Research Spotlight
The Moving Shapes Game

By conducting this two-day study, Yevdokiya Yermolayeva, a graduate student working with Dr. David Rakison, is interested in better understanding children’s expectations about how objects move. Specifically, she wants to discover whether observing one type of movement gives children clues about other types of movement that an object may exhibit. In this study researchers focus on three motion properties: being a causal agent (i.e., causing something else to move through physical contact); being a causal recipient (i.e., being caused to move by something else through physical contact); being self-propelled (i.e., starting to move from a standstill without an external force). Typically things that are agents tend to be self-propelled, and things that are recipients tend not to be self-propelled. Likewise, things that are self-propelled tend to be agents and not recipients. For example, people tend to cause other things to move and can move on their own, while cups tend to be caused to move and do not move on their own. We are interested in seeing whether children have expectations about self-propulsion after seeing an agent or a recipient, and if children have expectations about agents and recipients after seeing self-propulsion. We are also interested in the effect of probability on these judgments: for example, if something is an agent only 25% of the time and a recipient 75% of the time, would it still be self-propelled?

To determine children’s expectations, the research assistants will first show a child animations that depict one of two events, either objects that start moving on their own from a standstill or objects that cause other objects to move by bumping into them. After each animation, the child is asked questions about other types of movements that the objects could exhibit. If the animation was of objects starting to move from a standstill, then the child is asked whether the objects could push other objects or be pushed by other objects. If the animation was of objects causing other objects to move, then the child is asked whether the objects could start moving on their own. Across animations, the researchers also varied the probability of an object starting to move from a standstill or causing the motion of other objects. The responses that children provide after seeing different animations allow researchers to determine whether children expect things that can start moving on their own to cause other things to move, and, conversely, if they expect things that cause motion to start moving on their own and whether the probabilities affect their judgments. More broadly, they are comparing children’s performance to that of infants and adults to determine how these expectations about motion change across development as children get more experience with the way in which objects move in the world.

An example of a trial in which one object starts to move on its own from a standstill, while the second object remains stationary (arrows indicate direction of movement):
Research Spotlight, continued…

The Concentration Game

The world around us is complex and maintaining focused attention can sometimes be challenging - even for adults. The goal of graduate students Karrie Godwin and Derek Lomas' research project is to investigate the developmental course of deliberate selective attention. They are particularly interested in examining whether attentional selectivity can be improved through training with an instructional computer game. In the present study, they are examining how the design elements of a computer game affect children’s engagement and motivation to continue playing.

In the Concentration Game, children play two short computer games that differ in their design elements - the Moving Objects Game and the Hide-n-Seek Game. In the Moving Objects Game (Below Left), children see several objects moving on a computer screen landing on one of the nine screen locations, each location is associated with a different cartoon character. Children are asked to watch a particular object while ignoring the rest of the objects. When the objects stop moving and disappear from the screen, children are asked which cartoon character was last visited by the object they had been watching.

In the Hide-n-Seek Game, children watch as friendly characters run around a room and hide behind everyday objects. Children’s task is to ignore the distracter characters in order to identify the hiding location of a target character. For example, the target character may run around a playroom (similar to the room shown below on the right) and then hide behind a rocking horse. The child’s task is to click on the object that the target character is hiding behind (i.e., the rocking horse).

After children play each game for 5 minutes, they will be presented with a choice of playing either The Moving Objects Game or The Hide-n-Seek Game for another five minutes. The game children select and the duration of play will be recorded as a behavioral measure of children’s motivation and engagement in the game.

Karrie and Derek are both students in Carnegie Mellon’s Program in Interdisciplinary Education Research (PIER), for which Dr. Carver is the Co-Director. Karrie is working on a PhD in Psychology under the direction of Dr. Anna Fisher, while Derek is completing a PhD in Human Computer Interaction with advisor Dr. Ken Koedinger. Drs. Fisher and Koedinger are parents of Sasha (AM Preschool 4’s & Extended AM).