THE BEHAVIORAL AFFECTS OF THE CHILDREN'S CRETAN INTUIPATH® FINGER LABYRINTH DESIGN VS. A SAND TRAY ON CHILDREN WITH ADHD

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RESEARCH OVERVIEW:

The Intuipath is a mirror-image, double finger labyrinth wooden board designed for simultaneous use by both hands to activate and balance the left and right sides of the brain. Physical and Occupational Therapists suggest that using the right and left sides of the brain simultaneously has a positive affect on mood, behavior and stress management.

After 10 years of Intuipath use across the US, many parents, teachers and therapists reported positive effects from using the Intuipath with children. Therefore, in April 2008, at the urging of Dr. Lauren Artress, the pioneering voice of the labyrinth movement worldwide, Relax4life embarked on a national research study to determine if the reported benefits of the Intuipath could be validated scientifically.

We invited adults (parents, teachers and therapists) to observe children, ages 7-17, diagnosed with ADHD. Some of these children took medication to manage their ADHD symptoms. The children were instructed to play with either a Children's Cretan Intuipath or in a sand tray at home, in school or in a therapist's office for 4 weeks. The Intuipath and sand tray combination were chosen for the study as they both have a light sandy tactile feeling when used. The researchers wanted to be able rule out this tactile stimuli as a variable for behavior change.

The study involved each child being observed playing exclusively with either the Intuipath or sand tray for 5 minutes at a time simultaneously, 3-5 times per week for a 4-week period. After 4 weeks, the Intuipath® or sand tray was discontinued.

A symptom rating scale known as the ADHD-SRS was used to measure the child's behavior at baseline, at the conclusion of the 4 week intervention and lastly at the completion of the 6th week (i.e. two weeks after the intervention ceased). The scale which is norm referenced, contains 56 items, including two subscales, hyperactivity and inattention. It provides a thorough and complete assessment of ADHD symptoms based on the *Diagnostic & Statistical Manual-4th edition* criteria.

The parent/rater was instructed to fill out the scale prior to the introduction of the intuipath or the sand tray. This marked the baseline or "time 1." The rater was then instructed to fill out the scale both at the end of the four week playing phase ("time 2") and the six week mark ("time 3"). The rating scale took approximately 10-15 minutes to complete and was based on the frequency of behavior observed. Each rater was given 90 days to complete the study and return the paperwork.

One hundred and thirty five children and adolescents across the nation were admitted into the study, however only 87 of them completed the study, resulting in a 64% response rate. Of these 87 children, 70 were male and 17 were female (mostly between the ages of 7-10). Forty five were randomly assigned to the Intuipath groups (35 were on ADHD medication and 10 were not) and 42 were randomly assigned to the sand tray groups (29 were on ADHD medication and 13 were not).

RESULTS SUMMARY:

On average, children in the experimental (Intuipath) groups had higher initial baseline (time 1) scores on the ADHD scale than those in the control (sand tray) groups. Higher scores are indicative of a higher frequency of ADHD symptoms (including both hyperactivity and inattention).

The results suggest that both interventions caused an effect over time but the Intuipath groups had a greater reduction in ADHD symptoms than the sand tray groups after 4 weeks.

At the time 3 point, the Intuipath group showed a slight increase in total scores, indicating a worsening of ADHD symptoms. However, the overall reduction of symptoms was still a significant improvement from the baseline measure. The results suggest that using the Intuipath over time was positively associated with improvement in behavioral symptoms.

The research results suggest that when a child moved both hands simultaneously through a medium such as an Intuipath or randomly in a sand tray, a significant reduction in ADHD-type behaviors occurred.

STATISTICAL DISCUSSION:

A *repeated measures* ANOVA (analysis of variance) showed no main effects on ADHD behavior using the Intuipath or sand tray. However, there was a significant interaction between groups and time; Wilks' Lambda= .094 $F(2, 82) = 2.47$, $p < .10$.

Overall there is some indication that the treatment, both the finger labyrinth and the sand tray works over time. This can be explained statistically and seen graphically (see appendix A). In statistical terms, significance at .091 which equates to a p-value slightly under .10, does not signify with certainty that the treatment is effective, but indicates that there is marginal significance. Furthermore, $p < .10$ is considered acceptable in exploratory research.

The results of this exploratory research indicate that there are no main effects, meaning that there is no evidence that either the Intuipath finger labyrinth or the sand tray had a direct effect on ADHD symptoms. However, further tests reveal an interaction between groups (experimental and control) and time. Specifically, the Statistical Package for the Social Sciences (SPSS) output analysis indicated significance at $p < .10$

Most scientific studies only report results with significance $p < .05$. Significance is the alpha test level and is set by the researcher. In other words, the alpha level is the error rate, and can sometimes be more or less lenient depending on the circumstances of the study (i.e. exploratory research). In this case we increased alpha to $p < .10$ to accommodate the circumstances of the study. Alpha < .05 means that 5 times out a 100, we will reject the null hypothesis when we should not have, also known as a *type I error*. At an alpha level of .05, there is a 95% confidence level that the reported outcome is a result of the manipulation of the independent variable, which in this case is playing with the Intuipath or sand tray. In exploratory research however, it is acceptable to increase the alpha level to $p < .10$ meaning a 90% confidence level that the reported outcome was the result of the manipulation of the independent variable. Without accepting a higher alpha level, it is possible that an important interaction might have been overlooked and thus would have resulted in a *type II error*. This can be compared to a false negative where we fail to see the truth that ADHD behavior did decrease.

In this particular study, many variables were uncontrollable and different factors may have weakened the potential for statistical significance. Some limitations of the study include small sample size, unequal groups in terms of gender, age, and medical treatment.

In analyzing the results it is necessary to take into account all the possible sources of error to abstain from painting a false picture. Even though there is marginal significance for the interaction between groups and time, these results may be affected by other factors that limit interval validity including *history* and *maturation*.

History occurs in the time between the first, second and third measurements. Life happens and considering the study was done outside a research laboratory, a host of life events could occur during the study that are not held constant across the participants. These types of factors could affect the treatment, as well as the outcome. Considering the results are fairly consistent across participants, the effects of history are probably minimal.

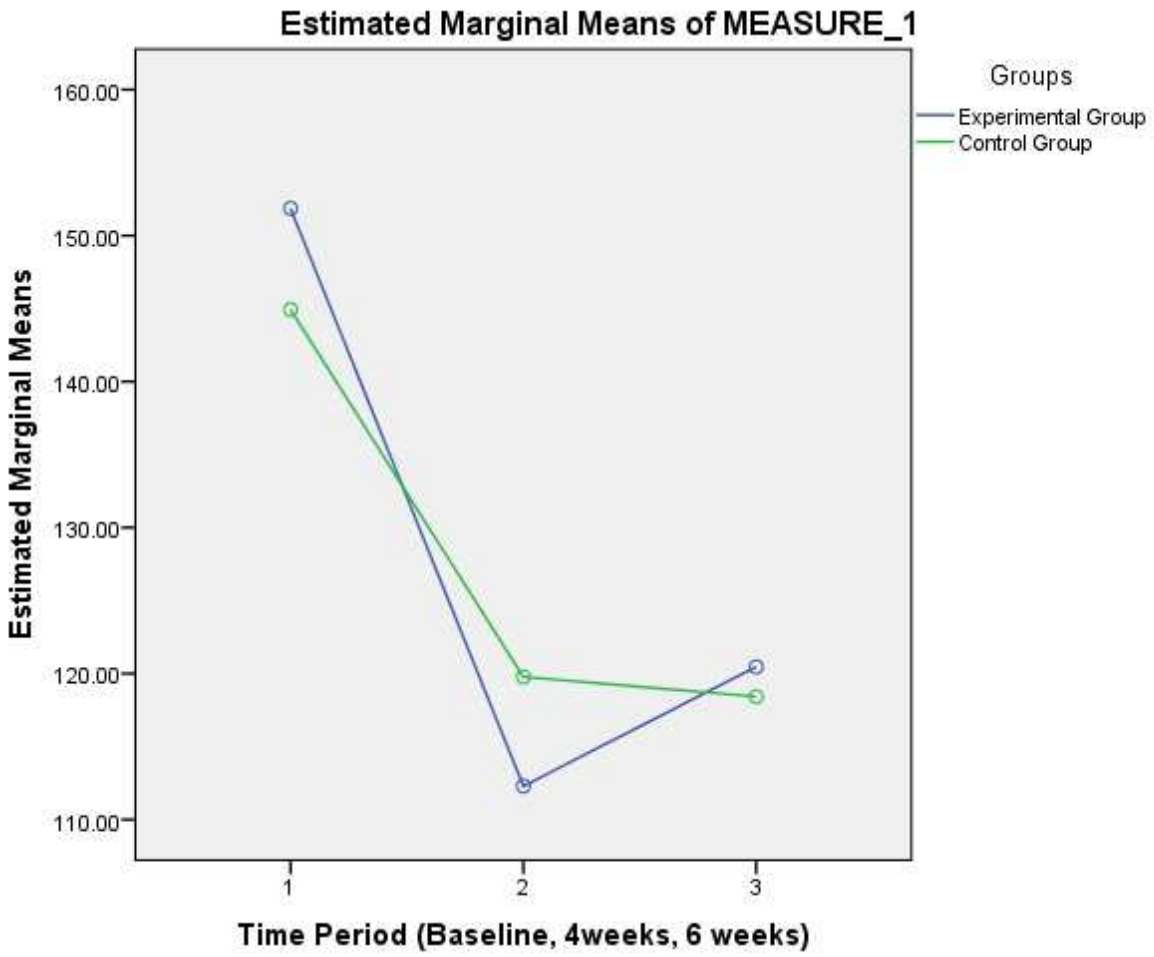
Maturation is the change of subjects over time. Participants naturally change over time; these maturational changes and not the actual treatment may explain the changes in participant behavior during the experiment.

Another important factor is the sample used in this study. Perhaps there is something about the people who returned the completed research study vs. those who did not. One hundred thirty five were sent out, but only 87 completed. It is possible that those 87 people share something in common that the other 48 did not. For instance, the parents or school raters who returned the completed paperwork may have been more attentive to their child. They may have been more interested in complementary treatments for ADHD and were therefore willing to take extra measures, such as participating in an exploratory research study. In addition, because the child was not reporting their own symptoms, there is a possibility for rater bias due to *expectancy effects*.

Expectancy effects occur when an experimenter (in this case the rater) unintentionally influences the results of the experiment. The rater can make errors in their interpretation or make errors in recording the data based on their own expectations. In addition, each child was being paid attention to by their rater during the task which could also contribute to their improved behavior at the 4 week mark.

Even with all of the limitations listed, the results indicate that children and adolescents with ADHD experience behavioral benefits over time when moving both hands simultaneously through either a Cretan Intuipath finger labyrinth or sand tray.

Appendix A


Estimated Marginal Means of MEASURE_1
Groups
Experimental Group
Control Group
Estimated Marginal Means
160.00
150.00
140.00
130.00
120.00
110.00
1
2
3
Time Period (Baseline, 4weeks, 6 weeks)