

Summer Research – Student Engagement Fund

The purpose of the Equine Research Project was to discern if equine therapy decreases anxiety levels of individuals with autism spectrum disorder (ASD) using wearable biosensor technology and direct observation. The Equine Study observed five male participants at Canopy, a day program for adults with autism, as they completed vocational (matching and sorting) activities after riding (Canopy and stables are located in Sugar Grove, Illinois).

The five participants only wore the biosensor technology (Spire Stone) when they completed the vocational activities, not while they were riding. There were two Northern Illinois University (NIU) students observing during each session. The session consisted of 15 minutes of observation using the method called momentary time sampling at 20-second intervals for each participant. Momentary time sampling is the process of directly observing an individual completing an activity for the full duration of the observation session, in this case 15 minutes. During the observation, the two NIU students utilized a phone application to alert them for each of the 20-second intervals. When the alert sounded, both students look at the participant and note what is seen only at that point in time and mark it on the recording sheet. The recording sheet has been attached to the report, but it includes information relating to disruptive and on-task behaviors. Also the recording sheet including the respiration codes recorded by the Spire Stone indicating if the participant was calm, tense, focused, or neutral.

The Spire Stone worn by each participant was calibrated to each individual, and each Spire was connected electronically to an i-Pod using Bluetooth technology. Each participant's i-Pod included a Spire application that reported the respiration codes. The Spires are relatively small in size, and were worn by the participants on their waistbands. During observations, each

participant's i-Pod was within reach of the NIU students to view the respiration codes or errors in connectivity with Spire Stones.

Objectives for the Equine Research were to collect reliable data during observations, keep the Spires from becoming lost, communicate with staff at Canopy, and be prepared with matching activities to stay ahead of individuals who are quick to complete them. It took some time to settle into the requirements of the research, and what we were required to do each session. In the beginning, I came away from each session with increased confidence and awareness of what was expected for the observations. I arrived early to each observation session to prepare data sheets, sync i-Pods with Spire Stones, and prepare matching activities. This helped ensure that we were prepared for each session.

In order to collect reliable data during our observations, we identified some issues that we were able to overcome to keep the session as productive as possible. One of the issues faced was the need for additional matching activities. I asked one of the staff members and we were provided extra activities. Another issue was one of our participants being very quick with completing matching activities. He would complete activities at a rate of about five per 15-minute observation session. After a few sessions, we needed to do something different than scrambling to disassemble matching activities during observations for this participant before he would get up and leave the table. If this individual had an activity in front of him, he would complete it and stay in his seat. I decided to include disassembly time into my preparatory tasks, which helped make our observation sessions less hectic.

An objective that we added after beginning the study was not losing any Spires. We unfortunately lost one Spire that was inadvertently put it on a participant when he went to the stables. We think that the Spire fell off the participant while he was riding. I left a note by the

Spires in the charging cabinet that explained Spires did not need to be attached to participants when they go to the stables. Two other Spires were temporarily misplaced, but staff members found and returned them.

Being a part of this project was a valuable experience in working with individuals with ASD. My curriculum for the Fall semester will involve working with individuals with ASD, so I feel that this experience has provided me with knowledge that will only make me a stronger teacher. I really enjoyed working with the five participants in our study, and getting to know each one. After being a part of this experience, I have a deepened respect for the research process. Over the last year, I learned about the different methods of collecting data on individuals but did not feel that confident in what they meant after the semester ended. However, I now have a good understanding of what momentary time sampling means. This experience allowed me to apply some of what I learned in NIU classrooms that may not have been covered during previous clinical placements; therefore, making me a better a better teacher.

Another benefit of this project was taking data that I took part in collecting, and putting it into a spreadsheet to be analyzed. Although we filled out data summary sheets for each session, it still did not provide a quick snapshot of the progression of the study like a spreadsheet. I am including the spreadsheet I generated at the end of the research project. The spreadsheet provided us with proof that the intervention (equine therapy) caused participants to be less disruptive than during baseline conditions. While our study did not yield significant results specifically linking equine therapy to decreased anxiety levels for participants; however, the information we gathered indicates that more research is needed.

Canopy – Day Program for Adults with Autism



Stables, located near Canopy



Observation Recording Sheet

Canopy Equine Therapy Study

Observer: _____ Date: 6/3

Time of observation: _____ Setting/Activity: _____

Recording sheet directions: Observe each participant during a 15 min instructional session rotating across each participant for each 20 sec interval. Momentary Time Sampling will be used to record on-task/off-task behavior and respiration patterns. At the end of each interval in the column labeled "O", the on-task/off-task behavior will be recorded (+ or -). The "R" column is to record the respiration code at the end of each interval (look at corresponding participant device and mark respiration pattern. See below for codes). Partial interval recording will be used to indicate disruptive behavior (D); the occurrence of disruptive behavior will be recorded if it occurs at any point in the interval that the participant is observed (0 or 1). If there are only two participants, skip a 20 sec interval before rotating.

Disruptive (D) = 0 or 1; Calm(C)= + or -; Respiration (R)= C=calm, T=tense, F=focus, N=Neutral

Condition (C) Baseline (no equine)/Intervention (equine) (B or I); **Disruptive (D)**= 0 or 1; **On-task/Off-task (O)**= + or -;

Respiration Code (R)= C=calm, T=tense, F=focus, N=Neutral

Participant (write name in space)	Condition	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15			
		D	O	D	O	D	O	D	O	D	O	D	O	D	O	D	O	D	O	D	O	D	O	D	O	D	O	D	O	D	O		
1 (1-20 sec)	B I	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+
2 (21-40)	B I	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+
3 (41-60)	B I	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+
4 (61-80)	B I	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+
5 (81-100)	B I	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+	0	+

Data Analysis Spreadsheet

Equine Research Summary Analysis								
Participant	Observed Behavior (Percentage of Time)							Days Observed*
	Disruptive	Neutral	Tense	On Task	Focus	Calm	Active	
Baseline								
W	32.4	62.9	10.4	62.0	1.9	0.0	24.7	7
B	0.0	80.0	0.0	56.6	0.0	20.0	0.0	8
N	6.8	68.9	2.2	57.6	11.1	1.4	16.3	9
P	9.8	67.2	0.0	55.8	24.3	8.3	0.0	6
C	7.5	89.9	3.4	41.4	0.0	6.6	0.0	8
Intervention								
W	6.8	73.3	18.3	91.5	3.3	0.0	5.0	4
B	0.0	93.4	0.0	49.0	0.0	6.6	0.0	5
N	0.0	71.8	3.3	40.0	3.3	0.0	21.5	4
P	7.8	71.2	0.0	70.0	10.0	18.8	0.0	6
C	0.0	81.2	5.4	62.8	0.0	13.4	0.0	5
Change								
W	-25.7	10.4	7.8	29.5	1.4	0.0	-19.7	
B	0.0	13.4	0.0	-7.6	0.0	-13.4	0.0	
N	-6.8	2.9	1.0	-17.6	-7.9	-1.4	5.2	
P	-2.0	4.0	0.0	14.2	-14.3	10.5	0.0	
C	-7.5	-8.7	2.0	21.4	0.0	6.8	0.0	
Participant Totals								
Increase	0	4	3	3	1	2	1	
No Chg.	1	0	2	0	2	1	3	
Decrease	4	1	0	2	2	2	1	
Trend	Y	Y	Y	N	N	N	N	

* Excludes four total student days with incomplete data