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Effectiveness of PMI Combined with Common Interest Activity for Elementary School Students with Autism Spectrum Disorder

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Abstract: Peer-mediated intervention (PMI) includes a range of strategies that are considered a successful aid in social-communication behavior for kids and their peers with autism spectrum disorders (ASD). This study was carried out to improve the social behavior of children with ASD, using peer training through an activity that they have in common. Three ASD students in Greek elementary schools, aged seven to ten years old, two boys and one girl, participated in this study. The peers of ASD students were trained to interact with them during recess in a comprehensive school setting. An ABA reversal design was used on each participant in order to define the effects of the intervention. Through observation probes, the responses and the initiations of all ASD students were noted by trained school staff. The results of the intervention phase showed an increase in both of these two variables. Furthermore, the follow-up phase depicted important results for the academic community, also showing an increase in all ASD students' responses and initiations. The current study supplements the existing PMI research, which leads to the possible use of this valid tool that could be used in school settings in order to increase the socialization of ASD students.



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1. Introduction

Social interaction difficulties are a defining feature of ASD [1]. Children with ASD show significant deficits in their social interactions [2] and primary impairments in both language and communication [3]. These characteristics can become more intense in play-ground activities with other children of the same age. In schools, ASD students often have difficulty in establishing and maintaining peer relationships over time [4] and face significant difficulties in their integration in the school environment. Social interaction is one of the most common difficulties in students with ASD and that may affect their successful inclusion [5]. Children with ASD have fewer friends, lower quality friendships [6,7], and a poor perception of the idea of what friendship is [5]. They are unaware of how to behave toward their peers and have difficulties in handling their emotions in any situation. As a result of these struggles, they feel isolated in recess [8] and have limited or qualitatively poor social interactions, even in an inclusive setting, such as a school [9].

According to Lee et al. [10], an inclusive setting provides a feeling of confidence and increases social relationships and interactions with peers for ASD people. Additionally, parents and therapists who realize that social disabilities are a significant hindrance have adopted a variety of interventions to teach social skills to ASD students [11]. For these reasons, inclusion of students with autism has been a challenge for educators who demonstrate gaps in professional training, especially regarding interventions where schools are concerned [12]. Educational professionals are crucial to successfully implementing inclusive education [13]. The severity of the disorder is a significant factor for the acceptance of a student with special needs in their classroom. However, in the current educational system no opportunity is given for social learning skills because teachers focus mainly on

the academic success of students [14]. The limitation of generalizing social abilities requires further education of ASD students in taking initiative and responding during interaction with their schoolmates. The best time for this effort to be made is during school recess. Research showed that children with ASD interact less with other children, are profoundly less dynamic, and choose to be in near vicinity of the adults during recess in comparison to their peers [15–21]. Peer interactions increase opportunities for children to develop both important communication behaviors and social skills [22]. For these reasons, there is a need for evidence-based interventions that will help ASD students have significant gains in all-inclusive settings [19].

In order to improve the outcomes for children with ASD, much research has been focused on developing effective methods to include these children in natural settings. The most popular interventions are based on peer engagement [23]. Peer-mediated intervention (PMI) includes a range of strategies in which typically developing peers are trained in social interaction to support their peers with disabilities in several settings [24]. The training includes ways to help and encourage their classmate with autism and teach him/her ways to develop social game skills, such as sharing and exchanging [25]. Several interventions have been developed to address impaired social interactions and play in children with ASD. These different approaches include coaching the child with ASD, identifying and addressing individual play skills and interests, and developing supportive relationships and environments [26]. The most common processes in this category of intervention are social skills groups and peer confidant approaches. The social skills groups are the methods that are going to be applied in this study. It involves small groups of students, including children with and without special needs who will practice the social skill, which the teacher presents to them. The teacher will guide and support the students when needed [27]. PMI has been particularly successful, being one of the two most promising intervention methodologies, which improves the social skills of children with ASD [28,29]. Typically developing classmates are important role models for imitating desirable social and communicative behaviors. PMI is a well-suited intervention for use in school settings because it can be easily applied in a daily school routine [30]. Brain and Mirenda [31] conducted a PMI for middle school students with ASD. The results showed an increase in engagement and communicative acts among ASD participants and peers, so the intervention program was proved apt for use by trained school staff. This study took place during recess period. One of the researchers trained a peer coaches group in order to introduce social and behavior skill strategies. Subsequently, peer coaches were instructed to use these strategies with ASD students. According to Brain and Mirenda [31], it would be helpful for students with ASD who have limited interests to create an intervention that augments appropriate play activities in conjunction with PMI.

On the contrary, Sivaraman and Fahmie [32] pointed out that by incorporating common preferences in order to match the interests of ASD participants and typical peers the socialization of children with autism and their peers could be improved. In this study, three early school-aged ASD children were involved in play activities with peers, which had been selected based on their preference assessments. There was neither further social skill training nor direct teaching but only engagement with peers. Initiations between them were effectively increased during play period. Additionally, Koegel et al. [33] integrated preferred interests in the regular lunchtime activities of young people with ASD in inclusive settings. Common interests were identified using interviews of ASD participants and then were incorporated into the club activities in the duration of lunchtime. Social engagement and initiations of ASD participants increased, and structured activities were enjoyable for both ASD and peer adolescents. This study is an extended version of Koegel et al. [34], where school-aged children participated in special lunch clubs. It was constructed according to ASD children's preferences in order to promote peer engagement. This was acquired by providing opportunities for peers to engage in these activities and socializing with target children. According to Sivaraman and Fahmie [32], a future study based on common interests, combining the training for typically developing peers, could

increase these results. Common interest activity is a particularly interesting topic for further research as it can enable the establishment of a long-lasting friendship [35]. Even though previous researchers have suggested promising intervention models, which decrease the social deficits of elementary school students with ASD, few of these models have been developed into training packages. These models can also be distributed to schoolteachers who can use them for promoting the social interaction of ASD students.

This study was firstly aimed to extend these methods of research with a lengthier intervention that combines both PMI and social activity emphasizing the common interests between the ASD elementary school students and their typical classmates. Secondly, it was targeted at evaluating the effectiveness of this intervention package by giving the opportunity to teachers and paraprofessionals to use it in order to promote the social interaction of children with ASD and their peers. Therefore, two interventions were combined in order to investigate the effectiveness of a useful tool that can be easily applied by the school staff. This program attempts to increase the social and communicative skills of ASD students through the training of their peers.

2. Materials and Methods

2.1. Objective/Research Questions

The effect of the intervention, concerning the improvement of ASD students' socialization, was evaluated through a single case design. This study used an ABA reversal across each design [36]. Phase A is the baseline, a type of control condition for the dependent variables. Phase B starts when the researcher applies the intervention, and final phase A consists of the follow-up. In this phase, the researcher controls if the dependent variables reached a steady state. Even though the baselines were non-concurrent, the study lasted almost 4 months and all participating students' groups started baseline within a 3-week period. The differentiation was due to several reasons, such as the availability of each child, which depended on the time the school year commenced. Consequently, the objectives that arise from the literature review and the context in which they will be explored are:

- Is there a functional relationship between peer-mediated support and students with ASD during recess period in school?
- Is there any increase in communicative acts made by students with ASD toward their peers and by peers to ASD students?
- Could an intervention based on common preferences of young children with ASD and their typically developing peers lead to an increase in social initiations and responses during the school day?

2.2. Sample

This study included three groups. Each group consisted of one ASD participant and five typical classmates per ASD participant.

The first group included Giannis, a third-grade Greek student with ASD, five typical developing classmates, and a special education teacher-therapist with four years of teaching experience. The peer group was comprised of three girls and two boys aged 9 years old speaking the Greek language. Giannis was diagnosed with ASD from the official governmental body where he was assessed by the multidisciplinary team. He attended public elementary school where he followed an individual educational program supervised by an educational teacher-therapist for twenty-four hours per week during school days. When the research began, he was 10 years and 3 months old. Giannis was able to communicate verbally but had made limited conversational attempts with his classmates, and he rarely responded to peer's questions. Even though he was prompted by a special education teacher to communicate with his peers in recess, his social communication level was significantly lower in relevance to his age group. Additionally, he usually avoided eye contact during social interactions. According to the teachers' remarks, he showed signs of aggression and maladaptive behavior. In the GARS-2 rating scale [37], his score in the field of communication and social interaction was 115 (>85), identifying autistic characteristics.

The second group consisted of a second-grade Greek student, five typical developing classmates, and a special education teacher-therapist, with five years of teaching experience. Peer group was comprised of three girls and two boys aged 8 years old. Peers were 8 years old, and their primary language was Greek. Panagiotis was diagnosed with Asperger syndrome from the official governmental body where he was assessed by the multidisciplinary team. He attended public elementary school where he followed an individual program related to educational and functional communication from a special education teacher-therapist for about twelve hours per week, during the school program. He had verbal communication with a variety of words, but his conversational skills were limited. He had a disability in the way he expressed his feelings and responded to social interaction with his classmates, and he usually walked alone in recess speaking to himself. In the GARS-2 rating scale [37], his score in the field of communication and social interaction was 100 (>85), a result that shows a high standard score (>85) performance with identified autistic characteristics.

The third group consisted of a second-grade Greek student, five typical developing classmates, and a special education teacher with six years of teaching experience. The peer group was comprised of three girls and two boys aged between 8 and 9 years old, and their primary language was Greek. Rania was diagnosed with ASD from the official governmental body where she was assessed by the multidisciplinary team. She attended public elementary school, and she followed an individual educational program supervised by an educational teacher-therapist for twenty-four hours per week during the school program. In recess, she used to walk alone observing the other children. When she got closer to the boy peers, she provoked them and used negative expressions, such as “shut up”, and language, such as “idiot” and “loser”. On other occasions, she pushed and kicked some boys from her class. On the whole, she got along better with girl classmates, but even so, there was not any friendly connection. In the GARS-2 rating scale [37], her score in the field of communication and social interaction was 125 (>85), an outcome that shows a high standard score (>85) performance.

2.3. Instruments and Techniques

This study examined two dependent variables through observation probes. These variables included the frequency of social initiations made by ASD students to peers and the frequency of responses made by ASD students toward peers' initiations. The number of initiations and responses were recorded in a special form designed by the researcher.

Social initiations included: (a) questions made by ASD students toward one or more peers (e.g., “do you want to play with me?”); (b) emotional expressions, such as unprompted gestures (e.g., high-five, hugs) and facial expressions (e.g., smiling, eye contact); (c) participation in activities on their own accord; (d) attempts at getting attention defined as vocalizations; (e) invitations defined as verbal or gestural offers to start a communication (e.g., “let's go play”). An initiated attempt had to include at least a consonant and a vowel sound (e.g., I am . . . , soooo . . . , eeemmm). Sudden sounds, such as screams or laughter, were not coded as initiations even though the student had eye-contact with one peer. This variable was coded by summarizing the number of initiations in every five categories. In the case that one ASD student engaged in more than one category of initiations, the first behavior that was noticed and was the one that helped us to categorize it accordingly. For example, if a child asks, “Do you want to play?” while smiling and pointing toward the playground, this counts as one initiation in the category of a question. The range depends on each student's efforts for initiations. The responses were defined as verbal and non-verbal responses to peer initiatives for interaction. If a response to peer initiation was assisted by a teacher, then it was not included in the measurements. The field of responses was coded by calculating the number of successful responses divided by the total number of their peer's questions. The range was 0–1.

At the end of follow-up phase, we collected the social validity data, which were applied to two different groups. The first consisted of peer participants and the second

included teachers. The social validity data were collected through a structured interview conducted by the researcher.

2.4. Procedure

The children who participated in the research attended Greek elementary schools near their place of residence. The whole intervention program was conducted in elementary schools where the children with ASD attended. Approval from the Ethics Committee or Institutional Review Board was not necessary because the teacher-therapists that had applied the intervention program were already staff of the specific schools where the ASD students were studying. Regarding the Declaration of Helsinki, a consent form for each ASD student and each typical student was obtained from their parents before the intervention program. Initially, the parents of the participants were informed about the basic principles and aims of this research, giving their signed consent. The filing of Gilliam autism rating scale (GARS) [37] was a necessary condition for the participation of every ASD student before the intervention program. Additionally, it should be mentioned that all the students were aware that they could leave the project any time. This option provided them with a sense of safety, stability, and control over the intervention process. The students who participated in this research were selected by the principal and the teachers at each school and agreed to participate with consent provided by their parents as was previously mentioned. Finally, it is important to mention that the name of each participant would not be their real one, as their parents had also agreed to in the signed consent.

Data collection took place during the recess period where spontaneous social interactions took place among the children. The intervention program was applied by a trained special education teacher-therapist, who was responsible for each of the ASD student's individualized program. The peers who were selected to join the research participated in the same activities as their classmates, and no changes were made to the school environment for the needs of the research.

Peer training sessions took place in empty classrooms during the school program. The data collection of baseline, intervention, and follow-up phase sessions took place during recess in the school yard area. Greek schools have two or three recess periods for students during a school day. The dependent variables started off being counted with continuous recordings in the recess period for about 10 min. It should be mentioned that there were not any changes to the school environment for the needs of the research, and no teachers interfered in the free play condition except for the need to prevent challenging behaviors. The researcher had already trained the observers during a pilot period when she was collecting the data, and they were taking note of the process.

The measurement took place in twelve sessions. Each session lasted 10 min during the recess period of each school day. An observation session in baseline and follow-up phase started after the first two hours of lessons when the students were free to play in the school yard. In the intervention phase, the observation period started in the second recess time, after the implementation of intervention program. Rania was the exception. She did not want to leave the classroom when the school bell rang, and on these days, the observation lasted two or three minutes less. The interventionist was the trained special education teacher-therapist of each ASD student, and the other two schoolteachers acted as secondary observers to help the first. The observers had no interaction with the students as they had to be discreet throughout the duration of the research, but they were on hand to intervene in case of any unwanted behavior. The observers nodded to each other at the beginning of each interval. Data were collected via social interaction, which was created from the researcher.

In the beginning of the project, special education teacher-therapists of ASD students completed the Gilliam autism rating scale (GARS) in cooperation with their parents. This occurred in order to obtain additional information about each ASD student's functioning level. The GARS [37] is a parent questionnaire for observing social and communicative behaviors of children who are likely to have autism [38]. The GARS covers three content

areas and focuses on the likelihood of autism: stereotyped behaviors, communication, and social interaction. Its purpose is not to offer a diagnosis but to gather information about the social and communication function of the examinees. In the present study, the experimental procedure included: (a) baseline, (b) intervention phase, and (c) follow-up.

2.4.1. Baseline

During baseline, the special education teacher-therapist observed and noted on a special form the social interactions between the ASD students and their schoolmates through recess and free game periods. This form was designed by the researcher. In this context, all the students had the opportunity to communicate while participating in social interactions. On the contrary, the classroom activities did not consistently encourage social interactions. Neither training or feedback nor prompts or praise were provided by the researcher and school staff about social interactions. The baseline phase was separated in four 10-min sessions. Finally, the researcher collected all the noted forms and analyzed the data.

2.4.2. Intervention Phase

After the collection of data in the baseline phase, peers were taken by a trained special education teacher-therapist into a separate room in order to start the training. Students were taken out of classroom activities only at times allowed by the classroom teacher in order to limit the disruption from the school schedule. The peer training occurred in three phases, and each phase lasted from 30 to 40 min. When each training session was completed, peers gained a sticker as a result from their participation in the common interest program. They were unaware about the sticker reward before they received it. Data were not collected during the peer training intervention but during the recess period after the intervention.

Phase 1: The first phase of training consisted of reading and discussing a story about a child with autism [39]. The book describes the characteristics of an ASD child who has typical autistic characteristics. This book allows peers to enter the world of autistic children, learn to decode their “strange” behaviors, and see the world from the autistic child’s perspective. After reading the book, a guided conversation began about the importance of peer friendships for children with disabilities in contrast to teachers and adults.

Phase 2: This phase consisted of a discussion about personal interests and the social contact among every group through common preferences. Each group, as was previously mentioned, consisted of one ASD student and five typical peers. The trained teacher loudly asked the group about the best activity/game played during the school recess. The students needed to answer to at least 3 activities/games on paper and then give the paper back with their names written on it. Then, the answers of each student were written in a special form, created by the researcher, in order to point out the most common choice. After this, the teachers tried to motivate the group to play the specific activity/game. This phase aimed to bring the peers closer to the ASD student to identify if they had any common preferences that they did not know of before. If something such as this happened, they might have a good chance to play together more and build up a friendship. Additionally, this phase helps students to recognize that all children with and without disabilities have special abilities and areas of need.

Phase 3: In this phase, the interventionist taught peers strategies to interact with an ASD child. Peers were taught how to prompt the ASD children to use the skill of the day, to encourage target children to ask questions, and to praise the target children for working hard. The interventionist went over the target skill of the week and conducted role-plays with the peers to assess their understanding of the target skill and answer questions. Then, the strategies that the classmates could use to be friends with ASD students were described.

2.4.3. Follow-Up Phase

In the follow-up phase, there were neither any teacher's feedback nor peer training sessions. In the same setting and conditions of intervention, the children acted naturally without prompt or praise from adults. The interventionists used the same form created by the researcher as in the baseline and intervention phase. Finally, the researcher collected and analyzed data as previously mentioned.

2.5. Data Analysis

Data analysis was based on visual analysis of graphs, use of descriptive statistical terms, such as mean (mean), standard deviation (SD), percentage of increase or decrease from baseline, intervention, and follow-up phases, which is consistent with single case designs [40]. The improvement of children's performance was assessed according to the differences observed in the graphs, in the averages, and in the rate of the behavior's modification after the intervention.

2.6. Interobserver Agreement

Two trained observers blind to the purpose of the study were trained to collect the reliability data. The baseline phase included session 1 to session 4, the intervention phase included session 5 to session 9, and follow-up phase included session 10 to session 12. The interval recording method was used to calculate the agreement between observers. In this method, IOA for initiations (Tables A1–A3 in the Appendix A) and IOA for responses (Tables A4–A6 in the Appendix A) were separately calculated with the number of intervals agreed divided by total intervals (agreed and disagreed) and multiplied by 100. The agreement occurred when both observers recorded either existence (by symbol "+") or no existence (by symbol "-") for a specific interval.

Overall, as it is shown in Table A7 in the Appendix A, IOA across groups' initiations was 95.5% (range 93.3–100%) and for responses was 90% (range 85–93.3%). Two low scores for responses (75%) occurred during the fourth observation session of Giannis and Rania because of the difficulty in collecting data accurately. The school playground is a natural environment where kids speak loudly, and it is difficult to hear with precision what the children are saying.

3. Results

The following sections describe the results for initiations and responses among ASD students and peers. Additionally, it depicts the interobserver agreement and the social validity for both peer and teachers.

3.1. Initiations—Responses among ASD Students and Peers

3.1.1. Group 1: Giannis

Figure 1 below shows the results of initiations and responses during baseline, intervention, and follow-up phases for Giannis.

During baseline, Giannis's average of initiations toward his peer was 2.0 (range 1–3), in intervention phase 7.4 (range 6–9), and in follow-up phase 5.3 (range 5–6). As concerning the responses, during baseline Giannis's average toward his peers was 0.11 (range 0–2.5), during intervention 0.58 (range 0.5–0.71), and in follow-up phase 0.41 (range 0.33–0.5). It is concluded that Giannis showed an increase in initiations and responses in both intervention and follow-up phase. Over all sessions, the standard deviation of initiations was 2.57, with an overall mean of 5.08. The standard deviation of responses was 0.23, with an overall mean of 0.38.

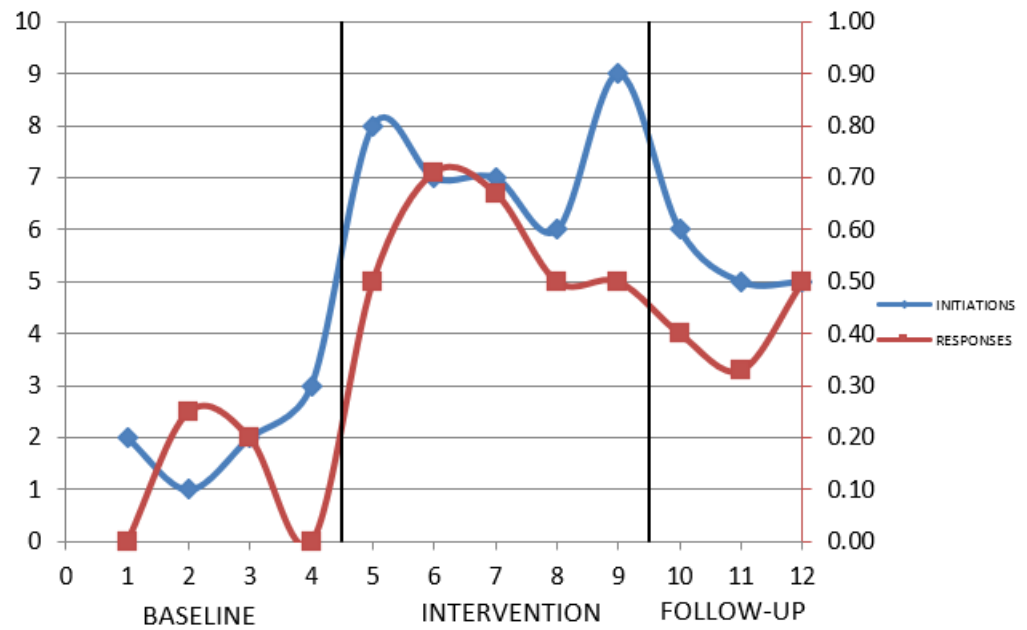


Figure 1. Frequency of initiations and responses for Giannis.

3.1.2. Group 2: Panagiotis

Figure 2 below shows the results of initiations and responses during baseline, intervention, and follow-up phases for Panagiotis.

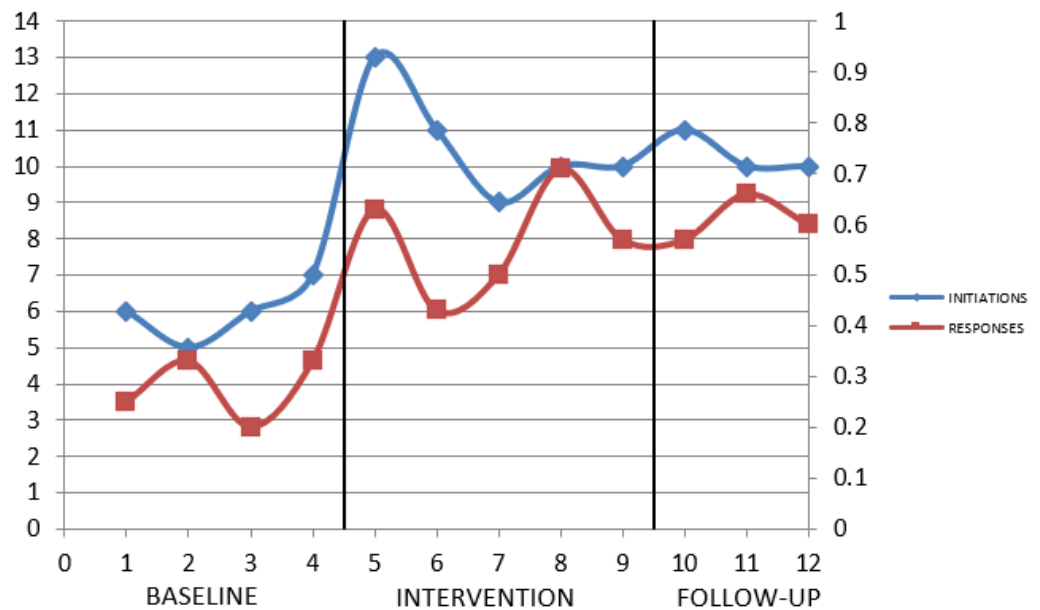


Figure 2. Frequency of initiations and responses for Panagiotis.

During baseline, Panagiotis’s average of initiations toward his peers was 6.0 (range 5–7), during intervention phase 10.6 (range 9–13), and in follow-up phase 10.3 (range 10–11). During baseline, Panagiotis’s average of responses toward his peers was 0.28 (range 0.2–0.33), during intervention 0.57 (range 0.43–0.71) and in follow-up phase 0.61 (range 0.57–0.66). It is concluded that Panagiotis showed an increase in initiations and responses in intervention that was also continued in follow-up phase. Over all sessions, the standard deviation of initiations was 2.45, with an overall mean of 9. The standard deviation of responses was 0.17, with an overall mean of 0.48.

3.1.3. Group 3: Rania

Figure 3 below shows the results of initiations and responses during baseline, intervention, and follow-up phases for Rania.

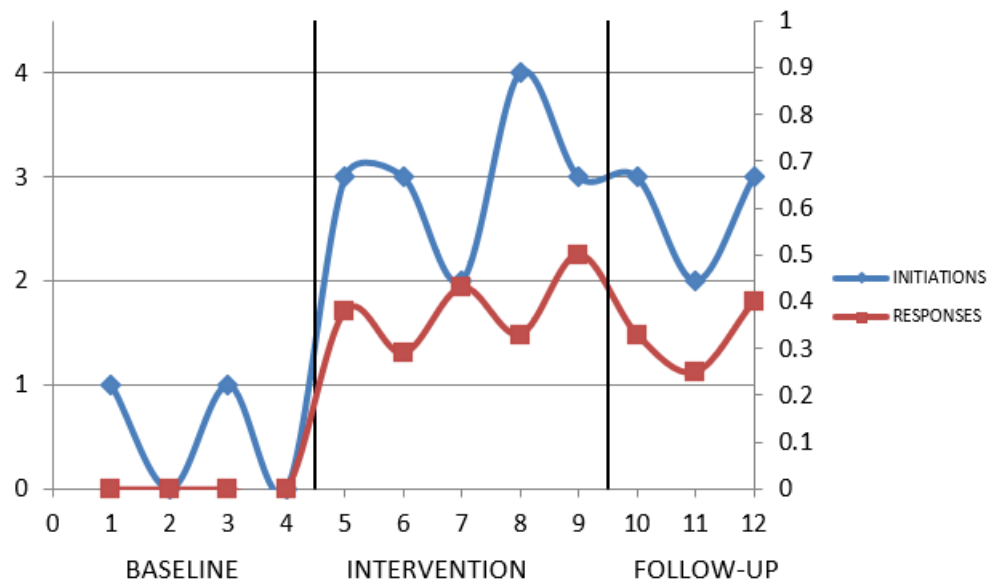


Figure 3. Frequency of initiations and responses for Rania.

During baseline, Rania’s average of initiations toward her peers was 0.5 (range 0–1), during the intervention phase 3 (range 2–4), and in follow-up phase 2.67 (range 2–3). During baseline, Rania’s average of responses toward her peers was 0, during intervention 0.38 (range 0.29–0.5), and in follow-up phase 0.33 (range 0.25–0.4). It is concluded that Rania showed an increase in initiations and responses in intervention that was also continued in follow-up phase. Over all sessions, the standard deviation of initiations was 1.31, with an overall mean of 2.08. The standard deviation of responses was 0.19, with an overall mean of 0.24.

3.2. Social Validity

The measurement of social validity included six closed-ended questions conducted through an interview that were rated on five-point Likert-type scale (i.e., 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree). Tables A8 and A9 in the Appendix A display the results for peer participants’ and for teachers’ social validity.

All of the teachers and the peer participants in all three groups rated the intervention experience quite positively. All of the peer participants stated clearly that they could understand more about ASD students, which was one of the goals during the PMI program. Additionally, most of the peers from then onward would consider their ASD classmate a friend, answering with a mean of 4.27 out of 5. Generally, all three groups of peers gave positive answers concerning ASD students and the package of PMI—intervention program, which is shown from the means at Table A8 in the Appendix A. All comments from teachers were also positive (e.g., “This program increases the interaction between the target child and peer participants”, “This strategy was helpful to me as teacher”, “I would recommend this strategy to another teacher who has a student with ASD”). These means were absolutely positive as Table A9 in the Appendix A shows while the rest of the questions were also positive with means near to five out of five.

According to Kazdin [41], the social validity in any research is very important for three reasons. Firstly, various effective techniques for facing problematic behaviors may not be equally acceptable to the person who receives the treatment. Secondly, breaching the rights of the people receiving the treatments should be avoided, and thirdly, the identification of specific variables could influence the acceptability of treatments.

4. Discussion

This study was conducted to enhance peer-to-peer social skills in three elementary ASD students and fifteen peers from general education classrooms. Important evidence of this research was (a) the use of a common interest activity to increase social interactions between peers and ASD students; (b) the use of a school setting to increase social interactions among students with ASD and their typical peers; and (c) the fact that the school staff would apply the intervention program.

Results indicated that the social skills intervention had direct and vigorous improvements on social initiations and responses in all three participants. Some changes were noticed in all study variables, keeping up a positive slant within the rates of initiating and responding to interactions, and a negative slant within the rate of time the ASD students maintained low interactions. This research had the advantage of evaluating training in school, which is the most naturalistic setting while simultaneously giving school staff the opportunity to implement the intervention. Intervention procedures required the collection of data during the free play period of school recess, and school professionals had no difficulty to access that program. At the end of study, we selected social validity data where teachers reported that they had no difficulty with the procedures of intervention, and they found it easy to apply in school. Peer participants reported positive things about their experience, too. It should be noticed that the implementers of intervention were not research staff for the need of the study, but they already worked in the public schools and taught the target students of the study. Even though the ABA design is more powerful than the basic AB design from an experimental point of view [42], there is concern that the limited phase changes may lead to an observation effect that coincides with external conditions [43]. Maybe, an expansion to ABAB design could provide better quality and one more chance to prove the effect of an independent variable than an ABA design [42]. According to Michiels and Onghena [44] and Onghena et al. [45], there are some techniques that could increase the validity of this design, such as randomization, large number of data points, and replicating across participants. As far as the results of this study are concerned, it is concluded that there is an emerging need to provide multiple opportunities for social interactions, not only in non-academic social groups but also in group settings with academic activities. According to Krier and Labros [46], by providing chances for interaction with typical peers, ASD students have higher possibilities of responding and participating in activities. This comes in line with our research, as all three ASD students showed more frequent participation in activities during school time. A similar condition was noticed in their responses and initiations, too. In these results, the training of peers in combination with a common interest activity, often helped them to create more contacts with ASD students. This happened because, during the common interest activity, peers realized some common preferences with their ASD classmates. Newcomb and Bagwell [47] support that children often define friendship in terms of mutual enjoyment of a preferred activity. A characteristic example was that after the intervention most of the students from Panagiotis's classroom were playing the "game of hide-and-peek" for many days, which was his favorite game. This was confirmed from the follow-up phase of Panagiotis's, where responses and initiations ranged at similar levels with the intervention phase. These findings are significant because ASD students could have more frequent interactions and responses with their peers building stronger friendships than before [32,48–50]. Additionally, it has been noted from Pierce and Schreibman [51] that the failure to engage in social behaviors that are often observed in ASD may be related to a lack of motivation. These promising results showed that school staff could use this intervention package in order to strengthen their students' relationship and simultaneously help the ASD children to interact with peers. These findings confirm and expand the previous studies of PMI indicating positive social outcomes of students with ASD [19,31,46,52].

5. Conclusions

In any case, this intervention package provides a promising approach to enhance social skills in ASD students promoting progress in acceptance and inclusion of students with ASD. The study presented also conduces to the literature by proving how peer training in combination with activities based on students' common interests can be easily used by the teachers in a school setting.

This study reproduced and extended the previous research of PMI by demonstrating that this approach can successfully increase interactions between students with ASD and their peers. This intervention has the benefit of school staff's participation and the verification of effectiveness by several subjects in different grades and in different schools. However, a greater number of peer participants in each social group may lead students to model more social skills and generalize the learning of the intervention with peers in several settings. Additionally, the presented research has unclear results about untrained classmates of an ASD student. It would be interesting for a future study to generalize the results in untrained peers and further explore the peers' benefits and experience of being surveyed via personal interviews.

The presented study has some limitations. Even though the intervention program showed an increase in social interaction among ASD students and peers, generalization data were not assessed. ASD students can become socially functional when the social behavior techniques are generalized beyond training conditions [53]. For this reason, progress toward the inclusion of ASD students can be assisted by generalizing the PMI goals in other natural settings, such as a private playground where peers are not guided or supervised by adults. Most of the PMI studies, such as the one presented, focus on exploring the effects of this approach in functional students with ASD where the possibility of interaction with classmates is greater. Future research on PMI should examine the effect of this approach for non-verbal or other low-functioning students with ASD. Additionally, researchers could analyze the quality of peer interactions to measure the duration of interactive play. The continuing research on PMI strategy could provide important guidance and strengthen the findings for new skills in the social acceptance of ASD children in inclusive settings.

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Informed Consent Statement: Informed consent was obtained from all participants.

Data Availability Statement: Not applicable.

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Appendix A

Table A1. IOA of initiations for Giannis.

Sessions	s.1	s.2	s.3	s.4	s.5	s.6	s.7	s.8	s.9	s.10	s.11	s.12
Observer 1	–	–	–	+	+	–	+	–	+	+	+	–
Observer 2	–	–	–	+	–	–	+	–	+	+	+	–

Table A2. IOA of initiations for Panagiotis.

Sessions	s.1	s.2	s.3	s.4	s.5	s.6	s.7	s.8	s.9	s.10	s.11	s.12
Observer 1	–	+	–	+	+	+	+	–	+	+	+	–
Observer 2	–	+	–	+	+	–	+	–	+	+	+	–

Table A3. IOA of initiations for Rania.

Sessions	s.1	s.2	s.3	s.4	s.5	s.6	s.7	s.8	s.9	s.10	s.11	s.12
Observer 1	+	–	–	–	+	–	+	–	+	+	+	–
Observer 2	+	–	–	–	+	–	+	–	+	+	+	–

Table A4. IOA of responses for Giannis.

Sessions	s.1	s.2	s.3	s.4	s.5	s.6	s.7	s.8	s.9	s.10	s.11	s.12
Observer 1	+	+	+	–	+	–	–	+	+	+	–	–
Observer 2	+	+	+	+	+	–	–	+	+	+	–	–

Table A5. IOA of responses for Panagiotis.

Sessions	s.1	s.2	s.3	s.4	s.5	s.6	s.7	s.8	s.9	s.10	s.11	s.12
Observer 1	–	+	–	+	–	+	+	–	+	+	+	–
Observer 2	–	+	–	+	–	–	+	–	+	+	+	–

Table A6. IOA of responses for Rania.

Sessions	s.1	s.2	s.3	s.4	s.5	s.6	s.7	s.8	s.9	s.10	s.11	s.12
Observer 1	+	+	+	–	–	+	+	+	–	+	+	–
Observer 2	+	+	+	+	+	+	+	+	–	+	+	–

Table A7. IOA of each ASD student for initiations and responses in each phase.

ASD student	Phase	Initiations	Responses
Giannis	Baseline	100%	75%
	Intervention	80%	100%
	Follow-up	100%	100%
	Average	93.3%	91.7%
Panagiotis	Baseline	100%	100%
	Intervention	80%	80%
	Follow-up	100%	100%
	Average	93.3%	93.3%
Rania	Baseline	100%	75%
	Intervention	100%	80%
	Follow-up	100%	100%
	Average	100%	85%
Total Average		95.5% (range 93.3–100%)	90% (range 85–93.3%)

Table A8. Peers' Social validity (Range).

	Group 1	Group 2	Group 3	Mean
I have fun during training period.	5.0 (5.0)	4.2 (3.0–5.0)	5.0 (5.0)	4.73
This participation has an impact in my social life.	1.0 (1.0)	1.4 (1.0–2.0)	1.4(1.0–2.0)	1.27
I consider my classmate with ASD my friend now.	4.4 (4.0–5.0)	4.8 (4.0–5.0)	3.6 (3.0–5.0)	4.27
If asked, I would volunteer again in a similar project.	5.0 (5.0)	4.4 (4.0–5.0)	4.2 (3.0–5.0)	4.53
I feel that I can understand more about students with ASD.	5.0 (5.0)	5.0 (5.0)	5.0 (5.0)	5
This participation was a valuable use of my school time.	5.0 (5.0)	4.8 (4.0–5.0)	4.4 (4.0–5.0)	4.73

Table A9. Teachers' Social validity (Range).

	Group 1	Group 2	Group 3	Mean
This strategy was helpful to me as a teacher.	5.0 (5.0)	5.0 (5.0)	5.0 (5.0)	5
This program increases the interaction between the target child and peer participants.	5.0 (5.0)	5.0 (5.0)	5.0 (5.0)	5
The strategy was easy to implement.	4.5 (4.0–5.0)	4.0 (3.0–5.0)	4.0 (3.0–5.0)	4.16
The student with ASD has more friends thanks to this program.	5.0 (5.0)	4.0 (4.0)	4.0 (4.0)	4.33
I would use this strategy again in the future.	5.0 (5.0)	5.0 (5.0)	5.0 (5.0)	5
I would recommend this strategy to another teacher who has a student with ASD.	5.0 (5.0)	5.0 (5.0)	5.0 (5.0)	5

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