

## Effects of Enhanced Structure in an Aquatics Environment for Three Boys with Autism Spectrum Disorders: A Pilot Study

### Abstract

*The purpose of the pilot study was to examine the effects of pictographic activity schedule implementation within a structured aquatic environment for individuals diagnosed with autism spectrum disorder (ASD). Three boys (11 to 17 years) enrolled at a school for children with developmental disabilities served as participants. An interrupted time series design (A/B/A) was used to assess the effects of the pictographic activity schedules on inappropriate response time in the aquatic setting. The results indicated that activity schedules, when used during structured teaching, improved behaviour in children with ASD by means of reducing inappropriateness. Additionally, a generalized effect of the activity schedules was found during free play with decreased rates of inappropriate behaviour. The implications of these findings show the importance of visual activity schedules within all domains of education, including those involving physical activity as a means of reducing maladaptive behaviour.*

According to the Centers for Disease Control (CDC), 1 out of every 68 children is diagnosed with an autism spectrum disorder (ASD) in North America (CDC, 2014). Moreover, current epidemiological data indicate that the prevalence rate for ASD is increasing on an annual basis (Kim et al., 2011). As such, research has focused on effective educational treatments aimed at minimizing the effects of the condition (Ryan, Hughes, Katsiyannis, McDaniel, & Sprinkle, 2011). One treatment method that has been proven effective is the Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) program (Mesibov & Shea, 2010; Mesibov, Shea, & Schopler, 2004; Schopler, Brehm, Kinsbourne, & Reichler, 1971; Schopler, Mesibov, & Hearsey, 1995). The TEACCH approach is recognized as one of the most popular educational program models available for individuals with ASD today (NasoudiGharehBolagh, Zahednezhad, & Vosoughillkhchi, 2013) with it being used worldwide in whole or part by between 30% and 60% of families, respectively (Green et al., 2006).

Central to TEACCH is a concept called "Structured Teaching" (ST). Based upon evidence and observation that individuals with ASD share a particular pattern of neurological characteristics (Mesibov & Shea, 2010), ST is the reorganization of visual information within the individual's environment with the objectives of focusing the attention of

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the learner and controlling the learning context. Within this approach utilizing the visual modality is important as individuals with ASD possess strengths with visual information-processing, yet experience organizational deficits and an inability to independently understand or control their behaviour (Mesibov, Schopler & Hearshey, 1994). Specifically, ST alters the visual information presented to the individual with ASD in four ways: (1) organization of the physical environment, (2) addition of predictability by sequencing activities through the use of visual schedules, (3) incorporation of work and activity systems for facilitation of independent functioning, and (4) inclusion of visually structured instruction, organization, and clarity that help make the tasks meaningful and understandable (Mesibov et al., 2004). With the addition of such alterations, a sense of independence for the student is fostered thus providing an effective setting for teaching and learning (Schopler et al., 1995).

Much of the research that has empirically demonstrated the effectiveness of the TEACCH program has done so using the program as a comprehensive intervention (NasoudiGharehBolagh et al., 2013; Ozonoff & Cathcart, 1998; Panerai, Ferrante, & Caputo, 1997; Panerai, Ferrante, & Zingale, 2002). Yet, given the breadth of the approach, individual components such as activity schedules and work systems have been explored as stand-alone treatment methods. MacDuff, Krantz, and McClannahan (1993) explored the use of activity schedules for children within a home-based environment. Positive outcomes included sustained engagement in tasks, generalizability of skills, and improvements to behaviour (i.e., increased independence and fewer aberrant behaviours). Since this early investigation, similar findings have been found in contexts such as the classroom (Bennett, Reichow, & Wolery, 2011; Bryan & Gast, 2000; Massey & Wheeler, 2000; O'Reilly, Sigafos, Lancioni, Edrisinha, & Andrews, 2005; Pierce, Spriggs, Gast, & Luscre, 2013; Schmidt, Apler, Raschke, & Ryndak, 2000), community (Carson, Gast, & Ayers, 2008; Dettmer, Simpson, Myles, & Ganz, 2000), and in clinical training settings (Pierce & Schreibman, 1994). In addition to activity schedules, Hume and Odom (2007) examined the use of classroom work systems on the independent work and play skills of students with autism. These

investigators discovered that with the implementation of structured work systems, the students displayed increases in on-task behaviour, number of tasks completed, and a reduction of behavioural assistance strategies (i.e., prompting). Further research has added to this list of positive benefits including increases in task speed and accuracy, improvements to overall behaviour, generalizability across settings, and increased student engagement (Bennett et al., 2011; Hume, Plavnick, & Odom, 2012). Such outcomes provide indication that both activity schedules and work system interventions can be considered as independent means to facilitating the learning experiences of individuals with ASD.

The TEACCH program has been recommended for use in special education classrooms for children with autism for a number of years (Mesibov et al., 2004; Mesibov, Schopler et al., 1994; Schopler et al., 1995). Yet despite the attention and success that structured teaching and the TEACCH methodology has received as a classroom intervention, recommendations for its use in physical activity settings have superseded empirical validation (Groft-Jones & Block, 2006; Houston-Wilson & Lieberman, 2003; O'Connor, French, & Henderson, 2000; Schultheis, Boswell, & Decker, 2000; Staples & Reid, 2010). This lack of evidence is surprising given the breadth of information which exists in relation to the impact of exercise and physical activity on the developmental domains affected by ASD (Lang et al., 2010; Sowa & Meulenbroek, 2012). Moreover, it is interesting given the supplemental value that the core elements encompassed within the approach hold in reference to establishing program guidelines for enhancing physical activity among individuals with ASD (Dawson & Rosanoff, 2009).

To date, only the work of Pan (2010) has explored the effect of adding structure to a physical activity setting. Here, the research explored the effects of using recognizable features of the TEACCH model to improve aquatic skills and social behaviours of 16 boys with ASD. Results from this study indicated that there is potential for the adjustment of structure to facilitate the development of skills and improve behaviours in children with ASD. However, despite these positive outcomes, there is still a lack of evidence to support the use of

structural interventions such as TEACCH within the areas of physical education and activity.

The purpose of this exploratory investigation was to examine the effects of both enhanced structure and how pictographic activity schedules within an aquatics program for individuals with ASD would affect participants' engagement in Inappropriate Response Time (IRT). The aquatic setting is important to explore, as it tends to include increased potential for distraction and unpredictability, as well as includes a variety of multisensory components that can affect behaviour in those with ASD. To date, the use of an aquatic environment has demonstrated benefits for individuals with ASD ranging from improvements in fitness levels and enhanced skill development to increases in social functioning (Fragala-Pinkham, Haley, & O'Neil, 2011; Pan, 2010; Summers & Wallace, 2013; Yilmaz, Yanardag, Birkan, & Bumin, 2004). In using an aquatic environment, the current investigation would lend support and extend the findings of other research conducted in such a setting, as well as lead to future considerations for ASD intervention research.

It was hypothesized that the activity schedules would decrease IRT over the course of the Adapted Physical Education (APE) teacher's instructional session. Behaviour upon the removal of the intervention (i.e., patterns of maintenance) was also examined.

## Materials and Methods

### Participants

Participants included three boys, with primary diagnosis of autism, ranging in age from 11 to 16 years of age enrolled at a school for children with developmental disabilities in a large metropolitan city. Physical education teachers, who thought schedules might improve motor performance, referred the participants to the researcher who was working in the school as a teaching assistant. A collaborative team of professionals from the school was responsible for confirming the diagnosis of autism through: (1) Observation for behaviours consistent with the criteria specified by the *Diagnostic and Statistical Manual of Mental Disorders* (4<sup>th</sup> ed., text rev.; *DSM-IV-TR*; American Psychiatric

Association, 2000); (2) Formal assessment with the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Rothen-Renner, 1988); and (3) Formal assessment with the Psychoeducational Profile Revised (PEP-R; Schopler Reichler, Bashford, Lansing, & Marcus, 1990). While all participants had received formal diagnoses of autism from the educational team, resources did not allow for independent confirmation for this study. All participants had histories of disruptive behaviours, all displayed high levels of stereotypical responses, and each exhibited deficiencies in language (See Table 1). The boys were reliant on ongoing supervision and prompting to complete activities, however all were familiar with the concept of schedules as they were used in their regular classrooms.

### Setting and Materials

The study occurred in an aquatic training pool at a recreational facility where the participants had taken part in a weekly aquatics program in the three months prior to the study. All sessions included the three participants in addition to 10 to 12 other students from the school with various disabilities. For the purposes of exploration, the participants were separated from the remainder of the group working within a distinct section of the pool as to minimize distractions. Sessions were conducted with the assistance of the participant group's special education classroom teacher. Due to scheduling limitations, the entire set of observations took place over a 13-week period. Each week consisted of one swimming session lasting approximately 30 to 40 minutes; swimming sessions included warm-up activities lasting approximately 5-10 minutes, skill instruction lasting approximately 15-25 minutes, and free play to complete the session.

Intervention materials included three pictographic schedules that were used within the activity environment (i.e., the swimming pool setting) comprised of coloured pictures, placed in sequential order, on a plain sheet of coloured paper using Velcro. All pictures were taken from a computer program (Boardmaker, Version 5) used by the school to create regular classroom schedules. Of the three schedules, one was used simultaneously by all three participants, one was used individually by each

Table 1. Participant Behaviour Profiles

Participant	Behavioural Characteristics
Matt	Displays echolalia and uses noncontextual speech; aggressive; hyperactive; impulsive; high levels of anxiety; inattentive; noncompliant; stereotypical behaviours (i.e., repetitive touching of those around, hand/arm flapping, bouncing)
Alex	High levels of anxiety; socially isolated; noncompliance when not observed by authoritative figure; inappropriate laughter despite being non-verbal; aggressive; self-stimulation (i.e., tapping fingers on back of neck, pacing, tapping inanimate objects)
Jake	Limited span of attention; avoidance; socially withdrawn; inappropriate vocalizations; stereotypical behaviours (i.e., licking and rubbing fingers, pressing outside corner of eyes, facial tics, grabbing and clutching himself)

participant, and one was set up in the form of individual work systems. Each schedule ranged in size and included activities corresponding to the Adapted Physical Education (APE) teacher's lesson. A further description of each schedule is given below.

The first schedule was used simultaneously by all three participants. Included on this schedule were activities corresponding to the APE teacher's daily lesson occurring within the swimming pool. For example, pictures representing warm-up activities, relays, games, and free time were incorporated. This schedule consisted of picture symbols approximately 21.5 cm by 28 cm which were placed on a wall beside the pool where the participants initiated their activities. In addition, to reduce the obstacle of the teacher getting in and out of the pool, an identical hand-held schedule with pictures approximately 3.5 cm by 3.5 cm was integrated. The teachers and assistants aided the participants in following this schedule through the use of a prompt hierarchy (Watkinson & Wall, 1982), whereby more intrusive prompts (i.e., direct manipulation) are gradually faded and less intrusive prompts (i.e., gestural and verbal prompting) are utilized.

The second schedule was an extension of the warm-up activities noted on the larger schedule of all pool activities. Each participant had their own copy of this schedule. Included within the schedules was a Polaroid photograph of the participant and pictures depicting the number of activities to be completed. For example, the schedule consisted of three pictures depicting

running across the pool, three pictures depicting swimming with the use of a pool noodle, and three pictures depicting swimming with the use of a flutterboard. All pictures were 3.5 cm by 3.5 cm, and the complete schedule was attached to an inverted V-shaped "Wet Floor" sign, which was approximately two feet tall, at the edge of the swimming pool. This schedule was identical for all three participants.

The third schedule was set up in the form of a work system for each of the three participants. Each participant had a different work system, as each reflected individual interests. For example, one participant enjoyed jumping into the water; another enjoyed diving underneath the surface; while yet another enjoyed swimming in the deep end of the pool. Therefore, the picture symbols were representations of these activities. Specifically, pictures of hockey pucks that the participants had to dive for, the action of swimming and the action of jumping off the side of the pool were used. Each picture was 3.5 cm by 3.5 cm, and five identical pictures made up the complete work system schedule. Individual work systems were placed away from the larger group (i.e., in the deep end of the pool), and used after the warm-up activities were completed.

## Experimental Design

An interrupted time series design (A/B/A) (Creswell, 2012) was used to assess the effects of the structured activity schedules on inappropriate behaviour. An interrupted time series

design consists of obtaining multiple measures prior to an intervention, administering an intervention, and then measuring outcomes on multiple occasions. This design allowed the researchers to determine if changes in behaviour were apparent after the implementation of an intervention, and if alterations could be maintained once said intervention was removed. Baseline sessions occurred in the first three weeks of the 13-week investigation, while intervention and maintenance sessions took place for eight and two weeks, respectively.

## Procedures

All procedures were carried out under the approval of the Institutional Review Board at McGill University.

**Pre-baseline.** Participants entered into this study with some experience of schedule-use as they had previously used picture symbol schedules in their regular special education classrooms. According to the homeroom teacher, they were able to discriminate amongst tasks and comprehend when an activity was completed. However, due to the unfamiliarity of the pictures in the current study, students had to be re-taught discrimination tactics to ensure that they could distinguish between the picture symbols being used. After each picture symbol was correctly identified from a larger group of pictures with the help of the classroom teacher or assistant, prompting was faded in order to promote a greater sense of independence. Criteria for participant inclusion in the investigation were an understanding of the picture symbols. Once the individual had correctly identified each of the pictures without the intrusiveness of prompting, it was believed that an understanding had been developed, and each individual picture could be incorporated into a schedule. The participant group's special education teacher was responsible for ensuring the discrimination of all picture symbols being used, thus establishing a level of understanding, prior to the commencement of the investigation.

**Baseline.** In the baseline condition, a trained APE teacher from the participants' school delivered a daily aquatic lesson to the entire group, including the participants under investigation. At the beginning of each of the activities within

the lesson, the teacher performed a single demonstration, accompanied by verbal instruction. With the assistance of the participants' regular special education teacher, the participants' engaged in each of the lesson's individual activities. Physical and verbal prompting was used to keep the participants' within the confines of the activity area, as well as on-task with respect to the APE teacher's lesson.

**Intervention.** All baseline procedures were used throughout the intervention condition in addition to the schedules. Each of the schedules was implemented in the same way. Once the child had completed the task denoted, he was guided to tear the picture from the board and place it in a plastic pouch located at the bottom of the schedule. The child was then instructed to return to the schedule in order to determine if any additional items were left. Once all the items had been removed, it was indicated to the child that the schedule was finished. Once the schedules were completed, the participants were instructed to wait. Wait times were minimal; nevertheless data were taken on the dependent variable during this time. Additional prompting, such as verbal instruction and gestures, were used if and when the participant had difficulties manipulating schedule items. Prompting was not used to assist the child in completing the activities themselves. It is important to note that the first schedule (used by all three participants simultaneously) was teacher-regulated with each participant taking turns in removing items and placing them into their appropriate finished location.

**Maintenance.** Over this condition, activity schedules were removed and all instruction returned to baseline levels.

## Response Definitions and Measurement

**Child behaviours.** Structured teaching is designed to educate individuals with autism and circumvent problems with difficult student behaviours. Therefore, research that has empirically evaluated the impact of structured teaching has typically selected dependent variables such as on-task and on-schedule behaviours, and inappropriate behaviours including stereotypes (e.g., Bryan & Gast, 2000; MacDuff et al., 1993; Panerai, Ferrante, Caputo, & Impellizzeri,

1998; Schultheis et al., 2000). Within the current investigation, inappropriate behaviour was measured as a function of time. The variable of *inappropriate response time (IRT)* was defined as time that participant behaviour was considered: (a) inappropriate to the time and place they occurred in, (b) non-functional to the completion of the activity, (c) disruptive in nature causing the teacher to stop instruction or a peer to stop engagement in activity, or (d) harmful to the individual or anyone in the surrounding area. Examples of inappropriate behaviours include aggression, hyperactivity, self-injurious behaviour, and stereotypical mannerisms such as self-stimulation and inappropriate vocalization.

**Measurement procedures.** All sessions were recorded using two digital video cameras, and stored in a secure location at the researcher's academic institution. Data for the dependent variable of inappropriate response time were subsequently coded over the course of two distinct periods of the swimming session: during the APE teacher's delivery and instruction of the daily aquatic lesson, and during the free play portion of the swimming session. The time period of free play was chosen to determine if any potential effect would extend beyond the period of formal instruction. Data were coded using a modified version of Siedentop and colleague's (1982) ALT-PE systematic observation instrument where behaviours were scored in 6-second intervals. Interval recording of the 6-second duration was used, as opposed to the 12-seconds outlined by the instrument in order to minimize the possibility of several behaviours being observed in the same interval (van der Mars, 1989). The ALT-PE instrument has been proven reliable at the .90 (Derri, Emmanouilidou, Vassiliadou, Tzetzis, & Kioumourtzoglou, 2008) and .92 (Temple & Walkley, 1999) levels, as well as been deemed valid as evidence has been provided by at least

11 studies where some measure of student's engaged time and learning via appropriateness have been correlated (Metzler, 1989).

**Interobserver agreement.** Interobserver agreement (IOA) on participant responding and the researcher's adherence to planned procedures was collected on 25% of all experimental sessions. Via the recorded aquatic program sessions, a trained observer conducted at least one reliability check in each of the experimental conditions. For event recording purposes, training consisted of the researcher explaining categorical definitions, methods of data collection, and procedures in detail to the trainee. Additionally, the researcher conducted a practice session alongside the trainee whereby both watched, scored, and compared recorded video data simultaneously. If disagreements occurred throughout the practice sessions, the video was paused and a discussion surrounding the disagreement ensued. The interval recording training took approximately three hours, at which time agreement reached acceptable levels (approximately 80%) and subsequent reliability estimates could be conducted. Such reliability estimates were calculated using the point-by-point method in which the number of agreements is divided by the number of agreements plus disagreements, and multiplied by 100. Over the 13-week study, agreement ranged from 80% to 97% on all timed intervals, with a mean agreement of 90%.

## Results

Mean results for the percentage of IRT in which the participants engaged in over the course of the swimming session is found in Table 2.

Figure 1 reports the results for each of the three participants when being formally instructed

Table 2. Mean Percentages of Inappropriate Response Time (IRT) Across Instructional Phases

Participant	IRT During Instruction			IRT During Free Play		
	Baseline	Intervention	Maintenance	Baseline	Intervention	Maintenance
Matt	11.2	5.1	8.5	12.9	7.7	4.0
Alex	12.2	3.1	2.3	23.6	11.8	5.3
Jake	10.0	3.0	0.0	13.9	4.6	1.4

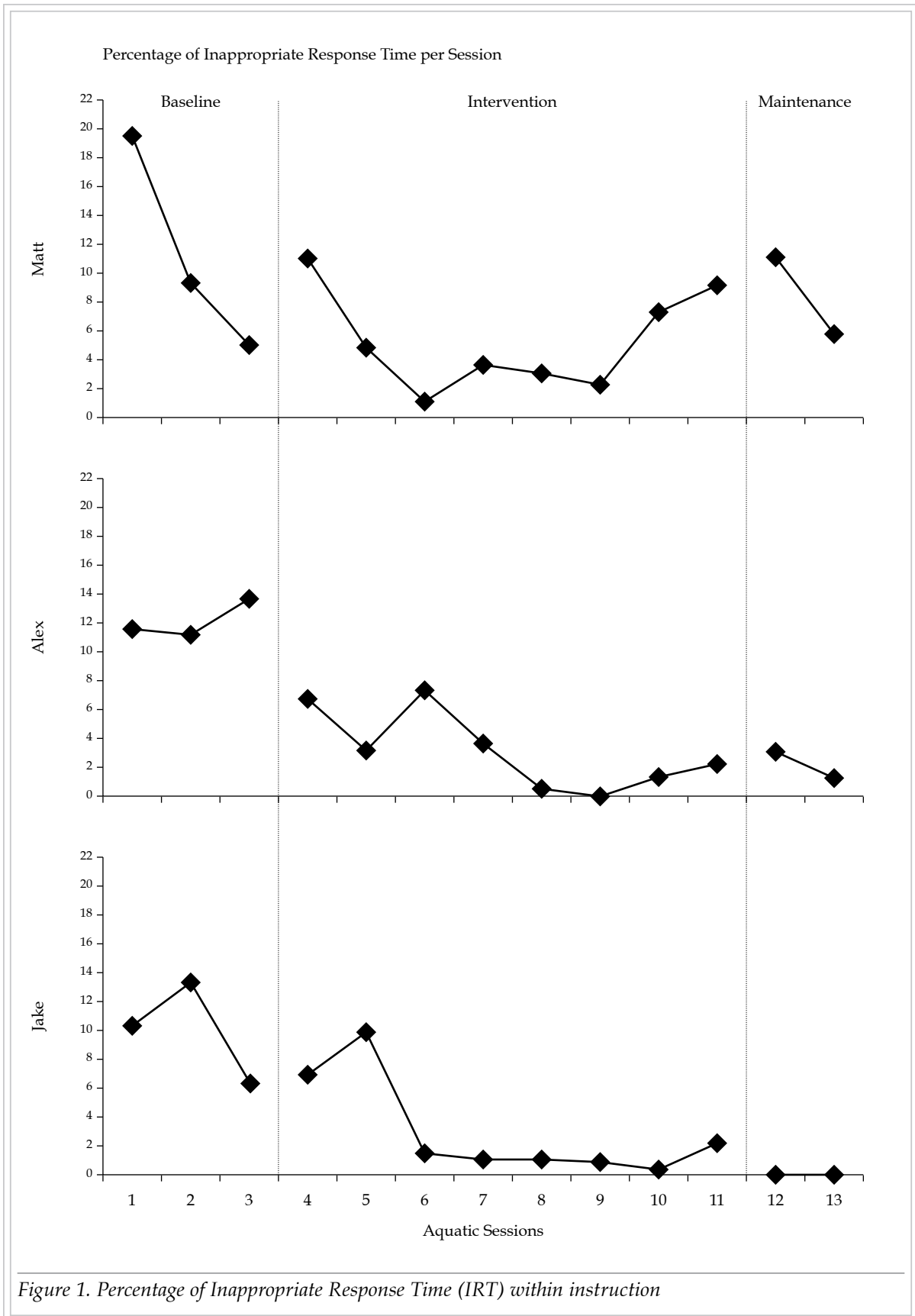


Figure 1. Percentage of Inappropriate Response Time (IRT) within instruction

by the APE teacher for all phases of the study. During baseline, the mean percentage for Matt, Alex, and Jake (pseudonyms) was 11.2%, 12.2%, and 10.0%, respectively. Over the duration of the intervention values dropped to 5.1% in Matt, 3.1% in Alex, and 3.0% in Jake. Finally over the maintenance condition, mean values remained below baseline levels, however varied amongst the three participants. Specifically, Matt engaged in inappropriate behaviour on a mean of 8.5% of intervals, Alex on a mean of 2.3% of intervals, and Jake showed no sign of inappropriate activity. As a whole, all three participants demonstrated a reduction in inappropriate behaviours through the use of activity schedules as the IRT variable fell below baseline levels over the course of the intervention sessions. Similar trends were observed when the intervention was removed.

Figure 2 shows percentages of IRT for all three participants over the period of free play (i.e., without formal instruction, not restricted in a specific area of the pool, and having opportunity to interact with the rest of the swimming class) for all phases of the study. During baseline, the IRT mean for Matt was 12.9%, while Alex displayed a mean of 23.6% and Jake a mean of 13.9%. Over the course of the intervention sessions, the use of picture symbol schedules produced reduced means of 7.7%, 11.8%, and 4.6% in Matt, Alex, and Jake, respectively. In maintenance, IRT was maintained and further reduced by all three participants as Matt displayed a mean of 4.0%, Alex of 5.3%, and Jake of 1.4%. Similar to the results of all intervals and those pertaining to instruction, these findings revealed improvements in IRT over the period of free play for all the participants.

## Discussion

The purpose of this pilot study was to evaluate the effectiveness of using pictographic activity schedules on IRT of three adolescent boys with autism over a 13-week swimming program. The findings from this study lend support to previous research on activity schedule use in the educational environment for individuals with ASD (Bennett et al., 2011; Bryan & Gast, 2000; Hume & Odom, 2007; MacDuff et al., 1993; O'Reilly et al., 2005), and extend the recommendations and limited evidence of such interven-

tion practices within aquatic physical activity settings (Pan, 2010; Yilmaz et al., 2004). Overall, the implementation of activity schedules positively influenced behaviour as the IRT variable was reduced. However, the extent of the influence varied between individuals as well as across the different time periods that were examined.

Within the formal instruction portion of the swimming session, two of the participants (Alex and Jake) demonstrated substantial reductions in inappropriate behaviour with the implementation of the activity schedule intervention, thus leading to minimal time spent engaged in inappropriate behaviours. The third participant (Matt) displayed more inconsistent behavioural patterns with initial reductions in IRT followed by an increase towards the end of the intervention sessions. It is unknown why the third participant demonstrated such variability with respect to behaviour as information was not recorded prior to and following the aquatics session. Moreover, resources did not allow for the confirmation of medications that may have also triggered variable responses over the course of the 13-week aquatics program. Nevertheless, the findings of improved behaviour for the first two participants are consistent with Yilmaz et al.'s (2004) study indicating stereotypical responses, such as spinning, rocking and echolalia, are reduced through active participation in aquatics programming for individuals with ASD.

A secondary aim of the research was to determine if the effects of improved behaviour would be transferred beyond the period of formal instruction. Similar to earlier trends, IRT was reduced and maintained below baseline levels in all three participants over the course of free play. This sense of generalization supports the findings of Bryan and Gast (2000) who discovered that students with ASD were able to generalize focus and appropriateness to novel activities not denoted by the picture activity schedules. In the case of the current investigation, the participants generalized their appropriate behaviour (i.e., reduced IRT) to the less novel activity of free play from the more structured component of the aquatic session, that being instruction.



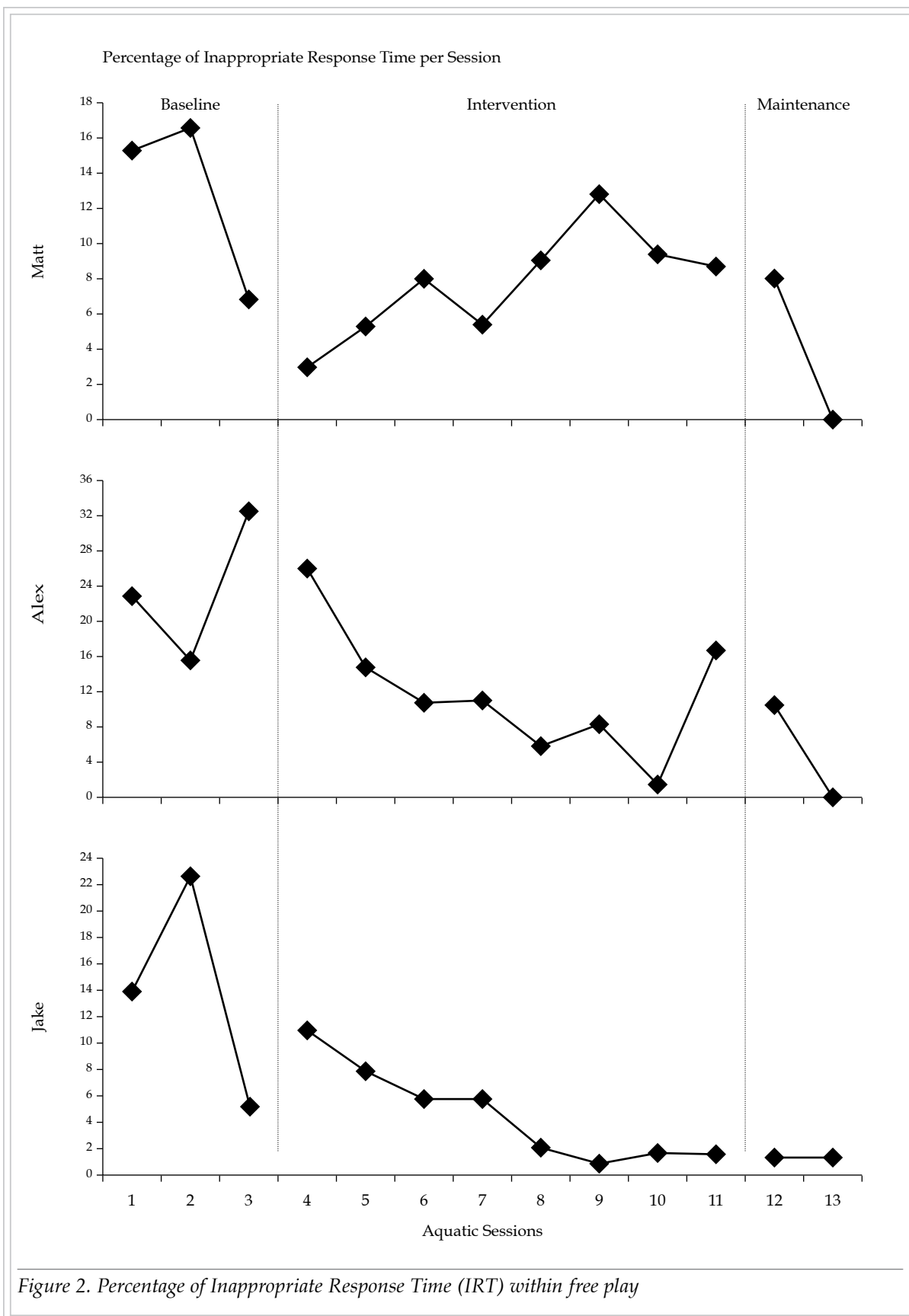


Figure 2. Percentage of Inappropriate Response Time (IRT) within free play

Finally, the current study examined how the activity schedules would affect behavioural patterns when removed. The results showed that maintenance effects for the dependent measure of IRT were inconsistent across all of the participants. Nevertheless, the findings are encouraging as the current investigation provides some support for the findings of Bryan and Gast (2000), who claimed the implementation of schedules allowed students to maintain high levels of on-task behaviour after schedules were removed.

Although the findings are positive with respect to the effect of activity schedules on behaviour, the limitations of the current investigation should be recognized. The first two limitations involve sample selection. Based on a convenience sample from an established aquatics program, each participant had already been exposed to the environment for a period of three months prior to the investigation. As such, a level of familiarity with the environment and the predictability of the APE teacher's lesson sequencing may have already been established masking the effects of the activity schedules. However, while a level of familiarity can be seen as a limitation, it is also important to consider that children, especially those with ASD, respond better in settings where the likelihood of events is predictable; if a more novel setting was selected for the intervention, it may not have been as successful. Secondly, this sample also represents one in which there was an established familiarity with schedule use. While discrimination tactics were used to familiarize the participants with the symbols, the result of the study may have been biased due to the additional practice that the participants had in using schedules within the special education classroom. These two limitations could have been minimized if a sample of participants, who were unfamiliar with the use of schedules, was selected from a larger population that had not been involved in the aquatics program three months prior to the commencement of the investigation.

The final limitation has to do with the experimental length. According to a meta-analysis performed by Virtues-Ortega, Julio, & Pastor-Barriuso (2013), studies examining a TEACCH-based intervention usually are conducted over an average of 19 weeks. In comparison, the current investigation is only examining an intervention of 8 weeks. While several studies have

demonstrated positive effects over intervention lengths of shorter duration (i.e., Durham, 2000; Durnick, et al., 2000; Ozonoff & Cathcart, 1998), the length of the current study's intervention period must still be considered as a limitation. Despite the current investigation's encouraging results, a more substantial experimental length with additional sessions at all three treatment conditions, may have added to the value of the findings demonstrated in the current study. This would have provided more opportunity for the students to become accustomed to using the schedules in an environment outside their special education classroom, and the researcher to determine a more accurate account of the effects of activity schedule implementation.

In conclusion, this pilot study extends the present literature demonstrating that activity schedules can be used to elicit positive effects when used in physical activity settings for individuals with ASD. Future examinations with differing physical activities are warranted to verify if schedules are generalizable to activity environments with reduced predictability (i.e., physical education classrooms, inclusive community programs). Considerations should be given to the type and extent of their use, in addition to the time in which they are implemented. Through such structural considerations, physical activity programs advocating for the successful inclusion of individuals with ASD can provide optimal opportunities for activity participation, thus promoting healthy and active lifestyles inclusive of all individuals.

## Key Messages From This Article

**People with disabilities.** Anyone can participate in physical activity; it is just a matter of finding the right way to structure the activity to suit one's needs.

**Professionals.** The use of activity schedules is an effective and easy-to-use means of support to enhance learning outcomes for individuals with ASD in an adapted physical activity setting.

**Policymakers.** Known intervention strategies used within general educational settings, and that can enhance the behaviour of individuals with ASD, should be encouraged as a means of promoting engagement in physical activity.

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