



## **Research on Cooperative Play and ThinkFun's "Robot Turtles"**

Suzanne Martin, Ph.D.

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In the world of cooperative board games, children and adults are working toward a common goal. This type of game play is particularly beneficial to younger children because they are developing what are known as "executive functions" and at the same time are learning how to maneuver social situations. Providing children with an opportunity to take part in cooperative games gives them learnings they can generalize to new situations they approach. Children far prefer to play together with others than to play a solitary game, and so these games may be important catalysts to child development.

In January 2014, ThinkFun game company licensed once such cooperative game, called Robot Turtles. This game had caused a sensation the previous year when it became the most successful board game in Kickstarter history; but because of its unorthodox rules, critics predicted that it would not be successful as a commercial game.

ThinkFun President Bill Ritchie believed in the mission of the game, which is to teach coding skills to preschoolers, but he also wanted proof that Robot Turtles actually did help to build players' abilities. So he commissioned Martin Research Group to field test the game and evaluate how parents and children were influenced. "This is cutting edge research," notes Ritchie. "The research community is just now developing the right models and learning how to ask the right questions about what matters. It makes a huge difference for us to know what is actually happening inside family households, and how this game is making a difference in both children's lives and parents' lives." Together with another scholar known for her youth work, Lan Chaplin, Ph.D., of the University of Illinois at Chicago, and the ThinkFun team, I conducted a research study during Fall 2014.

In the game of Robot Turtles, children learn general concepts of coding and try to have their turtle reach a certain spot on the board using directional cards. A unique aspect of this game is the fact that the child is the turtle master and the parent is the turtle mover. It's not often that preschoolers have the opportunity to tell their parents what to do.

## **Child Development Goals**

In developmental psychology, "executive functions" is an overall term we use to describe problem solving, reasoning, management of cognitive functioning, as well as forethought and planning. These "executive functions" also play an important role in social development goals and include learning how to maneuver social situations and teamwork. In addition, children will ideally learn from their small failures and how to problem solve through these failures.

The preschool years are the prime time for these to develop.

## **Research Design**

In September and October of 2014, we recruited a national sample of 150 parents with children at home between the ages of 4 and 5. A parent completed an online 15-20 minute online survey. Then, 125 of the families were sent a Robot Turtles game to play over a course of three weeks. Upon completion of that three-week play period, we surveyed the parents again to check on changes as a result of the game play. The other 25 families served as our control group and weren't sent a game to keep the study methodologically sound so we could more readily attribute the differences to actual game play.

Parents were not only asked about their children and the play experience but also about their own creativity. We explored areas of theory of mind, child behaviors, communication, executive functioning, handling of failure, as well as general demographics. We were thrilled to see that our findings showed not just benefits to the children but also to their parents.

## **FINDINGS**

### **Child's Theory of Mind**

Theory of mind is an especially important skill for a child to learn. It is the ability for a child to infer the intentions of others, the ability to reason about another's mental state and understand someone else's perspective. After playing Robot Turtles, parents reported increases in their child's ability to:

- Think about why people do what they do (83% pre vs 91% post)
- Have more complex reasons for why people do the things they do than most kids (55% pre vs 75% post)
- Immediately notice when people do not smile sincerely (46% pre vs 53% post)
- Notice more quickly than other kids when people aren't being honest (58% pre vs 63% post).

## **Child's Creative and Cognitive Attributes**

When examining the child's creative and cognitive attributes, we also found jumps between pre and post:

- Has lots of creative ideas (88% pre vs 98% post)
- Likes to do things in original ways (82% pre vs 94% post)
- Is innovative (80% pre vs 90% post)
- Likes to think about things more than most children (72% pre vs 82% post)
- Loves to solve complex problems (66% pre vs 77% post)

## **Child's Ability to Handle Failure**

Part of a child's success is built in the fact that at some point they have to fail and problem solve their way out of what is likely an uncomfortable situation for them. There seems to be a shift starting to not give every child on a team "a trophy" but rather instill the ability to manage their way out of what might not be a successful situation.

- We asked parents how their child handled things when they weren't going their way during gameplay and we did see a doubling in those who said extremely well (20% pre vs 40% post).

## **Child Behaviors**

In an interesting turn, where children were seen to be more helpful at home after game play they were also seen as slightly more bossy. What is being perceived as bossy could be likely be a result of a child being more confident and assertive in their communication.

- My child helps out at home (91% pre vs 98% post)
- My child is bossy (40% pre vs 45% post)

## **Child's Learning and Executive Functioning**

In the general types of learning, we saw some of the largest increases on parental rating of the following:

- Curiosity (90% pre vs 97% post)
- Creativity (77% pre vs 86% post)
- Communication Skills (76% pre vs 81% post)
- The ability to identify and correct mistakes (62% pre vs 67% post)
- Problem solving (56% pre vs 66% post)
- Thinking about the future (52% pre vs 64% post)
- Ability to stay on task (54% pre vs 62% post)

- Being able to see multiple solutions (54% pre and 59% post)
- Perspective taking (52% pre vs 57% post)

### **Parent's Cognitive and Creative Style**

Playing Robot Turtles affected parental cognitive attributes as well with an 8% jump in agreement to the statement:

- I love to solve complex problems (74% pre vs 82%)

We also saw a significant jump on a standard adult creativity measure:

- How many triangles can you see? (36 pre vs 40 post)

### **The Top 3 Reasons Parents Feel Robot Turtles is a Unique Game**

- Requires more thinking and problem solving (17%)
- Involves strategy/planning (11%)
- More complex (6%)

### **Summary**

Our evidence, even with a sample size of 125, shows that cooperative game play can have positive benefits for preschool child development on important developmental markers, and Robert Turtles does a good job providing this opportunity. "I am thrilled about these results," continued Ritchie. "I hoped and expected that children would be stimulated to think more creatively and improve their problem solving. But for me the biggest reveal was to learn that parents felt that they had become more creative after playing with their children. You can't get better than that."

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### Contact

Suzanne Martin, Martin Research Consulting, [smartin@martinresearchconsulting.com](mailto:smartin@martinresearchconsulting.com)