An evaluation of effective implementation of ABA on the outcomes across learning domains for children with autism

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Executive summary

Applied behaviour analysis (ABA) is considered an effective treatment for individuals with autism, and many researchers have further investigated factors associated with treatment outcomes. However, few studies have focused on whether treatment intensity and duration have differential influences on separate skills.

The aim of the case study will be to investigate how the intensity and duration for implanting ABA would impact learning across different treatment domains, including receptive skills, functional daily living skills, imitation, and communication, play and compliance.

Introduction

The study focuses on a 7-year-old with a diagnosis of autism. The pupil communicated using modified gestures and signs. They attend an ABA school and receive 1:1 support from an adult throughout their day. They additionally receive 1:1 Occupational Therapy intervention as well as 1:1 speech therapy, for 15 minutes every 2 weeks.

Interventions based on the principles of ABA are considered effective for individuals with autism.1, 2, 3, 4 Although there is strong evidentiary support for the use of ABA, there is evidence of heterogeneity in response to treatment. Researchers tend to approach this heterogeneity by considering predictors of treatment response that are either child specific or treatment specific. 5 Researchers have examined whether child-specific characteristics, such as age,6, 7, 8, 9 severity in the diagnosis,10, 11 cognitive functioning10 and adaptive functioning,8 impact response to treatment. Treatment-specific variables, such as treatment intensity,4, 6, 12 practitioner or teacher training,13, 14 treatment location15 and clinical supervision,16 have also been investigated. The amount of treatment, or treatment 'dosage,' is one of the most widely studied aspects of ABA intervention.

This pupil attended an educational setting before his current ABA setting, where even though he received education with 1:1 support during majority of his day, the pupil did not receive educational instruction by using the principles of ABA and with the intensity and duration required for his needs.

The current case study is aimed to compare the effectiveness of implementing ABA throughout the pupil's day and its effects on his rate of learning and acquisition of skills in a short period of 6 months.

Method

An AB design was implemented, and the study focused on two naturally occurring settings in school, baseline data collection period and post baseline/intervention period.

Target behaviour was operationally defined as the ability to learn and acquire, maintain and generalize skills across various domains of learning such as receptive skills, functional daily living skills, imitation, and communication, play and compliance.

Daily programme data was collected to track progress on the pupil's IEP programmes. Baseline data was collected prior to the developing the IEP and individualised curriculum plan for the pupil. The intervention (Instruction and strategies using the principles of ABA) was put in place for the entire day.

Observation and recording of the data occurred throughout the day. The settings consisted of school time (9:15 am - 3:15 pm) in the classroom and around the school campus. During this time, the pupil had access to 1:1 instruction from a trained adult implementing the teaching procedures and strategies based on the principles of ABA. Staff were training to utilize every learning opportunity to maximize the pupil's learning experience.

Upon arrival, the pupil completes his morning routine of putting his things away and getting ready for registration. This is a group activity that the pupils participate in, at the beginning of the day. After registration, the pupil is prompted to go to the toilet to get changed out of his nappy and get ready for the day. Throughout the day, the pupil engages in 15-minute sessions

that alternate between natural environmental teaching (NET) and intensive table teaching (ITT) sessions. These are structured sessions where the trained staff work on the individualised IEP targets either at the teaching table or in the natural environment. During these sessions the staff member collects data on the progression of these IEP targets. At the end of the day, the pupil engages in end of day activities before preparing to go home. Throughout the day, staff members promote independence and are constantly engaging in prompt fading in order to facilitate independence.

Results

Baseline data was monitored for three weeks. Data monitored was taken throughout the day using the Independence Framework, The Verbal Behaviour Milestones Assessment and Placement Program (VB-MAPP) and Essential for Living (EFL) assessment tools. Data was collected across various learning domains such as ABC (behaviour data), Manding, imitation skills, receptive skills, following daily routines and play skills. Figure 1 shows the average mands per week pre-intervention and 2 shows average mands per week post ABA intervention and intensive teaching and prompt fading. The average ranges from 76 to 132, which indicates nearly a doubling of total mands expressed by the pupil.

The intervention, intensive teaching of prompting and prompt fading, a teaching strategy used within the science of ABA was implemented. Figure 2 shows a graph which indicates the immediate increase in the total number of mands expressed by the pupil. This is also consistent across all days during the implementation of the intervention and across various other domains of learning.

As well, during the baseline phase, the pupil had weak and absent play skills and unable to complete play activities as compared to the intervention phase where the pupil was able to master being able to complete 5 independent play activities as indicated in Figure 3.

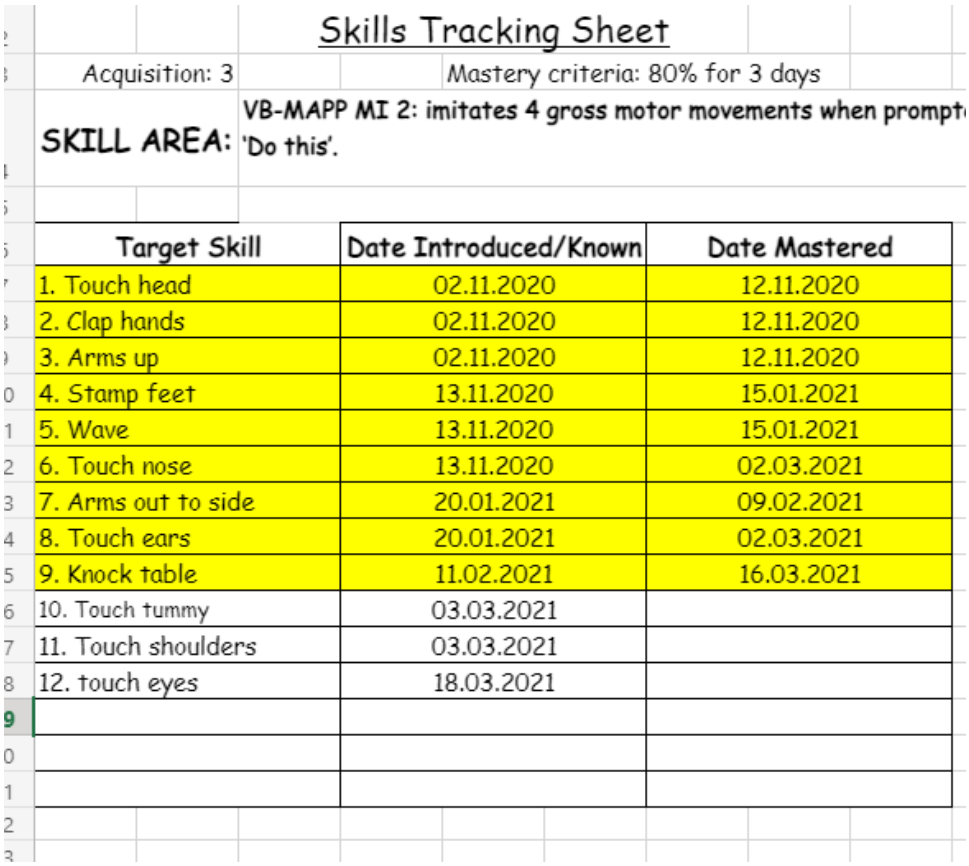
Figure 1 and 2. indicates the progress made during the intervention phase where the pupil mastered 8 gross motor imitation targets without objects as compared to the baseline phase where the pupil demonstrated absent, weak, or impaired imitation repertoire where imitation was prompt bound physically or verbally and the pupil demonstrates weak MO to imitate.

Discussion

The primary purpose of this study was to evaluate the effect of treatment intensity and duration on the number of learning objectives mastered by the pupil across various curricular domains such as communication, play skills, imitation skills, following instructions and tolerance. The results of the case study revealed that treatment intensity (for example, hours per week) and treatment duration (for example, months of treatment) had significant effects on all domains. Further, the current study found dose–response relationships to be stronger for some domains than for others, with relatively stronger impacts observed in the imitation and play domains.

Although only based on results from one participant, the findings of this case study indicate that the current data indicate a positive linear relationship between treatment intensity and the number of mastered learning objectives. That is, an increase in treatment hours predicted a higher number of mastered learning objectives in pupils receiving structured 1:1 ABA intervention. Although there were positive relationships across all domains, the highest effect sizes were observed in the intent to communicate, imitation and play skills domain. Increased treatment duration also predicted a higher number of mastered learning objectives with the greatest impacts observed in the tolerance (waiting) and following daily routines domain.

Figure 1 Gross Motor imitation



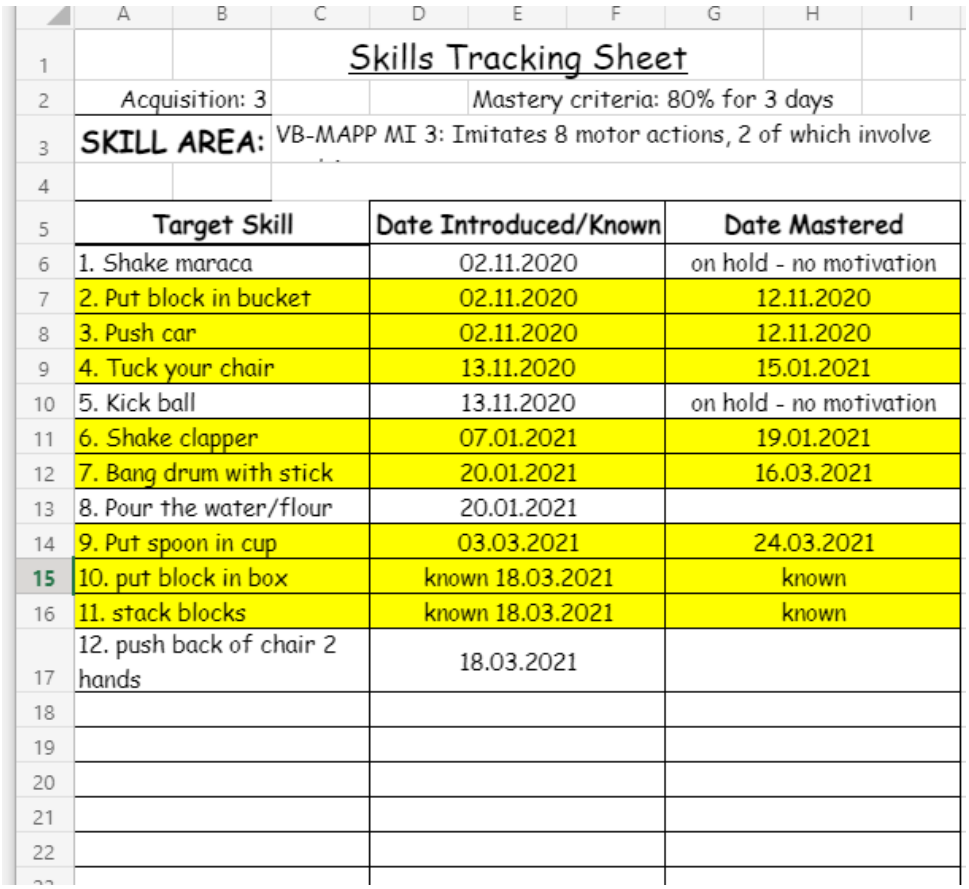
Skills Tracking Sheet

Acquisition: 3 Mastery criteria: 80% for 3 days

SKILL AREA: VB-MAPP MI 2: imitates 4 gross motor movements when prompt 'Do this'.

Target Skill	Date Introduced/Known	Date Mastered
1. Touch head	02.11.2020	12.11.2020
2. Clap hands	02.11.2020	12.11.2020
3. Arms up	02.11.2020	12.11.2020
4. Stamp feet	13.11.2020	15.01.2021
5. Wave	13.11.2020	15.01.2021
6. Touch nose	13.11.2020	02.03.2021
7. Arms out to side	20.01.2021	09.02.2021
8. Touch ears	20.01.2021	02.03.2021
9. Knock table	11.02.2021	16.03.2021
10. Touch tummy	03.03.2021	
11. Touch shoulders	03.03.2021	
12. touch eyes	18.03.2021	

Figure 2 Imitation with objects



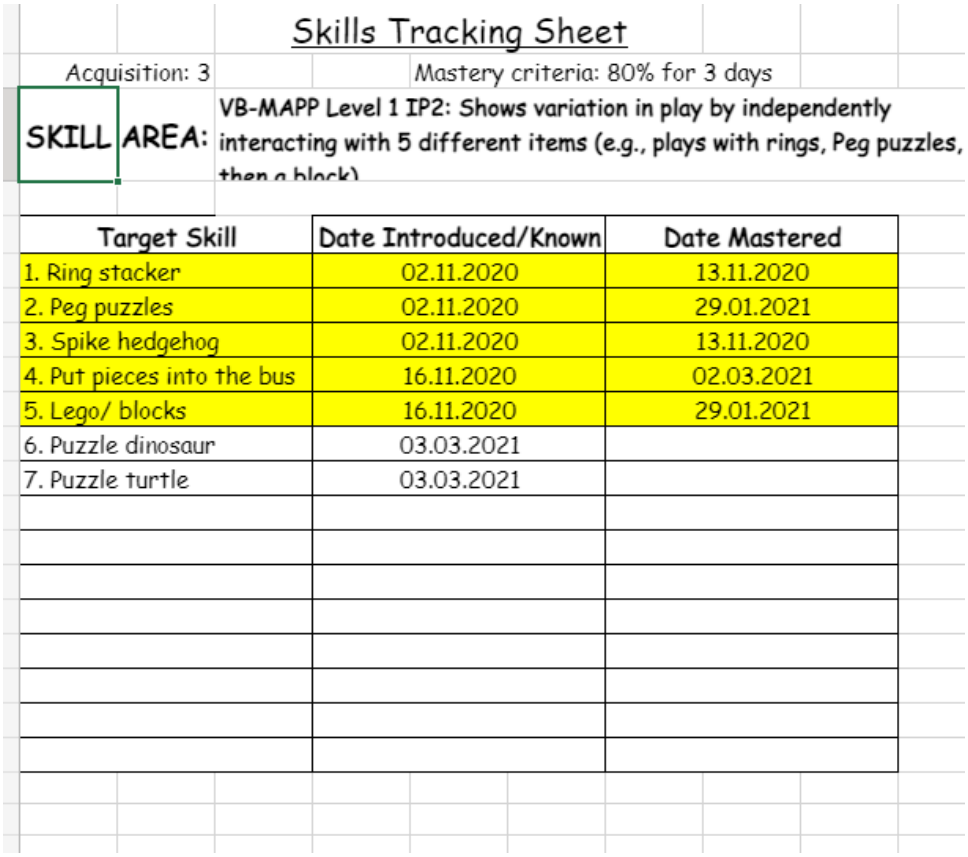
Skills Tracking Sheet

Acquisition: 3 Mastery criteria: 80% for 3 days

SKILL AREA: VB-MAPP MI 3: Imitates 8 motor actions, 2 of which involve

Target Skill	Date Introduced/Known	Date Mastered
1. Shake maraca	02.11.2020	on hold - no motivation
2. Put block in bucket	02.11.2020	12.11.2020
3. Push car	02.11.2020	12.11.2020
4. Tuck your chair	13.11.2020	15.01.2021
5. Kick ball	13.11.2020	on hold - no motivation
6. Shake clapper	07.01.2021	19.01.2021
7. Bang drum with stick	20.01.2021	16.03.2021
8. Pour the water/flour	20.01.2021	
9. Put spoon in cup	03.03.2021	24.03.2021
10. put block in box	known 18.03.2021	known
11. stack blocks	known 18.03.2021	known
12. push back of chair 2 hands	18.03.2021	

Figure 3 Independent Play



Skills Tracking Sheet

Acquisition: 3 Mastery criteria: 80% for 3 days

SKILL AREA: VB-MAPP Level 1 IP2: Shows variation in play by independently interacting with 5 different items (e.g., plays with rings, Peg puzzles, then a block)

Target Skill	Date Introduced/Known	Date Mastered
1. Ring stacker	02.11.2020	13.11.2020
2. Peg puzzles	02.11.2020	29.01.2021
3. Spike hedgehog	02.11.2020	13.11.2020
4. Put pieces into the bus	16.11.2020	02.03.2021
5. Lego/ blocks	16.11.2020	29.01.2021
6. Puzzle dinosaur	03.03.2021	
7. Puzzle turtle	03.03.2021	

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