aggression were assessed via multiple informants and methods. Approximately 4.5 years later, these girls participated in follow-up assessments during which they completed a commonly-used vignette procedure to assess social information processing; overt and relational aggression were again assessed through multiple informants. Correlations between (a) overt and relational aggression and (b) maladaptive social information processing were modest in this female adolescent sample. However, relationships between aggression and social information processing were stronger for the comparison girls than for the girls with ADHD.

Therefore, when the first solution is ineffective, aggressive children seem to have difficulty coming up with what to do next. However, these studies focused on children with aggression and did not specify if ADHD was also present. Therefore, it is uncertain if children with ADHD or even children with ADHD and aggression would respond in the same manner.

Method

Participants

54 students in grades five who had been identified as having ADHD and were experiencing social problems were chosen. The sample was randomly divided into two groups; experimental (n= 27; 20 boys and 7 girls) and control (n= 27, 22 boys, 5 girls). They two groups were matched on age, IQ, and Social Competency. Table 1. shows means, standard deviations, t-value, and significance level for experimental and control groups on age (by month), IQ, and Social Competency (pre-test).

Table 1. means, standard deviations, t-value, and significance level for experimental and control groups on age (by month), IQ, and Social Competency (pre-test).

Variable	Group	N	M	SD	T	Sig.
Age	Experimental	27	132.24	1.96	-.121	Not sig.
	Control	27	132.41	2.01		
IQ	Experimental	27	108.34	4.45	-.221	Not sig.
	Control	27	108.89	4.24		
Social Competency	Experimental	27	38.40	5.09	-.621	Not sig.
	Control	27	39.33	7.52		

Table 1. shows that all t- values did not reach significance level. This indicated that the two groups did not differ in age , IQ , and Social Competency (pre-test) .

Measures

Attention-Deficit Hyperactivity Disorder Test (ADHDT) (Jeong, 2005). To support evidence of criterion validity related to the questionnaire developed based on DSM-IV-TR criteria, the Attention-Deficit Hyperactivity Disorder Test (ADHDT) was employed. ADHDT is based on the DSM-IV. This instrument consists of three categories: Hyperactivity (13 items); Impulsivity (10 items); and Inattention (13 items). The items use a 3-point Likert scale with 0 representing no problem, 1 representing a mild problem, and 2 representing a severe problem. The author reported reliability with Cronbach.'s alpha coefficient. Cronbach alphas for hyperactivity, impulsivity and inattention were .98, .95, and .98 respectively for teacher ratings.

Social Competency Rating Form. (Gottfredson et al., 2002) . The revised scale consists of 29 items, with 12 negatively worded items and 17 positively worded items. Sample items include: Hits, kicks at, or jumps on other children; If provoked by peers, shows self-control; Solves problems with peers through compromise or discussion; and Expresses concern for others. It has three subscales ; namely Social Skills , social behaviour and impulsivity .All items are answered on a 4-point Likert-type scale, with a 1 indicating “Almost Never”, 2 indicating “Sometimes”, 3 indicating “Often”, and 4 indicating “Very Often.”.A study by Allison(2007) shows an adaptation of the SCRF to be a reliable and valid measure for use with elementary school children.

Procedure

Written permission was obtained from Al Fahd primary schools, Taif in order to conduct the application in schools. Schools were visited in order to inform parents and teachers about the study. Parents of all children were interviewed and provided permission for their children to be included in the study. Attention-Deficit Hyperactivity Disorder Test ,and Social Competency Rating Form were completed. The Social Information Processing program was applied to children. Children were shown SIP Scenarios for anger, anxiety and depression . Immediately after reading each scenario, participants completed a short series of questions assessing the domains of goal selection, response evaluation, and response selection The answers given by the children were recorded using a hidden camera. This protocol was adopted from the social information-processing protocols that have shown to be reliable, to have predictive validity, and been used extensively with children, adolescents, and adults (Dodge, 1986; Dodge and Swartz, 1997). The application lasted approximately 25 min .

Design and Analysis

The effects of implementing the program on students' social competency were assessed using a repeated-measures design, pre- post- and follow up testing.

Results

Table 2. shows data on ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in Social Competency Rating Form. The table shows that the (F) value was (204.912) and it was significant value at the level (0.01).

Table 2. ANCOVA analysis for the differences in post- test mean scores between experimental and control groups in Social Competency Rating Form

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
PRE	10.437	1	10.437		
GROUP	13405.188	1	13405.188	204.912	0.01
ERROR	3336.378	51	65.419		
TOTAL	16916.000	53			

Table 3. shows T. test results for the differences in post- test mean scores between experimental and control groups in Social Competency Rating Form. The table shows that (t) vale was (14.52). This value is significant at the level (0.01) in the favor of experimental group .

The table also shows that there are differences in post- test mean scores between experimental and control groups in Social Competency in the favor of experimental group .

Table 3. T- test results for the differences in post- test mean scores between experimental and control groups in Social Competency Rating Form

Variables	Group	N	Mean	St Deviation	T	Sig
Social Skills	Experimental	27	35.96	5.08	11.83	0.01
	Control	27	20.74	4.33		
Social Behavior	Experimental	27	23.88	5.47	12.17	0.01
	Control	27	10.92	6.11		
Impulsivity	Experimental	27	12.40	3.15	6.15	0.01
	Control	27	8.55	5.09		
Composite Score	Experimental	27	71.85	9.07	14.52	0.01
	Control	27	40.14	6.20		

Table 4. shows data on repeated measures analysis for Social Competency Rating Form. The table shows that there are statistical differences between measures (pre- post- follow up) at the level (0.01).

Table 4 . *Repeated measures analysis for comprehension test.*

Source	Type III sum of squares	df	Mean square	F	Sig.
Between groups	19317.772	1	19317.772	292.407	0.01
Error 1	3435.235	52	66.062		
Between Measures	9843.815	2	4921.907	105.956	0.01
Measures x Groups	10557.123	2	5278.562	113.633	0.01
Error 2	4831.062	104	46.453		

Table 5. shows data on Scheffe test for multi-comparisons in Social Competency Rating Form. The table shows that there are statistical differences between pre and post measures in favor of post test , and between pre and Follow-up measures in favor of follow up test , but no statistical differences between post and Follow –up test .

Table 5. *Scheffe test for multi- comparisons in Social Competency Rating Form*

Measure	Pre	Post	Follow -up
	M= 38.40	M= 71.85	M= 70.14
Pre	--	--	--
Post	33.44*	--	--
Follow-up	31.74*	1.70	--

Discussion

The main objective of the present study was to explore whether there were differences in post – test scores mean between control and experimental groups on social competency. The study also examined If the program was effective, if this effect was still evident a month later .

It was hypothesized that there would be statistically significant differences in post–test scores mean between control and experimental groups on Social Competency Rating Form in favor of the experimental group , and the effect of the program would still be evident a month later.

The results of this study as revealed in tables 3 and 5 show that the program was effective in improving social competency of students in experimental group, compared to the control group whose individuals did not receive training based on the information processing model.

Subject-related studies (Lemerise & Arsenio, 2000; Parke et al., 1989) put forth that social information processing models are effective on the emotions of children, cognitive processes, and responding to social situations. It is thought that children, who can control their emotions, have a better level of social skills and social interaction. Social goals are closely related to the social information process. In other words, children who develop relationships are not aggressive and have social goals developed using more positive strategies. These children are liked and accepted more by their peers, and are able to establish healthier relationships (Crick & Dodge, 1994; Rose & Asher, 1999). The

fundamental purpose of social relations is correctly interpreting social situations, and reacting to these situations accordingly (Crick & Dodge, 1994).

As illustrated, the study results are in line with the results obtained in previous studies. Children who are competent at all stages of social information processing display more prosocial behaviours towards their peers. These children enter their peer group easier, and develop a more cold-blooded attitude towards peer provocation. They can also respond to peer and teacher expectation, and respond accordingly to success and failure. These children are considered to be more socially competent at every stage of social information processing in comparison to inadequate peers. Social competence is an effective factor on interpersonal relationships, school readiness, and school adjustment of young children (Ladd, 2005).

The findings of this study were consistent with other studies that have demonstrated effectiveness of social information processing model with children with ADHD (Brendan et al, 2012; Jennifer et al., 2011; Tricia, 2005).

Limitations and Further Study

One limitation of the current study stems from the fact that the scope of the study is limited to the data collected from children with ADHD. Hence, further research with larger and more demographically diverse populations with random selection would strengthen the findings of the study.

Second, it may be that the length of the intervention was not sufficient to see change large enough to be measured. Sheridan et al. (1996) suggested that the training used in that study (10 weeks long) possibly was too short to produce long-range effects. The present study also used brief training (6 weeks), as is often the case with interventions in the school setting.

Despite these limitations, the present study contributes useful knowledge about the influence of social information processing model intervention on ADHD children's social competency.

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