Playthings That Do Things: A Young Kid's "Incredibles"!

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ABSTRACT
This paper looks into a small collection of animated toys, or "AniMates", which I describe in terms of the mental elbowroom each provides for exploring and enacting issues of agency, identity, attachment, and control. Toys are selected for their varying degrees of autonomy and responsiveness, and for their lasting popularity, or capacity to captivate commonly held passions. As will become clear through the examples, animated toys need not be computational to qualify as AniMates. Many classical toys exhibit creature-like qualities, such as self-propelled movement (wind-up toys) or the ability to keep a bearing (tops and gyros). And many no-tech or low-tech toys exist, which afford the thrill of controlling things at a distance (kites, string puppets). My purpose is to highlight some of the relational qualities that, beyond functionality, endow AniMates with the power to draw us in, amuse and delight us and, above all, re-enact some of the hurdles that growing up entails—an indirect hint to toy-bots/tech-toys designers.

Keywords
Animated toys, children, self-propelled movement, agency, robotics, play, imagination, identity, attachment, control.

INTRODUCTION
From pinwheels to wind up toys, from Tamagotchi to Virtual Petz, animated toys occupy a special place in people's lives [27]. Children, and many adults, find them fascinating and intriguing. They are intriguing because they exhibit creaturely behaviors and do things that inanimate objects are not meant to do. Sometimes, they even seem to have a mind of their own!

Obviously, toys need not be animated to behave in our imagination. In their pretend play, children endow things with life all the time, blurring the boundaries between animate and inanimate. Puppets, dolls, stuffed animals, and even sticks and brooms are transformed into living beings. Children treat them as companions, with whom they talk and play [15][29]. Adults, too, interact with imaginary

characters in all aspects of their lives. Fictional characters entertain us in books, films, play, and television shows. And monsters, bots, and talking teapots have populated our myths, tales, and children's toy chests since time immemorial. More surprising, many creative adults engage in imaginative dialogues with hosts of interlocutors, imagined or real, with whom they converse and through the eyes of which they may see themselves [3][34][35]. This is not to say that the creative adults believe the characters exist. They just treat them *as if* they exist, and take them for whom they are!

While it may not take much for children or adults to bring things to life in their minds, it is my contention that objects that actually exhibit behaviors capture their imagination, and are treated differently than inert objects [33][25].

In this essay, I show that animated toys can play a significant role, alongside dolls or Teddy bears, in helping children grapple with some of the hurdles that identity formation entail.

Unlike the comforting stuffed animals of our childhood, whose inert *presence* invites the projection of many human emotions, AniMates strike for being relatively autonomous—a quality that doesn't encourage domestication, or affection; at least, not at first [15]. No surprise then if *playthings that do things* often scare away the very young. Before long, however, most children become genuinely amused by AniMates' incongruity —that they look like things yet act like creatures—and intrigued by their aliveness. As the children grow older, they spend much time engaging the toy's singular mix of stubbornness and responsiveness, and in many cases become attached to it as to a pet, even if they know it is not alive! Contrary to belief, animated toys do not kill a child's imagination. Rather, they capture it in novel ways. They are a child's "incredible" playmates.

In sum, AniMates are special because of their ambiguous nature: between animate and inanimate. They intrigue us because of their relative autonomy: responsive yet with a mind of their own. We relate to them because of their singular form of agency, or "personality": a mind that is alien and surprising—yet, at the same time, familiar enough to be recognizable. The object's "aliveness" facilitates

identification. At the same time, its "thingness" helps us keep a secure distance.

In what's to come, I flesh out some of the features that make for amusing and enjoyable relational playthings. Beyond humanoid traits, I show, it is an AniMate's *manners of interaction* that matter. Beyond smarts, it is its conviviality. Beyond obedience or bossiness, it is an AniMate's *relative autonomy* and ability to *share control.* The moral of the story: To be fun, the tech-toys and toy-bots of the future will have to be "good dancers," i.e., good at negotiating gives and takes …

ATTRIBUTIONS OF AGENCY AND CAUSALITY

Children readily attribute agency to things that do things, to objects that behave. Piaget in particular has long ago established that young children tend to animate elements that move, such as clouds or water [21].

Research by Michotte [18], Heider and Simmel [11], and Steward [28] further suggests that people interpret very specific characteristics of movement as being person-like or object-like, *depending on whether the moving entity resists or follows a natural course*. And the natural course of a moving entity is defined as a steady or decelerating motion along a straight line. In essence, object-like things are perceived as being *passive* (they move only if pushed), and, if pushed, they are expected to move along in a straight line and, after a while, to slow down and stop. By contrast, if an entity sets itself in motion, or moves in a nonlinear fashion (for example by turning in a circle or suddenly speeding up), it is perceived as having *agency*. To Premack and premack [24], the appearance of self-propelled motion is a young child's equivalent of agency, or volition, which is a creature-like quality.

More recent studies on infants' social cognition [23] indicate that even very young babies distinguish between animate and inanimate—with great immediacy—and are sensitive to qualities of motion evocative of social causality. This comes as no surprise, given the adaptive nature of such distinctions, especially in babies.

In general, children's tendency to equate self-propelled motion with agency fades away around the age of 6, as children start to distinguish between what drives the motions of artificial versus natural creatures. As an example, if a live puppy and a robotic dog, like Aibo were to walk along side by side, most 7-year-olds would tell you that Aibo is not alive, that it has been programmed to walk, and that, as a consequence, it is not "really" in charge of its actions, self-driven, or "smart". This being said, when left to play with an animated toy, or as soon as a toy exhibits more sophisticated behaviors (like avoiding obstacles or pursuing a goal) or if it responds to a child's solicitations, agency and smarts are easily projected back onto the artifact.

Our own work on children's cybernetic intuitions [2] and children and machines [4] supports studies by Inagaki and hatano [13] and Gillieron and Thommen [7], showing that children do not distinguish between causation and agency in the ways most adults or scientists do. Instead, 5-yers-olds and up, interpret most any transaction between entities—whether inert or alive, causal or intentional—in terms of how each *controls* or *is controlled by* another's behavior, either through direct or mediated action. In the case of a direct action, an agent A *does* something to a recipient B, or *impacts* it physically, whereas in the case of mediated action, agent A *signals* something to B, and B acts or signals back accordingly. Important here is that the agents at play tend to be animated, at least while currently active, and recipients tend to be objectified. Thus, in a chain of transactions, whether causal or intentional, any particular entity is *in turn* seen as an agent or a recipient, i.e., as alive or inert, depending upon whether it is currently perceived as *initiating the action* (agent), or merely *reacting to it* (recipient).

Humans also treat differently entities—people or things—that they personify or endow with livelihood in their imagination than to entities that they objectify or treat as merely reactive [8]. What is not clear to this day, is the roles that personification and objectification play in a person's cognitive and personal developments.

Authors, such as Taylor [29], Watkins [34], and Hillman [12] bring strong evidence to the idea that people's abilities to suspend disbelief, bring things to life, and create—and relate to—fictional characters, or imaginary companions, are in no way a sign of intellectual or emotional immaturity, or delusion. Nor are they a folly reserved to children and poets alone. Instead, the works of the imagination enrich our lives as humans. In Hillman's words, "Where imagination reigns, personification happens" (p. 16).

People's abilities to treat fictional characters as if they were real and to project themselves into a fictional character's mind are a key component in learning and development. They bring empathy at the service of intelligence. And without empathy, there is no room for changing one's stance in the world or putting things in perspective [1][26]. Note that what is true of fictional characters is also true of virtual creatures, or *avatars,* with whom people mingle in social virtual environments, and of heroes and villains in computer games, that people drive around to feel things through their eyes [25][33]. Likewise, people's abilities to suspend reality or disbelief and create alternative worlds in their mind are essential because they put imagination at the service of intelligence. And without imagination, there is no room for creative or critical thinking [10]. A sustained dialogue between *what is* and *what could be*, between fact and fancy, between actuality and possibility, is a condition *sine qua non* to the development of both human creativity and rationality [5]

In sum, our lasting fascination with pretense rests upon two urges. The first is to seek out occasions to enrich the dialogue between what is and what could be. The second is to establish distinctions between entities that act/react like things and entities that act/react like people. Both urges contribute to helping people find their place and their voice in the world [1].

PROJECTION OF ALINENESS AND OBJECT AFFORDANCE

As a psychologist, I have always been interested in why, under given circumstances, people endow things with life, and how children conceive of—and relate to—things that think, or objects-that-behave. In working with designers, on the other hand, I became increasingly aware that not all artifacts are good enough projective materials! Some seem clearly better suited to foster meaningful and delightful encounters. Others just leave most of us cold.

Donald Norman introduced the term "affordance" to refer to an object's ability to signal its potential uses [19]. Examples of objects with poor affordances include a lamp that doesn't tell you where its "on" switch is located, or a doorknob that doesn't tell you whether the door wants to be pushed or pulled. While Norman's concept of affordance provides a first step toward understanding *how forms engage minds*, it is also worth noting that artifacts like toys cannot be characterized by usage alone. A rich toy, like a good book or an inspiring painting, transports us. It enchants and delights. It "knows" what surprises and wonders capture our imagination, and it offers *the mental elbowroom* for playful exploration of intriguing ideas. In other words, beyond affordances, a toy needs to have evocative power, and holding power. While affordance speaks to an artifact's straight-forwardness (clarity to signal its whereabouts), something more is needed to sustain human interest, let alone enchant. This "something more," in the case of AniMates, is the surprising blend of autonomy and responsiveness alluded to before: a clear invitation to play and dance!

A CHESTFULL OF ANIMATES

The toys I am about to present are diverse and varied. Yet, all share a common feature. They are *animated* in the sense that they exhibit specific behavioral attributes (like moving funny), attitudes (like keeping a bearing), or "social skills" (like engaging in give-and-takes), which, to a child, are synonymous of being alive. The collection includes mostly pre-digital toys and toys that we, as adults, may not even think of as being animated because we have long *thingified* them. The toys were also chosen for their lasting popularity, or ability to 'hold' commonly held passions.

More to the point, the *animated toys* I selected are neither *smart* nor *inert* but they sit somewhere in between, along a continuum. Closer to *smart* toys, like Aibo, Furbies, Norms, MicroPets,,, we find Lil' Ducky Do, a dull yet responsive cyber-duck for 3-years-olds (Cyber Pets 2000),. We also find KritterBots, responsive programmable pets for older children, and remote-control vehicles. Closer to "animable" toys, such as teddies, dolls, or Thomas the Tank Engine, we've got Twirly Tops, Shaky Sphere, Sliding Slinkies, Crazy Critters and Rolly Molly. And in between, we find our own favorite sociable AniMates: Kids' Kites, Musical-Mats, and mini-sailboats (to be monitored using sticks on small water-ponds).

Ducky Do, Kritter-Bots, and remotes are best described as a *toys that feel,* or sense. The rest of the toys either are *moving funny* [as if self-propelled], are *stubborn* [they keep a bearing], or are *convivial* [as if they knew it takes two to tango].

I first introduce the cyber-duck. I then climb down the ladder to speak of self-propelled and goal-driven toys. I end my tale with the most evocative toys, the good "dancers."

Toys that *feel*: Lil' Ducky Do, Kids' Kritter Bots, Remote-Control Vehicles

Toys that *feel* are sensitive to certain features in their environment. Besides touch, they may be responsive to light, heat, distance, or Infra Red. The fun is to control them at a distance.

Lil' Ducky Do – Pull-along with no strings attached!

Figure 1

Ducky Do [Fig. 1] is Aibo's dull little cousin. All it does is *seek a bottle* that has been pointed in its direction. As the cyber-duck senses the IR beam, it paddle*s* in the direction of the signal, and as it loses the signal, it babbles to be reconnected[i]. In spite of its obvious limitations, this toy is intriguing because it changes the ways young children perceive and control their rapport to "pull-along" toys.

We know it, most two- or 3-years-olds fall in love, at some point or other, with their pull-along toys, and the reason for this love affair is easily understandable. The world is a bewildering place to a young child. A pull-along toy offers comfort because it stays with you, unchanged, as you venture into unknown territory. Pull-along toys are most every "terrible two's" favorite toy travel-companion.

Lil' Ducky Do differs in one significant way from its low-tech ancestors: it follows with *no strings attached*. As we have seen, the duck "likes" its bottle. So if you, the child, point the bottle at it, it will recognize it and start paddling after it/you. Simple enough! What makes this string-less pull-toy attractive is that it will accompany you (i.e. become attached in the psychological sense) without your forcing it by tying it to a leash and physically pulling it. Metaphorically speaking, you "tell" it to come by pointing your "magical" beam, and there it comes. I cannot think of a better way to satisfy any young child's desire for omnipotence, especially at an age when wandering off into the world could make you vulnerable and powerless.

Many toys can be put in the category of "toys that feel." The worst instance I have come across is a wobbly plastic

simulacrum of a Coca-Cola bottle that responds to sound. When you clap your hands, it collapses and jitters: a scary thought to anyone who expects a glass bottle to conserve its shape (two-year-olds and up).

Evolving the Duck: Kids' Kritter Bots, Remote Controls

To older children, toys like the cyber-duck remain cool because steering things at a distance is fun. At the same time, older children mostly "diss" the duck for its babyish look and feel.

One way of evolving Ducky Do is to add features that make its sensory capabilities and repertoire of responses richer, and to diversify the interactive games to be played. This is what was done at the MIT Media lab in the early 1990s. Researchers in the Epistemology and Learning Group [9][14], of which I was [2], set themselves the task of building hosts of small, configurable cyber-creatures, some of which were sensitive to light, others to sound, or touch. The team then imagined all kinds of games to be played with the creatures. In one such game, I used a flashlight to get a light-sensitive creature to follow me—or, alternatively find its way through a maze. We also created sweet spots for the creature (places where it would feel at home) by shedding a fixed light source onto certain corners in a room. In a second game, I permanently attached a small flashlight onto a creature's left "shoulder," which, as a result, made it turn in an endless counter-clockwise circular loop.

Note that from a technological point of view, the location of the light source is irrelevant in describing a creature's behavior. From a psychological point of view, however, location matters. In the first game, the creature responds to the ambient light in "its" environment. In the second game, the stimulus is like an "implant," which triggers a creature-specific automated dance pattern, independent of environmental condition. Now, if you, as a child, control the creature's movement (by holding flashlight), it feels very different from watching it turning in a loop (with flashlight glued on its body). In the latter case, any attempt at influencing its behavior would require a "surgical" intervention of sorts: you would need to *re-wire* or reconfigure the creature instead of just *dancing* with it [2].

Both kids'Kritter-Bots and remote control toys are Ducky Do's for older kids. In all cases, the thrill resides in steering a toy from afar, and…the toy obeys. Using her "magical" controls, the child "tells" it where to go, and there it goes. Remote control remains pretty unilateral as long as the terrain is predictable. Yet, as the ground gets icy, or irregular, the dance becomes more interesting.

Toys that *move funny:* Rolly Molly, Crazy Critter, Shaky Sphere

We have seen, people's tendency to endow things with agency has much to do with how exactly things move. Moving down the ladder, I now introduce a collection of more traditional animated toys: toys that *move funny*. I first present Rolly Molly and Crazy Critters—two wind-up toys. I then describe a special case: Shaky Sphere (Fig. 2)

Rolly Molly and Crazy Critters. Whimsical wind-ups

The particularity of a wind-up toy is that you manually "power it up" for it to *do its thing*. Wind-up toys are not interactive. Instead, they *use up* their temporarily allocated energy, or livelihood, by executing their moves.

And as the mechanism winds down, the toy dies out.

Rolly Molly (Fig 2) is a colorful little clown on a red tricycle, with a simple mechanism that allows it to move alternatively forward and backward. An additional feature of Rolly Molly's tricycle is that one lateral wheel is in rubber while the other is in metal, and one wheel is loosely attached to the axle while the other is tightly fixed. What you get once you wind up the toy is this jittery movement that delights adults and older children, but scares away the young. Unlike the Cyber-Duck, Rolly Molly is disengaging because it just does its thing, and when it runs out of "steam", it stops. There is no sense of incompleteness, except when it stops: it invites you to rewind it. Rolly Molly's moves are so jerky and its noises so metallic and rattling that no two-year-old likes to play with it.

Crazy Critter (Fig.2) is a more elegant version of Rolly Molly. Crazy Critters use vibration as a mechanism to drive their movement. Like long legged metallic mosquitoes, they dance in a rhythmic way that is much smoother and predictable than Rolly Molly's jerky moves. This being said, 3-year-olds are unlikely to engage Crazy Critters any more than they do Rolly Molly. Wind-up toys fascinate for their autonomy yet they won't let you in.

Figure 2: Rolly Molly, Crazy Critter, Shaky Sphere

Shaky Sphere: Push-button AniMate with contagious jitter

Shaky Sphere is a 10 cm wide, battery-driven hard plastic sphere with colorful studs that jitters when turned on (Fig.2). In this case, the child pushes a button instead of rewinding, and the ball starts bouncing, as if animated from within. Not very exciting—until you try to hold the toy in your hands! The ball's inner bounciness is strong enough that you need to hold it tight for it not to wobble off, and as you do this, you start jittering, as if by contagion. While many people find this toy amusing, it is no more than a

battery-driven animated toy. The advantages of Shaky Sphere over Rolly Molly or Crazy Critters are its ability to pass-on its jitter thanks to it round shape and the location of the on-off button (on the surface of the sphere), both of which encourage you to hold it with two hands—and that's when the fun begins!

In general, young children don't like Rolly Molly, Crazy Critters, or Shaky Sphere. Their inability to draw you in keeps you out. It is only around age 4 and up that children begin to be intrigued by such toys' "incongruity."

Tops, Pinwheels, and Soap Bubbles

Compare the funny-moving toys just presented to the elegance of a top that you launch by a twist of the hand, and that starts spinning and spinning, like a whirling Dervish (Fig. 4). Tops have been popular forever. In Portugal, many adults engage in top competitions, and teach the young. It comes as no surprise that the top is now being re-introduced in many video games, like Bay Blades, as icons that lends magical power to their hero. A similar sense of delight arises when a child blows into a miniature pinwheel, and then holds it into the actual wind, or a water faucet. In this case, the child experiments with the different sources that lend energy to the toy. Likewise, most every child enjoys blowing soap bubbles and then holding her bubble-maker against the wind. Tops, pinwheels, and soap bubbles are the quintessence of AniMates "that move funny", and part of their beauty is that they don't look like one.

Toys *on the go*: Bouncy Balls, Sliding Slinkies

The *Toys on the go* we picked have no mechanism to speak of. Shape and consistence alone make for their "nomadic" tendency, an "attitude" that both children and adults have attempted to tame forever.

Figure 3: Bouncy Ball and Sliding Slinky

Bouncy balls

Even as they sit put, balls always appear at the verge of rolling off (Fig.3). Compare a ball to a LEGO brick. Bricks are square and well anchored in the ground. They are designed to be piled on top of each other, and to form steady towers and orthogonal edifices. Balls, by contrast, look like they are tiptoeing, and ready to roll at the slightest touch, which—provided the ball is light and bouncy— invites any toddler to kick it goodbye.

Now, as enjoyable as it may be to kick a ball goodbye: once it's gone, you've got to get it back to pursue the "dance." Not surprising, then, that most games involving a ball are about its moving back and forth: allowing the player to feel the thrills of letting go (throwing or kicking) and regaining (receiving or catching). Playing ball, in other words, is about *domesticating* the ball's nomadic tendency. In some games, players use rackets (e.g. tennis, badminton), in others, they play against a wall (e.g. Pelote Basque), or use gravity (e.g. volleyball). In others yet, the ball itself is attached to a string (e.g. the bilboquet, the yo-yo). A skillful player can perform various tricks while throwing the yo-yo, always causing it to come back again.

It comes as no surprise that the ball is often used as a favorite "go-between" in early give-and-take games. Very light, over-sized balls are often used to this effect with very young children. Later in life, entire teams of players engage in ever more sophisticated ball games, using increasingly complex rules (sophisticated ball games, using increasingly complex rules (Ex: soccer, baseball, basketball, football, etc.). In sum, the ball offers a good *form* to elicit give-and-take-games, and its qualities as a go-between in turn affords exploration of *object permanence* in all its forms (expressed by Freud's notion of *fort-da*): here-there, gone-back).

Variations around balls include Frisbees and Boomerangs. Frisbees can be thought of as super-balls when it comes to enhancing the throw: When you spin/throw them off, they swirl in the air like a top spins on the ground. It is exquisite to see them fly. Boomerangs, on the other hand, are the ultimate "come-back" toys: The further you throw, the more likely they will return. Not unlike Ducky Do, the boomerang fascinates because it comes back, all by itself.

Sliding Slinkies

Skinkies are another popular instance of a toy *on the go*. In this case, it is the springiness of a slinky that makes for its aliveness. Its tendency, like a ball, is to take off as you launch it on a slanted ground, yet its manner of moving is to walk down a slope or staircase, as if self-propelled back to front, front to back. People like to feel a slinky slide off their hands, as if it were alive, and to secure it at both ends with their hands, to confine and drive its wild moves.

Toys that *keep a bearing*: Levels, compasses, balloons...and tops again

Toys that keep a bearing are essentially "stubborn" or, to put it in a more positive light, driven. They come in many shades yet they all share a common attitude: They act as if they had a goal that they seem to pursue relentlessly. One may speak of a tendency, such as heading upward or down toward the floor, or keeping afloat, leveled (Fig. 4).

Toy-levels and compasses

There exists a popular Swiss bath toy made of a transparent plexiglass sphere filled halfway with water, on the surface of

which two colorful ducklings are swimming (Fig. 4). This toy shares some of the qualities of a ball (spherical shape) yet it is a very special ball in that it transcends its own unstable tendencies by holding a comfortingly steady world inside itself. No matter how quickly you turn this sphere around itself or how fast you roll it on the floor, it always responds by maintaining the horizontality of its water level. This stabilizing tendency, in turn, enables the ducks it holds to swim untroubled, heads up. The moral of the story is: no matter how unsettling things can get, some things stay the same at the core (e.g., the water level inside the ball protects its dwellers).

A variation of the same toy is a small transparent bouncy ball with a dolphin that sticks out of the water, conserving both the dolphin's upright position and the horizontality of the water level.

Along the same line, another classic stubborn toy has been crafted for the delight of toddlers (and older siblings): a little egg-shaped figurine that always pops back to its vertical position no matter how much you incline it, because its center of gravity is low (weight at its base).
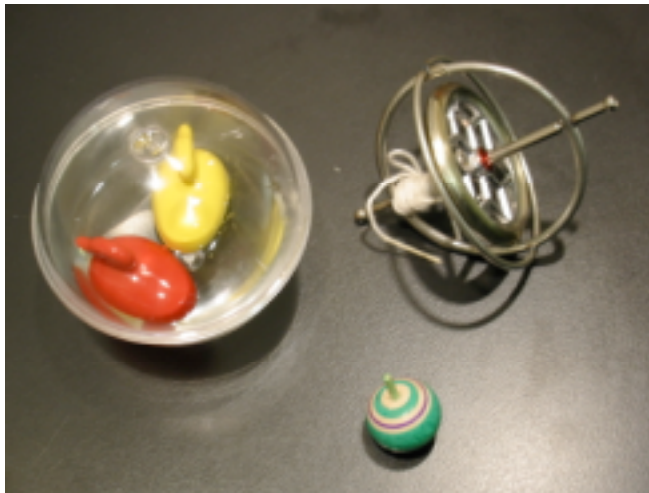

Figure 4. Toy-level (bath toy), gyroscope, and top…again

Adult versions of such objects include compasses, levels, and gyroscopes[ii]. And the most extraordinary example of all, the quintessential toy that keeps a bearing: the balloon.

Helium balloons are the ultimate stubborn nomads. When attached, they graciously float, heads up, and wave at the slightest breeze. Yet, as soon as you let go of them, unattended, they're gone! Helium balloons make for the perfect object to fall for. They seduce you (with their lightness and fragility), and then (as soon as you don't hold them tight), they leave in the most dramatic fashion possible: They fly up in the sky.

No wonder many children's stories deal with each person's secret dream that this exquisite object of desire will stay with them, forever. "*Le ballon rouge*," by Albert Lamorisse, is a superb instance of such a story, featuring a very special balloon that transcends its own nomadic

tendency by following the protagonist, a lonely and unloved young Parisian boy. Wherever the child goes, the balloon floats behind, to the surprise of everyone—including the boy—without need to be held. As the story unfolds, many other balloons join in to protect the child. At the end, the child flies off with all the balloons. I cannot think of a better scenario to comfort any child who craves for love s/he cannot receive

Toys to Tango: Kids' Kites and Other Artificial Dancers

Toys to Tango are good 'dancers'. You lead them and they lead you. You do part of the job, and they bring what you have done elsewhere, and then hand it back to you, and you take over. Toys to tango allow exploration of partial and shared control.

Kites (Fig. 5) are many people's number-one "artificial partners". You pull the toy off the ground and try to keep it aloft, usually at a great distance. The toy, in turn, acts back within the limits of its environmental constraints, among which is the wind. Kites are like remote-controlled paper birds with invisible strings attached. Yet, unlike remote controls, they operate on unpredictable ground, thus teaching you, sometimes the hard way, that it does indeed *take two to tango*! Note that kites are built—and can be configured—to behave differently under different atmospheric conditions.

Figure 5. Kite

Another favorite "dancer" is a popular French toy seen in many public parks. It consists of a set of colorful mini-sailing boats, usually for rent near round water ponds or public fountains, that children steer using wooden sticks—the trick being that the radius of the fountain needs to be wider than the length of the sticks. Here, too, the child is in partial control. However, she loses momentary control as her boat takes off toward the middle of the pond, where the stick can no longer reach.

The game usually involves several children. Each launches their boat, follows it visually as it takes off, and then catches it again, as it drifts back towards land. It is amazing

to observe how the children keep track of their boats and move around the fountain in a true choreography to facilitate launches and catches. Boats are color-coded, and ownership (which boat belongs to whom) is deeply respected.

CONCLUSIONS

As a way of concluding, I wish to readdress the question: What makes an AniMate a good-enough play prop, besides dolls and teddies, to explore and enact issues of identity formation and social-emotional development? What are some of the "hidden" qualities that endow an AniMate with the ability to draw people in, keep them engaged, and amuse them? What aspects of human transactions, or relational gives and takes, can be enacted and explored in ways not otherwise possible? Lastly, what's the fuss about going digital?

Inert toys like Teddies do not achieve much on their own. Yet, they have the advantage of existing at the mercy of a child's treatment. They are transitional objects in Winnicott's sense [36]. The child can love and hate them, and love them again in their play. The objects will be resilient enough to let the child *do it to them*, again and again. Transitional objects are there to survive bad as well as good treatment. They are both malleable and stable, affectively speaking: They are there for you, no matter what!

Animated or smart toys, by contrast, seem to have a will of their own, and, far from being accommodating, they resist being assimilated. Their manner is not to please or forgive but to reveal their "otherness." I suggest that animated toys qualify as transitional objects—or good-enough play props—provided they *let you in on their otherness*, *in ways that won't hurt*. This, in turn, calls for three attributes:

1. Artificiality – The child know*s the toy is not "really" alive* and thus *it can't be hurt*. The artificiality of AniMates makes it possible to engage and confront their "attitudes" *in ways not possible with people or pets*. Like on a stage, a child can play out many outrageous scenarios (in this case, relational), using AniMates as a "prop."

2. Believability – The child sees that the toy exhibits singular yet *believable* acts. In other words, an AniMate's consistency in manners of being and doing, more than humanoid traits or realistic features, are what fosters playful exploration of issues of identity and attachment.

3. Conviviality – The child realizes the toy *lets her in* while, at the same time, maintaining its integrity. The AniMate engages you in a dialog, as would a good dancer or conversationalist. It is responsive, yet it won't just give in. It is not malleable like clay. Nor is it stubborn as a donkey.

In sum, the very *artificiality, believability and conviviality* of AniMates, as well as their "otherness" afford exploration of *psychological* issues, such as agency and identity, and issues of control and communication, in ways otherwise impossible.

Children are quick to learn that AniMates may be better suited than dolls or stuffed animals—and safer than a pet—when it comes to mastering the subtleties and innuendos of relational *give-and-takes*, such as forcing someone/thing to act, acting on someone/thing's behalf, controlling someone/thing at a distance, or giving orders and using signals. How many times are young children told to use kind words instead of "brute force" in order to get their way? The problem is, it takes practice and a certain degree of maturity to become fluent in mediating needs and wants. Without playful experimentation—and this is what AniMates can contribute, in a safe way—it is difficult to learn the art of *negotiation within a relationship.*

In interacting with artificial cyber-creatures, the question of significance is not so much *how does it work* but rather *what does it achieve* (on its own), and *how should it be treated* (manipulated or controlled*)* so that *it responds* (to one's solicitations) in interesting ways. In other words, taking a cyber-creature *apart* (for the sake of transparency) is an awkward thing to do (unless you are a programmer). Our own—and related—research on children and cybernetics shows that most people prefer to take it *as is* and to explore *its* ways it of doing and being, so that *they* can optimize their dance with it—or control it—directly or remotely [2] [6]. Obviously, one can always reduce a cyber-creature to an inert object, and to physically push it around instead of "talking to it". Yet, even very young children, 3 years up, enjoy talking to responsive things, and they are no longer surprised or scared by things that talk back to them.

Digital per se is not synonymous of an artifact's ability to be an *enjoyable and rewarding relational partner*. Action at a distance and remote-control have been with us long before cyber-bots and electronic remotes filled our homes. When a three-year-old plays with a light-switch near the door, and the light appears on the ceiling, she doesn't know that some hidden wires pass the current from one to the other. What fascinated her is to experience her power and its responsiveness more than to unravel its mystery. Likewise, if a three-year-old switches on the TV—remotely or otherwise—and images and sounds appear, she won't know if the characters are there, really, right now, or not. Nor does she know what causes them to move and talk.

What is unique about cyber-toys, however, especially as they become an integral part of our lives, is that they create a new arena within which *action at a distance* and *relationships outside of a human presence* can be explored in a new light, thus changing the ways we dream-up and sustain relational continuities, whenever co-presence or territorial bounds won't hold. No doubt, the capabilities of today's digital animated toys are rapidly evolving—from AniMates to Toy-Bots—and so are our rapports with them. More to the point, people's very urge to imagine and create ever more sophisticated animated toys—for their children and for themselves—is, at root, a manifestation of their own endless quest for renewed identity. Animated toys "grow" with us, and within our culture, because *we* don't cease to re-invent ourselves. Re-inventing ourselves is about rethinking *who we are*, and *how we differ* from others (creatures or things). It requires that we draw lessons from *how others interact with their world* and *among themselves.* Even more relevant in today's digital world, reinventing ourselves calls for spaces where we can safely explore the nuances between physical impact, action at a distance, psychological manipulation, remote-control,

orders, and requests. Animated toys, as I have tried to show, constitute one arena that can provide just such types of spaces.

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