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Teaching Video Games as a Leisure Skill to Arab American Children with Autism Spectrum Disorder Using Video Modeling: A Multiple Baseline Study

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ABSTRACT

Children with autism spectrum disorder (ASD) frequently experience difficulties engaging in leisure activities because of deficits in social communication and interaction. Participation in meaningful leisure activities contributes to improved quality of life, emotional well-being, and social engagement. Despite the importance of leisure skills, limited research has examined interventions designed to teach leisure activities to culturally diverse populations. The purpose of this study was to investigate the effectiveness of video modeling in teaching an active video game as a leisure skill to Arab American children with ASD. Three elementary-aged Arab American children diagnosed with ASD participated in the study. A multiple baseline design across participants was employed to evaluate the effects of video modeling on acquisition of the Nintendo Switch game Just Dance. Results demonstrated a functional relation between video modeling and increased independent performance for all participants. Participants maintained the acquired skills after withdrawal of the intervention. Students and teachers reported positive perceptions regarding the intervention. Findings support video modeling as an effective and socially valid intervention for promoting leisure skills among Arab American children with ASD.

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Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by persistent deficits in social communication and social interaction, as well as restricted and repetitive patterns of behavior [1]. These characteristics frequently interfere with opportunities to participate in age-appropriate leisure activities. Participation in leisure activities contributes to improved social relationships, emotional well-being, adaptive functioning, and quality of life [2]. However, children with ASD often engage in leisure activities less frequently than their typically developing peers.

Leisure activities provide opportunities for friendship development, stress reduction, and community participation. Previous research has demonstrated that participation in recreational activities promotes social competence and enhances quality of life among individuals with ASD [2]. Nevertheless, barriers related to communication deficits, restricted interests, and difficulties with social interaction may limit access to meaningful leisure experiences [3]. Such challenges may be even greater for children from culturally and linguistically diverse backgrounds [4].

Arab American children with ASD represent an underrepresented population in autism research. Cultural beliefs, language differences, stigma associated with disability, and limited access to services may further restrict opportunities for participation in recreational activities [5,6]. Therefore, culturally responsive interventions are needed to support meaningful engagement and improve overall quality of life.

Video modeling is an evidence-based practice grounded in Bandura's Social Learning Theory and the principles of Applied Behavior Analysis [7]. Through observation and imitation, individuals acquire new skills by watching demonstrations of target behaviors. Previous studies have demonstrated the effectiveness of video modeling in teaching communication skills, social behaviors, academic tasks, self-care routines, and leisure activities to individuals with ASD [8-13]. Because many children with ASD are visual learners, video modeling provides a structured and predictable method for learning new behaviors [14].

Although previous studies have demonstrated the effectiveness of video modeling for teaching leisure activities, little research has focused on active video games or culturally diverse populations [2,15,16]. Furthermore, no studies have specifically investigated the effects of video modeling on leisure skill acquisition among Arab American children with ASD. Previous investigations have primarily involved participants from European American, Hispanic, or Asian backgrounds [5,6].

Therefore, the purpose of the present study was to evaluate the effectiveness of video modeling in teaching the active video game Just Dance as a leisure skill to Arab American children with ASD. Specifically, the study examined whether participants would

acquire and maintain the target skills and whether teachers and students would perceive the intervention positively.

Literature Review

Research consistently indicates that children with ASD participate in leisure activities less frequently than their peers without disabilities. Participation in meaningful leisure activities has been associated with improved social competence, reduced stress, enhanced self-esteem, and increased community involvement [2]. Furthermore, engagement in leisure activities contributes to overall quality of life and provides opportunities for friendship development, independence, and social inclusion [4]. Despite these benefits, children with ASD often experience difficulties accessing and participating in recreational activities because of deficits in communication, social interaction, and adaptive functioning [3].

Video games represent highly preferred leisure activities for many children with ASD. Previous studies have shown that technology-based leisure activities provide motivating and structured environments that align with the strengths and preferences of individuals with ASD [2,15]. Active video games, in particular, provide clear expectations, predictable routines, and opportunities for physical activity and social engagement [16]. Research has suggested that video games may promote cognitive development, increase physical activity, facilitate social interactions, and enhance emotional well-being among children with ASD [2,17].

Video modeling is an evidence-based intervention grounded in Bandura's Social Learning Theory and supported by principles of Applied Behavior Analysis [7]. Through observation and imitation, individuals acquire new skills by watching demonstrations of target behaviors. Previous studies have demonstrated positive outcomes when video modeling is used to teach communication skills, social behaviors, play skills, physical activities, and leisure behaviors to individuals with ASD [8-12]. Additional research has supported the effectiveness of video modeling in teaching leisure activities and promoting maintenance of acquired skills [16-23].

Although substantial evidence supports the effectiveness of video modeling, limited research has examined culturally diverse populations or investigated leisure activities selected according to participants' preferences [18]. Most previous studies have included participants from European American, Hispanic, or Asian backgrounds and have not specifically examined Arab American children with ASD [6]. Furthermore, many studies predetermined leisure activities without incorporating participant choice [2,8-12,14,16,17,19,20]. Incorporating participant preferences may enhance motivation, engagement, and social validity of interventions [18].

The present study extends previous research by examining the effectiveness of video modeling for teaching an active video game to Arab American children with ASD and by incorporating participant preferences when selecting the leisure activity. By focusing on an underrepresented population and emphasizing individualized, culturally responsive intervention practices, this study contributes to the growing literature on evidence-based leisure interventions for individuals with ASD.

Method

Participants and Setting

Three Arab American elementary-aged children diagnosed with autism spectrum disorder (ASD) participated in the study. Participants attended a private school in Pittsburgh, Pennsylvania, that provided educational and behavioral services for children with developmental disabilities. Pseudonyms were assigned to protect participants' identities. Participants included Adam (8 years old), Linda (8 years old) and Kamel (10 years old). Consistent with recommendations for single-case research, pseudonyms were used to ensure confidentiality and protect participant privacy [24].

Selection criteria required participants to (a) have a documented diagnosis of ASD, (b) demonstrate interest in video games and (c) possess prerequisite attending skills necessary to observe video demonstrations. Written parental consent and child assent were obtained before participation in accordance with ethical standards for research involving human participants.

Materials

Materials included a Nintendo Switch gaming system, the active video game Just Dance, a television monitor, video-modeling clips, and data collection sheets. A task analysis consisting of the sequence of behaviors required to independently set up and play Just Dance was developed to measure participant performance. Task analyses have been widely used in applied behavior analysis to teach and evaluate complex skills among individuals with ASD [25]. Prior to intervention, preference assessments were conducted to identify preferred reinforcers. For Adam, the highest preferred item was a Twix candy bar. Linda demonstrated a preference for gummy candy, whereas Kamel preferred Nutella sticks. Preference assessments are recommended to identify motivating stimuli and increase participant engagement [25].

Research Design

A multiple baseline design across participants was used to evaluate the effects of video modeling on leisure skill acquisition. The staggered introduction of the intervention allowed for demonstration of a functional relation between the independent variable and changes in participant performance. Multiple baseline designs are considered evidence-based single-case experimental designs and are frequently used in autism intervention research [24,26].

Dependent Variable

The dependent variable was the percentage of correctly completed steps in the task analysis for independently setting up and playing the Nintendo Switch game Just Dance. Performance was calculated by dividing the number of correctly completed steps by the total number of steps and multiplying by 100, consistent with procedures commonly employed in single-case research [26].

Independent Variable

The independent variable was basic video modeling. Video clips demonstrating the target behaviors were recorded using a smartphone and edited to provide clear demonstrations of the steps required to independently set up and play the game. Video modeling is an evidence-based practice for individuals with ASD and is grounded in Bandura's Social Learning Theory [7,14].

Procedures

Baseline

During baseline sessions, participants were provided with access to the Nintendo Switch and were instructed to play Just Dance independently. No prompts or instructional assistance were provided. Baseline sessions continued until stable patterns of responding were observed, consistent with recommendations for visual analysis in single-case experimental designs [24].

Adam completed three baseline sessions, Linda completed seven baseline sessions, and Kamel completed twelve baseline sessions.

Intervention

During intervention sessions, participants viewed the video model before being given the opportunity to perform the task independently. Performance data were collected during each session. The intervention procedures were based on principles of observational learning and previous research demonstrating the effectiveness of video modeling for teaching leisure skills to individuals with ASD [8-11,16].

Adam participated in 13 intervention sessions, Linda participated in nine sessions, and Kamel participated in seven sessions.

Maintenance

Maintenance probes were conducted after withdrawal of the intervention to evaluate retention of the acquired leisure skills. No video-modeling instruction was provided during maintenance sessions. Each participant completed three maintenance sessions. Maintenance assessment is an important component of intervention research and provides information regarding the durability of treatment effects [26].

Treatment Integrity

Procedural fidelity was monitored throughout the study using treatment integrity checklists. Treatment integrity was assessed during at least 80% of sessions. Results indicated 100% treatment integrity across all phases, demonstrating that the intervention was implemented as intended. Treatment integrity is essential for establishing a functional relation between the intervention and behavior change [25].

Interobserver Agreement

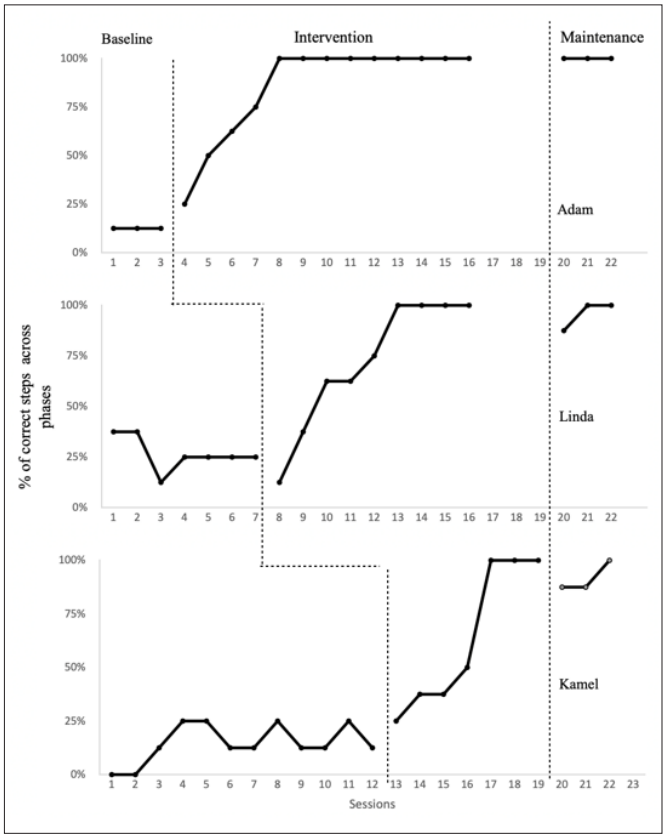
Interobserver agreement (IOA) data were collected by the researcher and a licensed behavior analyst. IOA was obtained during more than 20% of sessions across baseline, intervention, and maintenance phases. Mean IOA values were 97% for Adam, 90% for Linda, and 100% for Kamel, indicating strong reliability of data collection procedures. Collection of interobserver agreement data is considered a critical component of high-quality single-case research [24].

Social Validity

Social validity was assessed using questionnaires completed by students and teachers. Social validity measures provide information regarding the acceptability, feasibility and perceived effectiveness of interventions and are considered an important component of applied behavior analysis research (Wolf, 1978). Students reported enjoying the intervention and indicated that the video models helped them learn how to play Just Dance. Participants also expressed interest in using video modeling to learn additional video games. Teachers reported that the intervention was easy to implement and effective for teaching leisure skills. They indicated a strong likelihood of using video modeling in future educational settings and emphasized the importance of leisure activities for children with ASD.

Results

The purpose of this study was to examine the effectiveness of video modeling for teaching the active video game Just Dance as a leisure skill to Arab American children with autism spectrum disorder (ASD). Participant performance was evaluated using the percentage of correctly completed steps in the task analysis across baseline, intervention, and maintenance phases. Data were analyzed using visual analysis procedures consistent with recommendations for single-case experimental research [24,27].



Participant Performance

Adam

During baseline, Adam demonstrated low and stable levels of performance. Across three baseline sessions, he consistently completed 13% of the task-analysis steps independently. No variability was observed, indicating a stable baseline.

Following the introduction of video modeling, Adam's performance increased immediately. Mean performance during intervention was 86%, with scores ranging from 25% to 100%. By the end of intervention, Adam consistently achieved 100% accuracy. Percentage of nonoverlapping data (PND) analysis yielded a value of 100%, indicating a highly effective intervention.

Maintenance data demonstrated complete retention of the acquired skills. Adam maintained 100% accuracy across all maintenance probes, suggesting that video modeling resulted in durable learning, consistent with previous leisure intervention studies involving individuals with ASD [2,9].

During intervention, Adam expressed enthusiasm for the activity and frequently requested additional opportunities to play. He demonstrated preferences for songs such as Get on the Fire Truck and My Friend the Dragon. His teacher also used participation in the intervention sessions as reinforcement for completing academic work.

Linda

Linda demonstrated low but stable performance during baseline. Mean baseline accuracy was 27%, with a median score of 25%. Although she could independently turn on the Nintendo Switch, she experienced difficulty navigating menus, selecting songs, and engaging in active dancing.

After implementation of video modeling, Linda's performance improved substantially. Mean intervention performance increased to 72%, with scores ranging from 13% to 100%. Percentage of nonoverlapping data analysis indicated that 78% of intervention data points exceeded the highest baseline value.

Initially, Linda preferred watching the game rather than actively participating. However, after several sessions she began dancing independently and demonstrated particular enjoyment of the song Kitchen Kittens.

Maintenance probes demonstrated continued acquisition of the target behavior. Linda maintained a mean accuracy of 96%, indicating successful retention of the learned skills. These findings are consistent with previous research demonstrating maintenance of leisure skills following intervention [18,20].

Kamel

Kamel demonstrated low and stable responding during baseline, with an average performance of 14.6%. During early sessions, he frequently requested to watch television rather than interact with the game.

Following introduction of the video-modeling intervention, Kamel's performance increased markedly. Mean intervention performance increased to 64%, with scores ranging from 25% to 100%. Percentage of nonoverlapping data analysis yielded a value of 86%, supporting the effectiveness of the intervention.

After four intervention sessions, Kamel independently completed the target task and successfully navigated the game without assistance. His preferred song was Black Mambo.

Maintenance data indicated sustained performance. Kamel maintained an average accuracy of 92%, demonstrating successful retention of the target skills. The only step occasionally omitted involved turning off the gaming system. These findings are consistent with previous studies reporting maintenance of leisure skills among individuals with ASD [17,19].

Data Pattern Analysis

Visual analysis revealed a clear functional relation between video modeling and leisure skill acquisition. Baseline data for all participants were characterized by low and stable responding. Introduction of the intervention resulted in immediate increases in independent performance and positive trends across participants. High levels of performance were maintained after withdrawal of the intervention. Examination of level, trend, variability, and consistency across phases supported the existence of a functional relation between the independent and dependent variables [24,27].

Table 1 summarizes participant performance across phases.

Participant Mean Percentage of Correct Task-Analysis Steps Across Phases

Participant	Baseline	Intervention	Maintenance
Adam	13%	86%	100%
Linda	27%	72%	96%
Kamel	14.6%	64%	92%

Social Validity

Student responses indicated high levels of satisfaction with the intervention. Participants reported enjoying learning to play Just Dance and believed that video modeling helped them acquire the target skills. Students also expressed interest in using video models to learn additional games. These findings are consistent with previous studies reporting positive social validity outcomes for video modeling interventions among individuals with ASD [16,18,20].

Teachers reported that the intervention was easy to implement and effective for teaching leisure skills. Teachers further indicated a strong likelihood of incorporating video modeling into future instruction. Social validity has been identified as an essential component of applied behavior analysis and educational interventions.

Treatment Integrity

Procedural fidelity was monitored throughout the study. Treatment integrity was maintained at 100%, indicating that the intervention was implemented consistently across sessions. High treatment integrity is essential for establishing a functional relation between intervention procedures and behavior change [25].

Interobserver Agreement

Interobserver agreement data were collected during more than 20% of sessions. Mean interobserver agreement values were 97% for Adam, 90% for Linda, and 100% for Kamel. These findings demonstrate strong reliability of data collection procedures and are consistent with recommendations for high-quality single-case experimental research [24].

Discussion

The purpose of the present study was to evaluate the effectiveness of video modeling in teaching the active video game Just Dance as a leisure skill to Arab American children with ASD. Results demonstrated that video modeling was effective in increasing independent performance for all participants.

Consistent with previous investigations, participants demonstrated substantial improvements in leisure skill acquisition following implementation of the intervention [2,8-12,14,16,17,19,21]. Immediate increases in performance and sustained improvements during maintenance suggest a functional relation between video modeling and the target behavior [24].

An important contribution of the present study lies in its focus on Arab American children with ASD, a population that has received limited attention in the autism literature [6]. Furthermore, unlike many previous investigations, leisure activities were selected according to participant interests. Providing children with opportunities to choose preferred activities and songs may have contributed to increased motivation and engagement [18].

Maintenance data demonstrated that participants retained the acquired skills after withdrawal of the intervention. These findings support previous research indicating that video modeling promotes durable learning and independence [2,9,15,17,20,22].

Social validity findings further support the practical significance of the intervention. Students reported enjoying the activity and expressed interest in learning additional video games through video modeling. Teachers perceived the intervention as feasible, effective, and appropriate for educational settings, findings that are consistent with previous investigations [16,18].

Collectively, the findings provide evidence that video modeling represents an effective and socially valid intervention for promoting meaningful leisure participation among Arab American children with ASD.

Implications for Practice

The findings of the present study have important implications for educators, behavior analysts, and related service providers working with children with autism spectrum disorder (ASD). Results demonstrated that video modeling was an effective and practical intervention for teaching leisure skills within a school setting. Given the importance of leisure participation for quality of life, social development, and emotional well-being, professionals should consider incorporating leisure skills into educational programming for students with ASD [2,4].

One important implication concerns the use of preference assessments. Leisure activities that reflect individual interests are likely to enhance motivation and increase engagement. In the present study, allowing participants to select preferred songs and participate in a highly preferred activity may have contributed to successful skill acquisition and maintenance. Consequently, practitioners should prioritize individualized and culturally responsive interventions when selecting leisure activities [18,25].

The positive social validity outcomes suggest that video modeling is feasible for implementation in educational settings. Teachers perceived the intervention as effective, easy to implement, and valuable for promoting leisure skills. Therefore, video modeling may be incorporated into Individualized Education Programs (IEPs) as an evidence-based strategy for promoting independence and meaningful participation [14].

Collaboration among teachers, behavior analysts, therapists, and families may further strengthen the effectiveness and generalization of acquired skills. Encouraging participation in extracurricular activities and school-based clubs may provide additional opportunities for social interaction and community participation [4].

Limitations

Although the findings provide support for the effectiveness of video modeling, several limitations should be considered.

First, the study included only three participants. Although single-case experimental designs are appropriate for demonstrating functional relations, replication with larger samples is necessary to improve generalizability [24].

Second, the study was conducted in one private-school setting. Therefore, the findings may not generalize to public schools or other educational environments.

Third, parent perspectives were not included in the social validity assessment. Future studies should include parent feedback to better understand the perceived benefits and acceptability of the intervention from a family perspective.

Fourth, long-term outcomes beyond the maintenance phase were not examined. Additional longitudinal research is needed to determine the durability and generalization of leisure skills across settings and over extended periods [26].

Fifth, the cost of the Nintendo Switch and the Just Dance game may limit accessibility for some families and educational programs. Future investigations should evaluate lower-cost alternatives and other leisure activities.

Finally, the study focused on one leisure activity. Future research should examine a broader range of structured and unstructured recreational activities to increase understanding of leisure participation among individuals with ASD [2,14].

Conclusion

The present study investigated the effectiveness of video modeling for teaching the active video game Just Dance as a leisure skill to Arab American children with autism spectrum disorder. Results demonstrated a functional relation between video modeling and increased independent performance across all participants. Participants maintained the acquired skills following withdrawal of the intervention, and both students and teachers reported favorable perceptions regarding the intervention.

These findings contribute to the growing body of literature supporting video modeling as an evidence-based practice for individuals with ASD [14]. Furthermore, the study extends previous research by focusing on Arab American children, a population that has received limited attention in autism research [6]. By incorporating participant preferences and culturally responsive considerations, the intervention promoted meaningful engagement and independence.

The findings suggest that video modeling represents an effective and socially valid strategy for teaching leisure skills and improving opportunities for participation and inclusion. Future research should continue to investigate culturally responsive interventions and examine the long-term effects of leisure-skill instruction across diverse populations and settings [28-141].

Conflict of Interest

The author declares no conflicts of interest.

Data Availability Statement

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval

All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional review board. Written informed consent was obtained from parents and assent was obtained from participating children.

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