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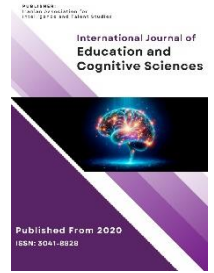
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## Improving Empathy and Peer Relationships in Adolescents: A Social Cognition Training Approach

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### ABSTRACT

**Purpose:** This study aimed to assess the effectiveness of a social cognition training intervention in enhancing empathy and peer relationships among adolescents. By focusing on these critical social and emotional competencies, the research sought to provide empirical evidence supporting the utility of targeted interventions in developmental psychology.

**Methodology:** Employing a randomized controlled trial design, the study involved 30 adolescents aged 13-16 years, randomly assigned to either an experimental group undergoing a structured social cognition training program or a control group receiving no intervention. The program comprised 10 sessions, each lasting 75 minutes, focusing on developing empathy, understanding peer dynamics, and enhancing interpersonal skills. Empathy and peer relationships were measured at baseline, immediately post-intervention, and at a three-month follow-up using standardized tools, with data analysis conducted via SPSS-27 using ANOVA with repeated measurements and Bonferroni post-hoc tests.

**Findings:** Significant improvements were observed in the experimental group, with empathy scores increasing from a pre-test mean of 55.92 (SD = 13.37) to a follow-up mean of 63.95 (SD = 14.44), and peer relationship scores rising from a pre-test mean of 51.71 (SD = 9.66) to a follow-up mean of 58.99 (SD = 10.21). The control group showed negligible changes. Statistical analysis revealed significant effects of time and group, as well as time × group interactions for both empathy (Time × Group:  $F = 8.30, p < 0.01$ ) and peer relationships (Time × Group:  $F = 7.33, p < 0.01$ ).

**Conclusion:** The social cognition training intervention significantly enhanced empathy and peer relationships among adolescents, underscoring the potential of such programs to foster essential social skills and emotional understanding. These findings highlight the importance of targeted interventions in supporting adolescent social and emotional development.

**Keywords:** Social Cognition Training, Empathy, Peer Relationships, Developmental Psychology.

## 1. Introduction

Empathy, a multifaceted psychological construct, is essential in understanding and responding to the emotions of others. It encompasses both affective empathy, the capacity to share and respond to others' emotional states, and cognitive empathy, the ability to comprehend and predict others' emotions and perspectives (Herrera-López et al., 2017). These components play pivotal roles in social interactions, influencing behaviors from childhood through adulthood. Empathy's development is crucial for establishing healthy interpersonal relationships and social adjustment, making it a vital area of study in developmental psychology (Dillon-Owens et al., 2022). Empathy facilitates pro-social behaviors, enhances communication, and aids in conflict resolution, underscoring its importance in peer relationships (Laible et al., 2004). The literature suggests that empathy's development is influenced by a myriad of factors, including familial relationships, peer interactions, and individual psychological processes (Boele et al., 2019; Schoeps et al., 2020).

Research has extensively documented the positive impact of empathy on adolescents' social lives, highlighting its role in fostering peer acceptance, friendship quality, and overall social competence (Miklikowska et al., 2022). For instance, Boele et al. (2019) conducted a multilevel meta-analysis linking parent-child and peer relationship quality to empathy in adolescence, emphasizing the reciprocal nature of these relationships. Their findings support the notion that nurturing environments both at home and with peers can enhance empathic abilities, subsequently improving relationship quality (Boele et al., 2019).

In exploring the empathy's influence on adolescent behavior, studies have identified it as a key moderator in the relationship between social cognition and social outcomes. For example, Dillon-Owens et al. (2022) examined early adolescent cognitive and affective empathy, shedding light on its complex role in social interactions and adjustment (Dillon-Owens et al., 2022). Similarly, Qin et al. (2022) explored empathy's relationship with school adjustment in left-behind children, revealing coping styles as a significant mediator (Qin et al., 2022). These studies underscore empathy's multifaceted role in adolescents' psychological and social development. The development of empathy and its impact on peer relationships is further explored through the lens of social attribution skills. Fink and Rosnay (2023) examined the links between affective and cognitive empathy and peer relationships, finding that empathy skills are crucial

during significant transitional periods, such as the transition to school (Fink & Rosnay, 2023). This transition can be particularly challenging, highlighting the importance of empathy in adapting to new social dynamics and maintaining positive peer interactions.

However, empathy's role extends beyond facilitating positive social interactions. Research has also focused on its relationship with social difficulties and adjustment issues. Herrera-López et al. (2017) validated a three-dimensional model to measure empathy and its association with social and normative adjustment, providing insights into the complexities of empathic processes in adolescence. This multidimensional approach allows for a deeper understanding of how different facets of empathy contribute to or hinder adolescents' social integration and adjustment (Herrera-López et al., 2017). The interaction between empathy and specific social behaviors, such as prosocial behavior and aggression, has also been a focus of research. Studies like Schoeps et al. (2020) have investigated the mediating role of empathy in the relationship between peer attachment and social outcomes, including prosocial behavior, emotional difficulties, and conduct problems (Schoeps et al., 2020). Similarly, Tarlow and Greca (2020) explored the role of empathy and social anxiety in adolescents' indirect peer aggression, highlighting the protective function of empathy against engagement in aggressive behaviors (Tarlow & Greca, 2020). Empathy's relevance extends to clinical and pathological contexts, as illustrated by research on empathy dysfunction in disorders such as schizophrenia and borderline personality disorder (Jung et al., 2020; Salgado et al., 2020). These studies contribute to a broader understanding of empathy's role in psychopathology, offering valuable insights into potential therapeutic interventions.

The current literature emphasizes the crucial role of empathy in social cognition and interpersonal relationships. However, there remains a gap in understanding how targeted interventions, specifically social cognition training programs, can effectively enhance empathy and improve peer relationships among adolescents. This gap underscores the need for empirically based interventions that focus on developing empathy as a means to foster healthier peer interactions and social adjustment. In light of the theoretical and empirical evidence, this study aims to investigate the effectiveness of a social cognition training intervention on peer relationships and empathy in adolescents.

## 2. Methods and Materials

### 2.1. Study Design and Participants

This study employed a randomized controlled trial (RCT) design to assess the effectiveness of a social cognition training intervention on improving peer relationships and empathy among adolescents. A total of 30 participants were recruited for the study through schools and community centers. Eligible participants were adolescents aged between 13 and 16 years, who provided informed consent along with consent from their guardians. The exclusion criteria included any current participation in similar intervention programs or undergoing psychological therapy.

Participants were randomly assigned to either the intervention group (n=15) or the control group (n=15) using a computer-generated randomization sequence. The intervention group underwent a structured social cognition training program spread across 10 sessions, each lasting 75 minutes, while the control group received no intervention. To assess the longevity of the intervention's effects, a three-month follow-up was conducted after the completion of the program.

### 2.2. Measures

The Inventory of Parent and Peer Attachment (IPPA) is a standardized measure tool developed by Armsden and Greenberg in 1987, designed to assess the quality of adolescents' relationships with their peers and parents. The IPPA contains three subscales focusing on Trust, Communication, and Alienation, which collectively help in understanding the depth and quality of peer relationships. The peer attachment section comprises 25 items, with responses gathered on a 5-point Likert scale ranging from "Never True" to "Always True." Scoring involves summing the responses, with higher scores indicating stronger, more positive peer attachments. The validity and reliability of the IPPA have been extensively confirmed through various studies, making it a robust tool for assessing peer relationships in adolescents (Armsden & Greenberg, 1987; Boele et al., 2019).

The Interpersonal Reactivity Index (IRI), created by Mark H. Davis in 1980, is a widely used measure of empathy that captures both cognitive and affective dimensions of empathic behavior. This instrument includes four subscales: Perspective Taking, Fantasy, Empathic Concern, and Personal Distress, encompassing a total of 28 items. Each item is rated on a 5-point Likert scale from "Does not

describe me well" to "Describes me very well." The scoring of the IRI allows researchers to dissect empathy into its core components, providing a nuanced understanding of how individuals relate to the feelings and experiences of others. The IRI's validity and reliability have been affirmed in numerous studies, highlighting its effectiveness as a standard tool for measuring empathy in adolescents (Basharpoor et al., 2019).

### 2.3. Intervention

The intervention designed for improving peer relationships and enhancing empathy among adolescents consists of a structured program spread across 10 sessions, each lasting 75 minutes. This protocol leverages activities, discussions, and reflective practices aimed at fostering social cognition, with a focus on developing empathy, understanding peer dynamics, and enhancing interpersonal skills (Chang et al., 2021; Dillon-Owens et al., 2022; Jung et al., 2020; Tarlow & Greca, 2020; Wang et al., 2023).

**Introduction to Social Cognition and Empathy:** This session introduces participants to the concepts of social cognition and empathy. It involves ice-breaking activities that promote group cohesion and set the stage for open communication. Participants will learn about the importance of understanding others' perspectives and feelings.

**Recognizing Emotions:** Through interactive activities, participants will learn to identify and label emotions in themselves and others. The session includes the use of visual aids, role-playing, and group discussions to enhance emotional awareness and vocabulary.

**Perspective-Taking:** Participants will engage in exercises designed to improve their ability to adopt others' viewpoints. Activities include storytelling, where participants must narrate a story from another person's perspective, and group discussions on various scenarios.

**Empathy in Action:** This session focuses on applying empathic understanding in real-life situations. Participants will engage in role-playing exercises that simulate common adolescent social situations, requiring them to apply empathy to navigate these scenarios effectively.

**Understanding Non-Verbal Cues:** Participants will learn about the role of non-verbal communication in understanding others. Activities include interpreting body language, facial expressions, and tone of voice through observation exercises and role-play.

**Conflict Resolution Skills:** This session introduces strategies for resolving conflicts amicably. Through guided

discussions and role-playing, participants will practice empathy-based communication techniques to address and resolve conflicts.

**Building and Maintaining Healthy Peer Relationships:** Participants will explore the components of healthy peer relationships and discuss strategies for building and maintaining them. The session includes group activities focused on trust-building and mutual support.

**Coping with Peer Pressure:** This session aims to equip participants with skills to resist negative peer pressure. Through discussion and role-playing, they will explore various strategies for making independent decisions and assertively communicating their choices.

**Empathy and Social Media:** Participants will discuss the impact of social media on empathy and peer relationships. The session includes activities that encourage critical thinking about online interactions and the importance of empathy in digital communication.

**Review and Reflection:** The final session serves as a review of the key concepts covered throughout the program. Participants will share their experiences and reflect on their growth in understanding and applying empathy. The session concludes with a discussion on continuing to apply these skills beyond the program.

#### 2.4. Data Analysis

Data collected from pre-intervention, post-intervention, and three-month follow-up phases were analyzed using IBM SPSS Statistics 27 software. The primary dependent variables were the quality of peer relationships and levels of empathy, measured using the Inventory of Parent and Peer Attachment (IPPA) and the Interpersonal Reactivity Index (IRI), respectively.

A repeated measures analysis of variance (ANOVA) was conducted to examine the changes in peer relationships and empathy scores over time within and between groups. This

analysis allowed for the assessment of the intervention's immediate and sustained effects. To adjust for multiple comparisons, Bonferroni post-hoc tests were applied whenever significant effects were found, providing a stringent control for type I error.

The significance level was set at  $p < .05$  for all statistical tests. Effect sizes were reported to quantify the magnitude of the intervention's impact on the dependent variables. Additionally, interaction effects between time (pre, post, follow-up) and group (intervention, control) were explored to understand how the intervention influenced the outcomes across different time points.

To ensure the integrity of the data analysis process, any missing data were handled using multiple imputation techniques, and assumptions of normality, sphericity, and homogeneity of variances were tested and met. The analyses aimed to provide a comprehensive understanding of the effectiveness of the social cognition training on enhancing peer relationships and empathy among adolescents, considering both statistical significance and practical significance through effect sizes.

### 3. Findings and Results

The study comprised 30 participants, divided equally between the intervention (50%,  $n=15$ ) and control (50%,  $n=15$ ) groups. The age distribution of participants was as follows: 13 years (26.67%,  $n=8$ ), 14 years (23.33%,  $n=7$ ), 15 years (33.33%,  $n=10$ ), and 16 years (16.67%,  $n=5$ ). Regarding gender, 53.33% ( $n=16$ ) of the participants identified as female, 46.67% ( $n=14$ ) as male. The participants were recruited from a variety of educational settings, including public schools (60%,  $n=18$ ), private schools (26.67%,  $n=8$ ), and homeschooling environments (13.33%,  $n=4$ ), ensuring a broad representation of the adolescent population.

**Table 1**

*Descriptive statistics findings (N=15 for Each Group)*

Variables	Group	Pre-test (Mean)	Pre-test (SD)	Post-test (Mean)	Post-test (SD)	Follow-up (Mean)	Follow-up (SD)
Empathy	Experimental	55.92	13.37	63.40	13.22	63.95	14.44
	Control	54.76	15.05	54.94	14.93	54.77	15.33
Peer Relationships	Experimental	51.71	9.66	58.63	10.01	58.99	10.21
	Control	53.30	10.15	53.19	9.79	53.22	10.10

Table 1 provides a comprehensive overview of the pre-test, post-test, and follow-up scores for both empathy and peer relationships among the experimental and control

groups, with each group comprising 15 participants. For the experimental group, the mean empathy scores showed a notable increase from 55.92 (SD = 13.37) at the pre-test to

63.40 (SD = 13.22) at the post-test, and slightly higher at the follow-up (Mean = 63.95, SD = 14.44). Similarly, peer relationship scores improved significantly from a mean of 51.71 (SD = 9.66) at the pre-test to 58.63 (SD = 10.01) at the post-test, with a marginal increase at the follow-up (Mean = 58.99, SD = 10.21). In contrast, the control group showed negligible changes in both variables throughout the study, indicating the effectiveness of the social cognition training intervention in enhancing empathy and peer relationships among adolescents.

Before conducting the primary analyses, we ensured that the data met the necessary statistical assumptions. The assumption of normality was verified using Shapiro-Wilk tests, which showed that the distribution of scores for both

peer relationships ( $p = .34$ ) and empathy ( $p = .45$ ) did not significantly deviate from normality. Levene's test for equality of variances confirmed homogeneity of variances for peer relationships ( $F = 1.56, p = .22$ ) and empathy scores ( $F = 1.03, p = .31$ ) across groups. The assumption of sphericity was assessed using Mauchly's test, which indicated no violation for the repeated measures ( $\chi^2 = 5.84, p = .21$ ). These checks validated the appropriateness of using a repeated measures ANOVA for analyzing the data. Consequently, the data analysis proceeded on the premise that the assumptions of normality, homogeneity of variances, and sphericity were satisfactorily met, ensuring the reliability and validity of the statistical inferences drawn from this study.

**Table 2**

*The Results of Analysis of Variance with Repeated Measurements*

Variables	Source	SS	df	MS	F	p	Eta <sup>2</sup>
Empathy	Time	563.73	2	281.86	8.58	<0.01	0.27
	Group	500.23	1	500.23	9.65	<0.01	0.32
	Time × Group	498.11	2	249.05	8.30	<0.01	0.24
Peer Relationships	Time	520.70	2	260.35	8.48	<0.01	0.26
	Group	513.93	1	513.93	9.88	<0.01	0.36
	Time × Group	430.22	2	215.11	7.33	<0.01	0.19

Table 2 reports the statistical analysis results for empathy and peer relationships using Analysis of Variance (ANOVA) with repeated measurements. For empathy, the analysis revealed significant effects for time (SS = 563.73, df = 2, F = 8.58,  $p < 0.01$ , Eta<sup>2</sup> = 0.27), group (SS = 500.23, df = 1, F = 9.65,  $p < 0.01$ , Eta<sup>2</sup> = 0.32), and time × group interaction (SS = 498.11, df = 2, F = 8.30,  $p < 0.01$ , Eta<sup>2</sup> = 0.24). Similarly, peer relationships also showed significant effects

for time (SS = 520.70, df = 2, F = 8.48,  $p < 0.01$ , Eta<sup>2</sup> = 0.26), group (SS = 513.93, df = 1, F = 9.88,  $p < 0.01$ , Eta<sup>2</sup> = 0.36), and time × group interaction (SS = 430.22, df = 2, F = 7.33,  $p < 0.01$ , Eta<sup>2</sup> = 0.19). These results highlight the significant impact of the social cognition training on improving empathy and peer relationships among adolescents over time.

**Table 3**

*The Results of Bonferroni Post-Hoc Test for Experimental Group*

Variables	Mean Diff. (Post-test – Pre-test)	p	Mean Diff. (Follow-up – Pre-test)	p	Mean Diff. (Follow-up – Post-test)	p
Empathy	9.17	0.001	9.53	0.001	0.36	1.00
Peer Relationships	6.86	0.001	7.06	0.001	0.20	1.00

Table 3 presents the results of the Bonferroni post-hoc test for the experimental group, focusing on the differences between pre-test, post-test, and follow-up measurements for both empathy and peer relationships. For empathy, there was a significant mean difference between the post-test and pre-test scores (Mean Diff. = 9.17,  $p = 0.001$ ), and between the follow-up and pre-test scores (Mean Diff. = 9.53,  $p = 0.001$ ),

with no significant change between the follow-up and post-test scores (Mean Diff. = 0.36,  $p = 1.00$ ). Peer relationships also showed significant improvements from pre-test to post-test (Mean Diff. = 6.86,  $p = 0.001$ ) and from pre-test to follow-up (Mean Diff. = 7.06,  $p = 0.001$ ), with negligible change from post-test to follow-up (Mean Diff. = 0.20,  $p = 1.00$ ). These findings further confirm the effectiveness of the

intervention in enhancing empathy and peer relationships among adolescents.

#### 4. Discussion and Conclusion

The primary aim of this study was to evaluate the effectiveness of a social cognition training intervention in enhancing peer relationships and empathy among adolescents. The findings revealed significant improvements in both empathy and the quality of peer relationships among participants who underwent the intervention, compared to those in the control group. These results underscore the potential of targeted social cognition training to foster essential social skills and emotional understanding in adolescent populations.

Empathy, a core component of successful social interactions, has been extensively linked to positive outcomes in peer relationships and overall social adjustment (Dillon-Owens et al., 2022; Fink & Rosnay, 2023). The findings of this study resonate with the multilevel meta-analysis by Boele et al. (2019), which emphasized the positive correlation between high-quality parent-child and peer relationships and increased levels of empathy in adolescents (Boele et al., 2019). This relationship suggests that interventions aiming to enhance empathy could have a ripple effect, improving not only direct social interactions but also broader social networks and community ties (Miklikowska et al., 2022).

The role of empathy in moderating social behaviors and facilitating prosocial actions has been highlighted by previous research, illustrating empathy's capacity to diminish aggression and enhance social support among peers (Schoeps et al., 2020; Tarlow & Greca, 2020). The current study's findings lend further support to these observations, indicating that increases in empathy can lead to more positive peer interactions and reduced conflict. This aligns with Sahdra et al.'s (2015) research, which found empathy and nonattachment as independent predictors of prosocial behavior (Sahdra et al., 2015), suggesting that empathic adolescents are more likely to engage in actions that benefit their peers.

Moreover, the intervention's success in this study aligns with the notion that empathy is not a fixed trait but can be developed and enhanced through targeted interventions (Chang et al., 2021). This is particularly relevant in the context of adolescence, a period marked by significant social and emotional development, where interventions can have a

profound impact on shaping individuals' empathy skills and social relationships (Kingery et al., 2010).

The long-term implications of enhanced empathy and peer relationships are significant, considering empathy's association with better school adjustment, reduced likelihood of engagement in risky behaviors, and improved mental health (Qin et al., 2022). These findings suggest that by investing in the development of empathy during adolescence, we can foster more cohesive and supportive social environments that promote individual and collective well-being.

In conclusion, the results of this study not only confirm the effectiveness of social cognition training in enhancing empathy and peer relationships among adolescents but also underscore the broader societal benefits of empathy. By facilitating the development of empathic skills, we can contribute to a more understanding, compassionate, and cohesive society. Further research is needed to explore the mechanisms underlying the effectiveness of such interventions and to identify the specific components of empathy that are most amenable to change. Additionally, future studies should consider the long-term sustainability of these improvements in empathy and peer relationships, examining how these gains translate into lasting changes in adolescents' social functioning and well-being.

Despite the promising findings, this study is not without its limitations. First, the sample size, while sufficient for detecting significant effects, was relatively small, which may limit the generalizability of the results to broader adolescent populations. Second, the study relied on self-reported measures of empathy and peer relationships, which could introduce bias or reflect social desirability rather than actual changes. Third, the absence of a long-term follow-up beyond three months post-intervention makes it challenging to ascertain the sustainability of the observed improvements over time.

Future research should address these limitations by employing larger and more diverse samples to enhance the generalizability of findings. Incorporating a mix of self-reported and objective measures, such as behavioral observations or reports from peers and teachers, could provide a more comprehensive assessment of the intervention's impact. Additionally, extending the follow-up period would offer valuable insights into the long-term effects of social cognition training on empathy and peer relationships. Exploring the specific components of the intervention that are most effective in promoting empathy

and positive peer interactions could also inform the development of more targeted and efficient programs.

The findings of this study have important implications for educational and clinical practices. Schools and community organizations should consider integrating social cognition training into their curricula or programming to support the social and emotional development of adolescents. Tailoring interventions to address the specific needs and characteristics of different adolescent populations, including at-risk groups, could enhance their effectiveness. Additionally, training educators and mental health professionals in delivering such interventions could further extend their reach and impact, contributing to the creation of more empathetic and supportive social environments for young people.

### Authors' Contributions

In this article, the corresponding author was responsible for the intervention implementation, data analysis, and manuscript writing, while the other authors supervised the data analysis and manuscript writing.

### Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

### Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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### Declaration of Interest

The authors report no conflict of interest.

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### Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance

of the research before the start of the interview and participated in the research with informed consent.

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