

**Findings from a mind-microscope: Relationships between long- and shorter-term narrative change in autistic speech**

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## Abstract

In this paper we present an embodied account of increasing coherence in an autistic adolescent's repeated retellings of a story. Our focus is on the contribution of gestural *catchments* in the production of a single, multimodal, syntactic construction. The analysis traces the construction's *mesodevelopment* in speech and enactment across three days of retellings, from its origin in three separate descriptions of three event sequences, to the merging of two event sequences in a single utterance and then the merging of all three. We suggest that each utterance in the multimodal chain served a constitutive function in the formation of the next, with speech and enactment taking turns "leading the way," and that a function of enactment, gesture, and the movements of speech itself is to keep track of spatiotemporal relationships while new linguistic constructions are being formed – either entirely new propositionalizations, or constructions formed from the compression of old ones. A conjecture arising from this analysis is that change across mesodevelopmental time may be of interest for analyses of more typical speech and thought on the microgenetic scale. In our proposed account, mesodevelopmental change serves as a *mind-microscope*, revealing components of the growth point thinking-for-speaking that are indiscernible across the rapid changes of microgenetic time. We conclude with implications of viewing the autistic adolescent's linguistic behavior through a mind-microscope, suggesting that 'mind-blindness' was overcome through a combination of character- and observer-viewpoint enactment.

## **Introduction**

A method by which to observe the emergence of spoken discourse cohesion over short intervals—short, but extended enough to permit observation of the emergence—is to collect repeated narratives of a provided story (Levy, 2003). In the study to be described, the stimulus was the children’s classic, “The Red Balloon.” Specific to the method is that the narrator tells the story repeatedly, over several days (sometimes on the same day), to the same or different listeners. In this way, changes, which typically are consolidations that enhance cohesion, can be tracked as they emerge. We refer to this time scale as the ‘mesogenetic scale’. The method can be employed with speakers of all sorts and has been used previously by Levy and Fowler (2005) and Levy (2007, in preparation) with autistic children. We concentrate on a case study of a 13 year-old autistic boy whom we refer to as ‘D’. While many differences from typically developing children are found with autistics, we focus, following McNeill et al (2001), on the catchment and its theoretical role in creating fields of oppositions. Catchments are named for the discourse theme they seem to embody; for example, the ‘back-and-forth’ catchment, to be described later. Through catchments, we find D using gesture to construct (relatively complex) syntax, as will be seen below.

Utilizing the concept of a catchment and the linked theory of the growth point, we can tie together three time scales: mesogenetic—the scale of the emergence of structure over repeated retellings; microgenetic—the scale of utterance and thought creation; and ontogenetic—the scale of children’s linguistic/cognitive development, which in the theory of the growth point has similarities to the microgenetic scale. The mesogenetic scale can expose components of the GP thinking-for-speaking that may be indiscernible at the microgenetic scale. It creates something like a mind-microscope through which we see, in slow-motion, the unfolding of mental processes that also take place at much higher microgenetic speeds.

Autism itself seems to stretch out mental processing, which we observe in repeated storytelling. Processes that normally are simultaneous are spaced apart; yet they accumulate over time, with repetition, and congeal into discourse units which then approximate normalcy. It seems that D’s processing, although thus extended, may be similar to the mental processing of typical children who are much younger (thus at an earlier stage of ontogenesis). Theoretically, autism is of interest for what it may suggest of normal speech and thought on the microgenetic scale, using the microscope metaphor. Some aspects of the widely noted repetitive behavior of autism may be spontaneous adaptations to this temporal dimension, the subject trying to extend through repetition what would normally be instantaneous. Autism of course may include qualitatively different processes of thought and speech to those of normal speech, but qualitative differences stand out when we look at the stretched forms of cognition that autism presents on the mesogenetic scale, and we shall point out some of these. For example, D enacts events from the film as well as events of watching it. While these features can be likened to the extensive use by young typically developing children of ‘character viewpoint’ gestures (cf. McNeill 1992), they do so in a way that is specific to autism and some may in fact play a role in the spread-out cognition of autism itself.

## **An example**

On the third day of his attempted retellings of the story, D produced a long, cohesively linked and temporally accurate account. The utterance in (1) occurred midway through his retelling:

(1) and and then the balloon [followed him] (right hand, index finger extended, moves in downward curve) [and back and forth back and forth all the way to school] (head and right hand, index finger extended, move side to side) (Day 3)

This utterance had a complexity of syntax not seen before in D's retellings. It was formed from a combination of two utterances produced on the day before. The first, in (2a), was split into two parts, and the second (2b) inserted between them:

(2a) the balloon balloon followed him to school

b) and then he went back and then he went back and forth and back and forth and and this and that (head moves side to side) (Day 2)

In (1) the compressed utterance is multimodal, as was its precursor in (2b). Two gestures accompanied utterance (1). First, co-occurring with "followed him," the right hand, with index finger extended, moved in a downward curve, as if to indicate the balloon<sup>1</sup> following the boy. Then, accompanying "and back and forth back and forth all the way to school," the head and right hand, with index finger still extended, moved side to side, illustrating the manner of the balloon's motion. Looking at the preceding utterance (2b), a nearly identical side-to-side head gesture accompanied closely related speech, "...and then he went back and forth and back and forth and and this and that."

The two instances of side-to-side movement, produced on two different days, formed part of a gestural catchment (McNeill, 2005). Catchments are recognized when gesture features recur in at least two (not necessarily consecutive) gestures. The recurrent features suggest a discourse theme and cohesive thematic thread (in this case, the theme of What Happened While The Balloon Moved Back and Forth). A GP theoretically is a point of differentiation in the immediate context of speaking, conceptualized as a field of oppositions. The catchment is both a record of this field and embodiment of it. Working backwards, we see the values the GPs had and how they worked as differentiations – in this example, detailing what happened (as the balloon moved back and forth, the boy went to school, a differentiation, as we see above, in (1), that took D three days to achieve. Other examples of D's differentiations seem unusual relative to typical speakers.

For typically developing speakers, gestural catchments can be constitutive of discourse meaning, with gestures at times "leading the way" (see also Goldin-Meadow, 2003). In this view, gestures supply a second channel that works with speech to keep track of events in sequence. Speech supplies conventional, lexicogrammatical categories, and gesture – a semiotically "opposite" mode of meaning capture – is imagistic, the "essence of embodiment" (McNeill, 2005). The discourse history of utterance (1) suggests that, for this autistic speaker as well, discourse meaning arose from a combination of gesture and speech. It originated in adult prompts and D's enactments, and progressed to D's reproductions of adult speech and of his own earlier speech and body motion. Across the three days of retellings, each reproduction helped create a multimodal chain of references.

Our goal in analyzing this example is to describe the discourse history of utterance (1), and to point out how each link in the utterance chain may be constitutive of discourse meaning. The rest of the paper is organized as follows. The first section provides an overview of speech and movement across the three days of the retellings. Later sections zero in on the target utterance on Day 3 and its precursors on Days 1A, 1E and 2. The final section considers implications of using the case of D as a ‘mind-microscope’ onto the organization of thinking-for-speaking and for insights into the character of autism in general, including the claim by Baron Cohen that it exhibits ‘mind-blindness’.

## Overview of Data

D was 13<sup>ii</sup> when he participated in the study. Five adults were involved at various times: at all times his mother (M), and at times his father (F), his home health aide (H), and two undergraduate students (E and C). The intention of the experimenters, parallel to that in earlier studies of nonautistic children (Levy, 2003; Levy, in press), was to show D the classic children’s film, “The Red Balloon,” and ask him to retell the story immediately after viewing it and then on each of the following two days. The film is silent, and putting it into words is an especially difficult task for a language-impaired child. Not surprisingly, at first (the afternoon of the first day, or “Day 1A”) D was resistant to describing the story, and as a result was asked to participate in a second session that evening (“Day 1E”). Two sessions followed on each of the next two days (“Days 2” and “3”).

Levy and Fowler (2005) trace D’s use of social speech to build multiple scene narratives, from an initial linguistic structure to additions, deletions and transformations, and finally to temporally and informationally coherent accounts at the end of Day 2 and again on Day 3. The retellings were analyzed with respect to four scenes: the *introductory*, *school*, *stores* and *closing* scenes. The utterance in (1) (hereafter the “target utterance”) forms part of the second, *school* scene.

### Day 1A

D’s resistance to retelling the story in session 1A was reflected in his direct and indirect attempts to avoid the task, illustrated in his answers to E’s questions in (3). (In these and other examples adult speech is in italics.)

(3.1) *what’s the movie about?* called the red balloon

.2) *and what happened in the red balloon?* (speaking in low voice) the boy [pause] (*uhhuh*) the kids [pause] (*um*) (speaking in nearly inaudible voice) the kids were happy [unintell] and lived happily ever after...

.3) *what do you remember from the beginning of the movie?...why don’t you tell it, and then I say after you?* (Day 1A)

The adults, especially D’s mother, were persistent in prompting him to complete the task, and the result was a long interactive session, consisting of nearly 1000 utterances. (See details in Levy and Fowler, 2005.)

Most of D’s responses on Day 1A consisted of single utterances or utterance fragments, occasionally enacted, although they were most often accompanied by diffuse body motion: He shifted position, swayed back and forth, rocked, fidgeted, or simply reclined on the couch. For the most part his early utterances were not grounded in his own retellings; that is, he did not

introduce referents with respect to the time and place of the story, but rather responded to adult questions that followed the story line. In this sense, most of his utterances were produced in “somebody else’s ground.” Toward the end of the session D agreed to E’s request that he “think about” the movie until the next day:

(4) *I want you to think really hard for tomorrow, okay? (okay) cause I have to drive far to get up here, and I want you to tell me a whole story without trying to stop, okay? (okay) and I want you to think really really really hard, okay? And I’m going to come here tomorrow afternoon, alright? [unintelligible] afternoon. Yes, we can do it, okay.*

### **Day 1E**

During the next session, 1E, D interacted mostly with his home health aide, H, and his mother. The character of this session was dramatically different from the earlier one. From the start D played an active role, and much of his activity was energetic and focused. He began by grounding his activities in the context of a pretend movie:

(5) Pretend we’re at the movie show (stands with right arm up while H rolls up his sleeve, “high fives” H, and puts right hand down). (*okay*) And then, and then we watch a movie (walks to right, points at H with left hand), okay (starts to sit down). (Day 1E)

Later enactments were preceded by similar remarks: “I’m gonna act it out (standing up to begin enactment),” “I just want to pretend I’m the little boy (beginning enactment),” and “ladies and gentlemen...boys and girls, welcome to this movie (sitting still).”

D’s enactments grounded his retellings in physical space, creating frames of reference, each in Buhler’s (1982) terms an *origo* in the here-and-now of speaking. As Levy (in preparation) describes, D then made use of each physical ground to push his retellings forward. This is illustrated in (6); D identified a reference point in (6.1) and used it to anchor a sequence of utterances in (6.2-4):

(6.1) (D has been walking as he enacts a retelling) I went to the mirror store (remains relatively still) here’s the mirror store (walks outside room)

.2) I looked around (not visible; still outside room)

.3) and then and then guess what I did? I lost the balloon

.4) (calling through cupped hand, on each word facing a different direction) “balloon balloon balloon”

This passage was influenced by adult speech, as were most of the enacted passages on Day 1E. That is, most of D’s enacted speech during this session consisted of reproductions of utterances from the session before; in fact all enacted events that referred to actual events in the film had been put into words during session 1A. This is illustrated by a comparison of passage (6) to the earlier question-answer sequence with D’s mother in (7). (6.1) is an elaborated reproduction of (7.1); (6.2) and (6.3), respectively, were reproductions of (7.3) and (7.2).

(7) *can you tell me one place he went?* to the mirror store

*and what happened at the mirror store?...then he lost it*

*and what happened after he lost the balloon?...he looked for it* (Day 1A)

Just before the final retelling on Day 1E, D acknowledged that his retellings were facilitated by his enactments:

(8) *Can you tell it better if you move?* Yes. (Day 1E)

### **Day 2**

The session on Day 2 once again had an entirely different character from sessions 1A and 1E. For most of the session D sat still, visibly trying to concentrate. His attempt to concentrate was reflected in his remarks to E at the start of the session (in 9), addressing E's earlier questions at the end of session 1A (in 4).

(9) *okay D I need you to tell me the story of the red balloon the way how you remembered it... I think 'bout in my head... tell me from the beginning to the end I thought about [it] in my head...*

E led D through the story, asking a series of questions, and as in (10):

(10) *what happened in the beginning of the movie?* the kid climbed up in the pole *okay why did the kid climb up the pole?* cause he wanted to get the balloon...(Day 2)

D then produced five retellings that were for the most part monologic, consisting of utterances that were temporally accurate and informationally coherent, as illustrated in (11), his first retelling on Day 2:

(11) one day a little boy climbed up on a pole and he followed the bus he went to school and then the balloon went in and out in and out in and out (moves head side to side)...and and then he- and then he went to school (Day 2, retelling 1).

In this passage, the main character was appropriately introduced with an indefinite referring expression, "a little boy," and subsequent coreferences were made with pronouns; a reference to the balloon, in contrast, used a more explicit form. The pattern of referring expressions suggests that D's retellings were *grounded in his own language*; thus, unlike his spoken responses to adult prompts in earlier passages, the frames of reference were of his own making. D had now transposed the origo from an immediate location to one that was distanced in time and place.

This retelling, as well as the next three, stalled after the first two (*opening* and *school*) scenes. The fifth described these as well as the remaining two (*stores* and *closing* scenes); and thus the session ended with a single, temporally coherent account. It was produced without full-body enactment, although accompanied at times by adult-like gestures.

### **Day 3**

On Day 3 D again remained relatively still, now sitting cross-legged in an armchair with his arms resting on his knees. He appeared engaged in the story, even enthusiastic, and looked directly at C while he spoke:

(12) Can I tell you The Red Balloon? The story goes like this. I telled my mommy [unintell]. (Day 3)

Soon after, he asked his mother for help, a marked change from his earlier repeated attempts to end the narrative task:

(13) And just- Mom I need some help. *What did the boy do when he climbed- he he got the balloon and he climbed down the pole with the balloon, and then where did he go? He went- he went uh down the pole, and then went to the school bus...* (Day 3)

Following a second prompt from his mother, D completed the narrative, again producing all four scenes in sequence as he elaborated on his final retelling on Day 2. Like the earlier one, the retelling on Day 3 was produced using speech alone or accompanied by adult-like gestures.

The cohesive narrative on Day 3 was very different from the individually elicited utterances on Day 1A that had been linked through adult speech<sup>iii</sup> Across the three days of the study, D made a remarkable shift from a strong reliance on adult prompts to a reliance on his own earlier speech, and in the process achieved temporal and informational coherence (Levy and Fowler, 2005).

Throughout this transition – including all of D’s enactments on Day 1E -- adult speech remained an important influence on D’s retellings. That is, both semiotic modes played a role in D’s constructions: the lexicogrammatical categories borrowed from earlier speech, and imagery embodied in gesture. Perhaps, as Goldin-Meadow put it for typically developing speakers, each helped to “lighten the cognitive load” – and so facilitated the construction of sequences of cohesively linked utterances.

### **Evolution of Target Utterance: Co-contributions of Speech and Enactment**

Figure 1a shows the path of development of the target utterance across all retellings; highlights are summarized in Figure 1b. Two segments of the utterance (“the balloon followed

INSERT FIGURES 1A AND 1B ABOUT HERE

him” and “to school”) originated in session 1A, and a third (“and back and forth back and forth”) on Day 2. These are labeled in order of their emergence in discourse (Figure 2).

#### ***Day 1A: Original Descriptions of Event Sequences 1 and 2***

##### ***Event sequence 1***

Event sequence 1, the boy traveling to school by bus, was first described during an early series of question-answer sequences between D and his mother. D sat on a couch with E, leaning forward with his chin on a cushion, and answered questions in the absence of movement, in fact, barely moving his mouth as he spoke; his mother remained behind the camera (column 1 of Figure 1a):

- (14.1) *he was on his way to?* (leaning chin on cushion) school
- .2) *school, that’s right, and how did he get to school?* by bus
- .3) *he went by bus, that’s right* (Day 1A)

In this sequence, D’s utterances were produced in a linguistic structure created by his mother, and thus produced in “her” ground.

##### ***Event sequence 2***

Event sequence 2, the balloon following the boy, was different. It was first described in a rare moment of concentration on Day 1A, produced with a combination of speech and enactment



(column 1 of Figure 1a), and physically anchored in D as a character in the story – and thus in D’s “own” ground:

#### FIGURE 2 ABOUT HERE

- (15.1) (sitting on floor facing E) then he (leans forward) stayed & stayed  
.2) and followed him everywhere (rocking in circular motion on “everywhere”)  
.3) and then all the balloons gathered around (rocks in more pronounced circular motion)  
.4) and then- once a- and then that’s the end (rocks in less pronounced circular motion) (Day 1A)

This sequence followed a segment more characteristic of session 1A, in which D appeared unfocused and unmotivated, using frozen expressions, repetition, and an invented segment, in an apparent effort to end the task. Then, in (15.1) he leaned forward and produced the novel and accurate descriptions in (15.2) and (.3). First, on the word “everywhere” he rocked in a circular motion, as if, in a motoric reflection of events in the film, he took the perspective of the balloon circling the boy. That is, D-as-the boy served as an implicit reference point for the balloon’s activity. Then in the next utterance (15.3) the same movement was amplified. It now accompanied “all the balloons gathered around,” as if D now took the perspective of a bunch of balloons encircling the boy. In this second motoric reflection of observed events – this time events that occurred toward the end of the film – D-as-the boy remained the implicit reference point.

It is possible that, as in McNeill et al’s (2001) observations of the discourse of typical speakers, gesture “led the way” in the construction of (15.3). That is, the circling motion on “everywhere” may have called forth the description of the second event, “all the balloons gathered around,” and in this sense D was describing what he already was enacting.

The speech-movement combination, “all the balloons gathered around” with circling motion, formed the start of a gestural *gathering* catchment, carried through to the end of D’s retellings on Day 3 (see Levy, 2007). The circling movement accompanying utterance (15.2), “the balloon followed him,” took a different path in sessions 1E through 3, described below.

#### ***Day 1E: Merging of Event Sequences 1 and 2 in Social Speech and Enactment***

Event sequence 1, the boy traveling to school by bus, was omitted from D’s spontaneous retellings for most of session 1E, perhaps because of confusion created by the structure of the original film.<sup>iv</sup> Event sequence 2, the balloon following the boy, was spontaneously described and enacted toward the start of the session (Figure 3, lines 7 and 8), inserted between descriptions of the *opening* (lines 5-6) and *stores* scenes (not shown in Figure 3; see 6 above). In the rest of this section the developmental path of the merging of the two event sequences is described with respect to three passages: D’s description of event sequence 2 (Figure 3); H’s merging of event sequences 1 and 2; and D’s own merging of the same event sequences (Figure 5).

#### ***D’s description of event sequence 2: Figure 3***

In response to H’s prompt (“I need D to tell me what the beginning of the movie was about”), D stood up and moved forward while observing that he would “act it out” (line 4). He

then produced a series of multimodal utterances: first “the little boy climbed up” while moving his arms up and down (in line 5); then, with hands overhead and starting to turn in a circle, “got the balloon” (line 6); then the partly unintelligible utterance, “[carried it around/followed him] everywhere” while still turning with arms overhead; and finally walking in a straight line out of the room with arms down (line 7), “...the balloon followed me everywhere, right here” (line 8). (See column 2 of Figure 1a).

#### FIGURE 3 ABOUT HERE

In the first description of event sequence 2 – “(carried it around/followed him) everywhere” in line 7 – enactment again preceded speech (compare to utterances 15.2-.3 from Day 1A). The movement that accompanied the utterance in line 7 began on the preceding one, “got the balloon” in line 6, as D started to turn in a circle. Plausibly, a contribution of the circling motion was to help call forth linguistic categories used on the day before (in “followed him everywhere” in 15.2).<sup>v</sup> The second description of event sequence 2 – “...the balloon followed me everywhere, right here” in line 8 – was an elaboration of the preceding utterance, now a close reproduction of utterance (15.2) on Day 1A (“followed him everywhere”), transformed to the first person (“me”), and with location marked (“right here”). The path of movement was also transformed, now walking deliberately out of the room, in a straight-line with his arms at his side, as if he were the boy with the balloon following. Across the two utterances (line 7 and 8), the similarity in speech and the change in movement suggest that speech was now leading the way. Figure 4 maps out the path of speech and movement from the utterance in (15.2) to those in lines 7 and 8 of Figure 3.

As the utterance in line 8 was completed with “right here,” it was explicitly grounded in physical space, a location outside the room. D used this and a second, more explicit and specific physical ground to continue his retelling (the example in 6 above).

#### FIGURE 4 ABOUT HERE

##### ***H’s merging of event sequences 1 and 2***

As (16) shows, D’s home health aide, H, then engaged him in an exchange in which sequences 1 and 2 were combined for the first time (see column 3 of Figure 1a):

(16.1) *Did the little boy go to school?* yes he did

.2) *Did the balloon follow him to school?* yes (Day 1E; 220 utterances after passage 16 in Figure 3)

##### ***D’s merging of event sequences 1 and 2: Figure 5***

By the end of the session (25 utterances after the exchange in 16), D still had not described the *school* scene spontaneously. His mother engaged him in a long interactive session (column 4 of Figure 1A), a multimodal co-construction in which the two mapped out spatial relationships among characters and locations, and thus their temporal sequence (see Figure 5). During the course of the interaction, D used two reference points in physical space to ground subsequent utterances. Using the first (lines 7 and 10, “pretend this is the bus”), he worked out spatial relationships in event sequences 1 and 2, from the boy getting on the bus, to the balloon floating in the air while following the bus, and then the boy getting off the bus. Toward the end of this first segment (“the balloon... followed him to school” in line 16), he reproduced H’s utterance in (16.2) (“*did the balloon follow him to school?*”). Looking ahead to the retelling on

Day 3, D's utterance was an exact precursor to segments 1 and 2 of the target utterance ("the balloon followed him...to school" in Figure 2). Using the second reference point ("pretend this is school" in line 19) he continued to articulate spatial relationships between the boy and the balloon, this time with respect to school.

#### FIGURE 5 ABOUT HERE

This development – D's first merging of event sequences 1 and 2 – unfolded as follows. He was asked by his father to tell the story from the beginning: "*We're starting at the beginning of the movie now...and I want you to tell me what you remembered from that film The Red Balloon.*" D responded by enacting a general statement, "[the kid was] walking around and then walking around" (line 1), the accompanying motion similar to his enactment in the passage in line 8 of Figure 3, as he walked in a straight line motion with his hands at his side. While standing still he made explicit a "pretend" balloon ("pretend this is the balloon" in line 2). He then re-described event sequence 2 (line 3), reproducing both speech and movement from line 8 of Figure 3: He walked in a straight line path (toward the back of the room and toward the camera again) with his arms at his sides, taking the perspective of the boy with the balloon following in the air, as he said "the balloon followed me everywhere."

After this D continued a pattern set in earlier passages, responding to his mother's question, "*Where was the first place that the boy went?*" with "[I know], the mirror store" (line 4). His mother, determined to redirect the retelling to the description of the *school* scene, responded (line 5), "*No, that wasn't the first place ...where was the first place he went?...*"

#### ***Lines 7-17: First reference point.***

The first reference point – the bus, located at the doorway to the room – was created in response to questions prompting D to describe event sequence 1, the boy traveling to school by bus ("*why didn't he take some transportation? why didn't he go in a car or a bus or a whatever it was that he was supposed to, what was he supposed to go on?,*" in line 7). D walked to the back of the room while his mother was talking, and at the doorway turned to face the camera. With his feet anchored at that location he swung his arms expectantly and said, "pretend this is the bus, okay." He then used the physical location at which he was standing to enact changing spatial, and thus temporal relationships between the boy and the bus going to school. First, he responded to his mother's question ("*did he get on the bus?*" in line 9) in words, "the little boy went to get on the bus." He then enacted it, jumping forward as he repeated, "pretend this is the bus" (line 10). Finally, he put into words what he had just enacted, "he jumped on the bus," while standing still (line 11), as in earlier passages his movement preceding his propositionalization of it. He then remained in that location while he answered a series of questions about event sequence 2, the balloon following the boy (lines 13-16): "*was the balloon on the bus too? yes he was was the balloon in the bus too? no...you're right...why wasn't the balloon on the bus? because [unintell] the balloon was floating in the air...as the little boy was in the bus and the bus was moving along, where was the balloon floating?* in [pause] the [pause] air [pause] and then the balloon followed him to school." This was now D's first merging of event sequences 1 and 2.

In the last utterance in this segment (line 17), D changed position for the first time since establishing the reference point; he enacted a description of the boy getting off the bus: "*and where did he get off the bus? [unintell] off off,*" the last word spoken as he jumped far forward.

### ***Lines 18-23: Second reference point.***

After this, the second reference point helped D complete the scene. The reference point emerged as D again walked to the front of the room and back, while responding to two questions from his mother, “*and then what did he do?*” with “and then he walked” (line 18), and “*where did he go?*” with an identification of the reference point, “pretend this is school” (line 19). Arriving at the doorway, he jumped to enact the boy arriving at school as he said “then he walked in,” and, while standing still, “then the balloon walked in” (lines 20-21). D’s narrative ended as it drifted toward an invented sequence, spoken while he walked through the doorway to “school,” “then he said hi [unintell], what are you doing,” and soon after, “and then...the end” (lines 22-23).

In summary, in the passage in Figure 5 D mapped out spatiotemporal relationships among the boy, the bus, the balloon and school, using a combination of enactment and social speech. D made use of two reference points in space, the first helping to ground a series of utterances that culminated in the merging of event sequences 1 and 2. Looking at the entire passage, the contributions of D and his mother produced a sequence that was both spatially and temporally accurate: the boy and the balloon moving toward school, from the boy getting on and then off the bus, and then walking to and entering school, with the balloon following.

### ***Summary of Days 1A and 1E***

Tracing the history of the target utterance on Days 1A and 1E, the entire process created an interactive, multimodal chain of references. The process began on Day 1A with separate references to event sequences 1 and 2, one originating in social speech and the other in enactment. Then, the entire path of development pointed up the persistent contributions of adult speech and enactment.

D’s task, as put to him by adults – and as he clearly understood it – was to describe the observed events in words. (At the start of the first session, D’s mother said, “*we’re trying to figure out what kind of words children use, and so you need to help us by telling us something.*”) Event sequence 1 was first put into words with the mother’s direct scaffolding, a two-person utterance in which she supplied some linguistic terms and D supplied others (“*he was on his way to? school...and how did he get to school? by bus?*”). Despite this practice, D seemed to resist re-describing the sequence on his own until he worked out the spatial underpinnings in the interactive session at the end of session 1E. Then, he put relationships between characters and locations into words, using a physical reference point in the here-and-now of speaking.

Event sequence 2 originated in a combination of D’s own speech and enactment, the first reference made with an upper body circling movement (accompanying “everywhere” in “followed him everywhere”). Enactment and D’s own speech seemed to take turns “leading the way.” First, in the next session, 1E, a related movement – the start of a full-body circling motion while walking with arms held over head – appeared to trigger a second, related description, “(carried it around/followed him) everywhere,” produced with a continuation of the circling movement (line 7 of Figure 3). Then, the articulation of this utterance appeared to trigger the next one, the elaborated reproduction “the balloon followed me everywhere,” produced as D walked in a straight line toward the door at the back of the room (line 8 of Figure 3). 245 utterances later (line 3 of Figure 5), D reproduced both speech and movement when, again walking to the back of the room, he repeated “the balloon followed me everywhere.” The speech-movement combination was preceded by a similar movement (walking to the back of the

room while saying “(the kid was) walking around and then walking around” in line 1 of Figure 5), the movement of the earlier utterance perhaps helping to call up the movement and speech of the later one.

D’s merging of references to event sequences 1 and 2 in “the balloon followed him to school” appeared to be influenced by a combination of social speech (as in H’s earlier production, “(“*did the balloon follow him to school?*”), D’s own earlier speech (his earlier descriptions of event sequences 1 and 2), and enactment. The merged utterance followed D’s use of a reference point to enact and articulate relationships among characters and locations (the boy, the bus and the balloon); that is, a physical location (“the bus”) became an orientation point relative to which the movements of characters were located and put into words, from the boy getting on the bus to the location of the balloon relative to the boy on the bus.

### ***Day 2: Addition of Event Sequence 3***

For the first time on Day 2 D spontaneously included event sequences 1 and 2 in his retellings (see example 17.2-.3 and column 1 of Figure 6; see also column 5 of Figure 1a). The descriptions of these event sequences were elaborated reproductions of earlier utterances, produced while sitting down, in the absence of full-body enactment. They were grounded in a linguistic origo (in 17.1); and as described above they made use of cohesive devices to maintain reference to characters that had been established through speech.

(17.1) (sitting on couch, facing E; fidgeting) one day a little boy climbed up on a pole  
.2) and (long pause) he followed the bus  
.3) he went to school  
.4) and then the balloon went in and out in and out in and out (moves head side to side) (Day 2, retelling 1).

The rehearsed utterances in (.2) and (.3) scaffolded the addition of the new speech-movement combination in (17.4), the first description of event sequence 3. The speech co-occurred with a *side-to-side* head gesture that indicated the manner of movement of the balloon as it traveled to school. This now completed the structure of what persisted through the rest of the retellings as the *school* scene.

The structure in (17) was repeated four more times on Day 2, with various transformations (see columns 2-5 of Figure 6, and the corresponding columns in Figure 1a). In the final retelling (column 5 of Figure 6) 20 utterances were used to describe all four scenes in accurate temporal order (Levy and Fowler, 2005). This and the two retellings that preceded it (columns 3-4 of Figure 6) reflected the spatiotemporal layout worked out in session 1E. For example, the first utterance of retelling 3 (column 3 of Figure 6), “the little boy went to get on the bus,” was an exact reproduction of D’s earlier utterance at the end of Day 1E (see line 9 of Figure 5), although the earlier utterance was enacted while its reproduction on Day 2 was produced while sitting still. The second utterance in column 3 of Figure 6, “the balloon balloon followed him to school,” was also an exact replica of the earlier utterance on Day 1E (line 16 of Figure 5), also enacted in the earlier session and produced without body motion on Day 3.

On Day 2, two additional utterances in the multimodal chain (Figure 6) were accompanied by gestures. In retelling 2 a reproduction of “followed the balloon to school” was accompanied by movement up and down of the left hand (see column 2 of Figure 6). This

utterance merged two from the retelling before, “he followed the bus” and “he went to school” in retelling 1 (see column 1 of Figure 6 and 17.2-.3). Retelling 3 of Day 2 (column 3 of Figure 6) included a multimodal elaboration of the earlier utterance “the balloon went in and out in and out in and out,” now the more accurate “he went back and then he went back and forth and back and forth and and this and that,” produced with the second instance of side-to-side head movement – the second of three gestures in the *side-to-side* catchment. In both instances the utterances accompanied by gestures were new syntactic constructions. This suggests that, in the formation of new syntactic constructions, gestures may help to keep straight spatial and therefore temporal relationships as lexicogrammatical categories are put together for the first time.

### ***Day 3: Merging of Event Sequences 1, 2 and 3 in Single Utterance***

In the target utterance on Day 3, “and and then the balloon followed him and back and forth back and forth all the way to school,” events were again described accurately and in sequence, as mapped out in speech and enactment on Day 1E: from the boy going to the bus, to the bus taking the boy to school, to the balloon following the boy on the bus to school. (See column 6 of Figure 6 and column 9 of Figure 1a.) As we described above, this utterance was formed from the compression of old utterances (compare examples 1 to 2), with one, “the balloon...followed him to school,” split into two parts, and another, “he went back and forth and back and forth,” inserted between them. Again the creation of a new grammatical construction was accompanied by gesture. First, a hand gesture accompanied segment 2, “followed him,” as it had in retelling 2 on Day 2 (see column 2 of Figure 6). The gesture now consisted of the right hand moving in a downward curve, with the index finger extended, showing the trajectory of the balloon following the bus. Then, a combination of linguistic segments 3 and 1 was accompanied by the third instance of the *side-to-side* head gesture.

Plausibly, the gestures on Day 3, as on Day 2, helped to keep straight spatiotemporal relationships while new linguistic constructions were formed. In this interpretation gestures actively contributed to the compression of old utterances in speech. Thus the use of gesture may help explain the formation of the relatively complex syntactic construction by this language-impaired speaker.

FIGURE 6 ABOUT HERE

### ***Summary of Days 2 and 3***

On Days 2 and 3 D’s retellings were transposed from an origo in the here-and-now of speaking to a reference point created through speech. In Bühler’s (1982) terms, it was a transposition from *ocular* to *imagination-oriented* deixis, a significant achievement if it then generalized to other instances of speaking. This is because, as Wertsch (1985) put it, language can then serve as its own context, freeing children to “operate on...objects whose existence and identity are created through speech” (p. 150).

In the target chain of references and in the retellings on Days 2 and 3 more generally, D’s speech consisted for the most part of elaborated reproductions of his earlier utterances. Four gestures occurred within the target chain on Days 2 and 3, one used to construct an entirely new utterance (“the balloon went in and out...”), one for its elaborated and more accurate reproduction (“he went back and forth...and this and that”), and two with the merging of old utterances to form a new one (“he followed the balloon to school”, and “the balloon followed him and back and forth...all the way to school”, the target utterance). All were new syntactic

constructions, an observation that leads to the conjecture that D's gestures, like his earlier enactments, continued to serve a constitutive function – in the formation of entirely new utterances and the elaboration of old ones, including instances of *narrative compression*, consolidations of old utterances that enhance cohesion.

Similar processes of narrative compression have been observed in the repeated retellings of typically developing children and adults (Levy, 2003). At a smaller level of linguistic analysis, Vygotsky (1987) argued that an *agglutination of meaning* takes place when “several words are merged into one” and the new word expresses a more complex idea (p. 246). When entire utterances are compressed, perhaps the same argument holds: The resulting utterance is not only structurally more complex but semantically as well. That is, it combines the meaning of the earlier utterances in a single “complex idea,” resulting in a more coherent description than what existed before (Levy, 2003).

### **An Embodied Account of D's Narrative Development**

The goal of the analysis was to trace the path of development of a relatively complex construction in D's retellings. The utterance was multimodal, as was its history. It originated in three separate utterances, one elicited by adult prompts and two others in D's own enactments. From Days 1A to 3 the progression of utterances formed a multimodal chain, shown in Figure 1a, and summarized in 1b.

The path of the construction's development is suggestive of how change occurred. Plausibly, each utterance in the chain served a constitutive function in the formation of the next. In the early sessions (1A and 1E) adult speech, enactment, and D's own earlier utterances took turns “leading the way.” Sometimes enactment triggered speech and/or other enactments, and other times utterances were triggered by the speech of an adult or of D himself. In fact, D seemed to make use of whatever information was available to complete the task required of him, and as he combined both semiotic modes his retellings inched toward narrative coherence.

The use of enactment was especially revealing of how change occurred. When D began to act out events with respect to an explicit and specific reference point, his retellings “took off” in a way that they had not before (see discussion of session 1E above). This was perhaps due to the following property of enactment. If, as McNeill (2005) proposes, “the gesture *is* the very image; not an ‘expression’ or ‘representation’ of it, but *is* it,” then D's enactment – as a direct reflection of events in the film – may have helped call up those events, and helped to keep track of their sequence. The last passage on Day 1E (Figure 5) made visible how movements through space helped establish relationships in time, thus helping to form the basis of an accurate reporting of events, the foundation of narrative coherence.

The retellings on Days 2 and 3 were different. Most reported events had already been articulated and enacted, and the retellings consisted mainly of D's elaborations of his own earlier speech. Although the retellings did not involve full-body enactment, most likely the temporal sequencing of utterances remained motivated by the embodiment of spatiotemporal relationships. As the later retellings unfolded, it is possible that gestures continued to serve a function parallel to that served by earlier enactments – helping to keep track of spatiotemporal relationships while new linguistic constructions were formed, either entirely new propositionalizations, or constructions formed from the compression of old ones.

In this embodied account of narrative development, as in McNeill’s view of utterance formation in typical speakers, discourse meaning arises from the moment-to-moment changes that constitute thinking itself: “It is not that one thinks first, then finds the language to express the thought.” Rather, thinking is the *source of meaning* (McNeill, 2005), and thinking is a dialectic between the two semiotic modes; the conventional categories of speech, and imagery embodied as gesture. For D as well as for typical speakers, coherent discourse was constructed through a combination of speech “borrowed” from adults<sup>vi</sup> and D’s own idiosyncratic movements.

## **The Mind-Microscope: Speculations on the Relationship between Long- and Short-term Language Change**

### *Mesogenetic to microgenetic*

In this concluding section we invoke our ‘mind-microscope’ to see how, over the mesogenetic scale of three days, something like the birth and unpacking of a growth point (or several of them) emerges before our eyes. This emergence is in part, we argue, similar to the microgenesis of GPs in general, including a dialectic opposition of imagery, in gesture form, and linguistic encoding that resulted in the relatively complex syntactic construction of our target utterance. The GP is so named because it is a distillation of a growth process—an ontogenetic-like process but vastly sped up and made functional in online thinking-for-speaking. It is an irreducible, ‘minimal unit’<sup>vii</sup> of imagery-language code combination. It is the smallest packet of an idea unit encompassing the unlike semiotic modes of imagery and linguistic encoding. A GP is empirically recoverable, inferred from speech-gesture synchrony and co-expressiveness.<sup>viii</sup> Even when the information (the ‘semantic content’) in speech and gesture is similar, it is formed according to contrasting semiotic modes: to be a GP unit, the speech-gesture combination may have the same information in a referential sense but together speech and gesture must be the point of differentiation of newsworthy information in the context of speaking. This is because a GP is what Vygotsky termed a psychological predicate, and is inseparable from its context. Simultaneous unlike modes create instability. Instability fuels thinking-for-speaking as it seeks resolution (McNeill & Duncan, 2000).<sup>ix</sup> The result is an idea unit in which holistic imagery and discrete code are combined, and this drives thinking-for/while-speaking.<sup>1</sup>

The process with D was mixed with particular features due to his autism, and we shall point out the two threads as we proceed. For convenience we repeat the target utterance (1):

and and then the balloon [followed him]

(right hand, index finger extended, moves in downward curve)

[and back and forth back and forth all the way to school]

(moves head and right hand, index finger extended, side to side)

On Day 1A, D’s initial narrative stabs were grounded in the speech of others. It is conceivable that such productions as (3.2), *and what happened in the red balloon?* “the boy ... the kids [pause] ... the kids were happy [unintell] and lived happily ever after...” do not arise from GPs at all; they contain no differentiation of novel content in a field of oppositions. Such utterances can be compared, perhaps, to the kind of empty verbiage that anyone may produce when drawing a mental blank (cf. the example from an adult speaker in McNeill 2005, p. 27,

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1



where, with no gestures, she said “let’s see what happened”, while groping for the next event in a story).

The bridge to something closer to a standard catchment with significance in terms of the narrative itself, was when the child, within his enactments of watching the film, became the character that he, D, was ‘watching’, in (6) on Day 1E:

(D has been walking as he enacts a retelling) I went to the mirror store (remains relatively still) here’s the mirror store (walks outside room)

This reflects perhaps another feature of storytelling particular to autism, a hyper-reliance on enactment as a source of discourse structure. D does not yet have a field of oppositions apart from his own movements, and can differentiate GPs only as landmarks in his own perambulations, but the enactment functioned as a bridge. His first step was on Day 1A with the *gathering* catchment, carried in a rocking circular motion in (15, repeated here):

(15.1) (sitting on floor facing E) then he (leans forward) stayed & stayed

**Cgath** .2) and followed him everywhere (rocking in circular motion on “everywhere”)

**Cgath** .3) and then all the balloons gathered around (rocks in more pronounced circular motion)

**Cgath** .4) and then- once a- and then that’s the end (rocks in less pronounced circular motion) (Day 1A)

The field, in contrast to his later self-grounded one, can be identified as something like What Happened While The Balloons Gathered, and we see, in .2), that they were following the boy, then in .3) they gathered, and then, in .4), something more, but D cut off the narrative, possibly because the next thing he could think of was not a point of differentiation in the *gathering* catchment. The circling, rocking gesture, still with the body, was capable of carrying a story-focused theme. It may be a type of “proto-GP” (because the circling gesture was carrying so much of the theme) that awaited the activities of the next session (1E), before full-fledged GPs emerged (where there was more of a balance) on Days 2 and 3, as we see in Figure 6. It is at this moment that we can say, too, that GPs were possible: “and followed him everywhere”, “all the balloons gathered around”, although his use of the full body makes identifying the GP’s linguistic content imprecise. That D uses his full body in both bridging to the catchment and in the catchment itself, is no accident. We see here the kind of classic repetitive motion often described for autistic speakers, but also we see that it was functional, picking up semiotic values in the course of speaking.

The next steps of differentiation for D occurred in the evening session. He created a schema in terms of which he could differentiate new points of information. What is unusual, and we believe was an aspect of his autism, is how catchments, or what could be called such, were constructed with information that would not be found in a normal narrative. Nonetheless, there was here the seed of thematic continuity, however embryonic, in an enactment strategy in which D plays himself watching the film. In this way he grounds events as if they were occurring while he is ‘watching’. The field of oppositions is something like What I Saw While Watching The Red Balloon. Then (with adult help) GPs or proto-GPs emerged as differentiations of this context, not events of the story as such, but meaningful as events of his own past. So, he said in (5) on Day 1E:

Pretend we're at the movie show (stands with right arm up while H rolls up his sleeve, "high fives" H, and puts right hand down). (*okay*)

And then, and then we watch a movie (walks to right, points at H with left hand), okay (starts to sit down).

This is perhaps a glimpse of something that theoretically takes place in all GP formation, although not usually with self-based framing. In common with all GPs, the productions involve the reciprocating activation of the "I" and the "me", as Mead termed the two sides of personal identity. The "I" is the side of the self that initiates actions, taking the lead, and the "me" is the passive recipient, coming into play as the GP resolves into speakable form during unpacking (generating a 'stop-order').<sup>x</sup> D found a way to accomplish fields of oppositions through the recreation of his own experience of looking at the film, even including a detail such as sitting down in front of the screen. In other words, an especially concrete instantiation of the "I".

Further convergence occurred when D, in example 17, which is repeated here, produced what would be by any standard a normal GP (17.4 – the lateral head motion being categorized, linguistically, as "in and out"). And we observe, again, with clarity, microgenesis stretched out on the mesodevelopmental scale – first origo anchoring, in 17.1, and then recapturing earlier discourse segments, in 17.2 and .3, all feeding the GP in .4:

- 17.1) (sitting on couch, facing E; fidgeting) one day a little boy climbed up on a pole
- .2) and (long pause) he followed the bus
- .3) he went to school
- .4) and then the balloon went in and out in and out in and out (moves head side to side)

Perhaps the most important conclusion from this analysis so far is that, in achieving a full, appropriate, gesture-synchronized utterance on Day 3, D also attained a new form of cognition, at least temporarily. This cognitive mode involved true fields of opposition and the linguistic-gestural packages differentiated from them. His idea units arose by differentiating and assimilating story context and, in this way, fulfill our mind-microscope, revealing in slow motion what occurs in GPs generally. We observe the "I"/"me" aspects of the self in material form, initiating GPs as "I", and morphing into appropriate socially-regulated forms, the "me". D did this in a unique way, starting out with reenactments of himself watching the film, then acting out what he 'saw'. This enactment-within-enactment, or 'hyper-enactment', served as a bridge (as when he substituted the first-person pronoun for the boy). Hyper-enactments are possibly an autistic feature, but the role of the self in the process of thinking-for-speaking is shared and explains in part the function of enactment, once engaged. Enactments were not at first synchronized with speech (cf. Fig. 3, line 7), suggesting a transitional state from hyper-enactment to GP formation, in which the "me" aspect, including a sense of the constructions suitable to unpack GPs, was not immediately forthcoming. The achievement on Day 3 was to surpass this enacted form of the self with new "I"/"me" packages incorporating discourse references and opening the way for socially-regulated linguistic forms. Several of the unpackings had appeared earlier in fragments both in D's own speech and that of his co-participants, but his emerging new mode of cognition seems not to have had a place to put them. But with GPs no longer tied to enactments, on Day 3, linguistic fragments could cradle the core meaning.

Some of the repetitious movements seen in autistic behavior – e.g., the rocking movement of the *gathering* catchment – may be functional in this process (as it appears to have been in this case), an effort to attain GPs out of initially highly materialized realizations of the self. It is ironic and not without pathos that repetitive movement is also doomed to misfire. Acts with extensive repetition that could lead eventually to something like normal speech and thought, as surely interfere with normal social interaction and are defeated almost as soon as they begin. Nonetheless, a brief attainment of something like normal speech and thought appears to have been within the reach of this speaker.

### ***Ontogenetic to microgenetic***

The above account is not meant to imply that D’s retellings developed along a path identical to that followed by typical speakers engaged in the same task. In fact, looking at these same data, McNeill and Duncan (in press) observe that, relative to typical speakers, D’s early retellings show an imbalance between enactment and speech.<sup>xi</sup> There is an over-abundance, viewed from a typical development perspective, of actions as representations. Nonetheless, there were also some parallels with typical development. Initially productions were limited by impoverished fields of oppositions – at first the back and forth catchment did not provide a means of differentiation of GPs, but with repetition, the catchment acquired differentiable content, resulting in the example we have been analyzing. These fields build up over time and repetition. When comparing D’s early retellings to his later ones McNeill and Duncan note as well that D appears to overcome the enactment-speech imbalance. These and other observations suggest that comparisons across *two spans of time* – the *mesodevelopmental* time of D’s repeated retellings and the *ontogenetic* changes of typical narrative development – may yield further evidence of similarities between language-impaired and typical speakers.

In previous work (e.g., McNeill 1992) we have described a young child who, like D, combined speech with enactment in a narrative retelling. The child was shown a cartoon and asked to narrate it while sitting in a chair. As he said “he cl-climbed up” he left his chair to climb on a second one, thus *describing what he already was enacting*. This child’s activity can be interpreted with respect to a general developmental principle:

Piaget (1954), Werner (1961), Bruner (1966), and many others have recognized that objects and events in the world are, for little children, represented in the form of the actions that the child himself performs on the objects, or in the form of the actions the thing itself performs (simulated by the child)...The child doesn’t see himself presenting meanings so much as enacting them, and in this state he *is* what he is symbolizing... (McNeill, 1992, pp. 297-8).

In this view, the young child’s movements illustrate an early stage in an ontogenetic process of semiotic change. Early movements are actionlike, and gesture space is “full-sized, it centers on the child and moves about with him, it has local orientation, and all parts of the body are equally privileged to move in it...” (McNeill, 1992, p. 303).

In such an account, enactments are transformed to adult-like gestures in later childhood, as gesture space is reduced to a “flattened disk” in front of the speaker. A second study (Duncan, 2008) of adults’ gestures during elicited retellings shows parallels to D’s adult-like gestures on Days 2 and 3. Just as D appeared to use gestures to keep track of spatial relationships while forming new spoken utterances, adults in Duncan’s study also used gestures to keep track of

space: They “placed” discourse referents at specific locations that persisted with the assigned meanings during entire narrative segments. Thus for these adults and for D, physical space contributed to creating and maintaining discourse reference. Duncan suggested that the adults’ gestures served as a form of memory support for the organization of discourse, “materially supporting extended discourse production, functioning as physical, perseverating embodiments of discourse entities and themes.” For D as well gestures, as residues of earlier enactments, may have served a similar function.

In a recent paper, McNeill and Duncan (in press) describe the growth point of an utterance as “an ontogenetic-like process but vastly sped up and made functional in online thinking-for-speaking.” In this view, microgenesis is a process of semiotic change, making use of linguistic skills acquired in ontogenesis. The purpose of the above comparison between D’s rapid changes over mesodevelopmental time and the ontogenesis of typical narrative development is to illustrate the following conjecture: that the mesodevelopmental changes engaged in by a language-impaired speaker may provide a window onto aspects of more typical ontogenetic change that are normally more difficult to view.

To conclude, the intermediate time scale of mesodevelopment may make visible changes that occur over the short time span of microgenesis. For example, extrapolating from D’s repeated retellings, there is a pattern of reduced movement, from full-scale enactment to gestures – both normally accompanied by the movements involved in speech itself – to the movements of speech alone. We have proposed that in later retellings gestures take on functions served by earlier enactments. Perhaps the movements of speech acquire these same functions as well. Then the entire process manifests the embodiment of language in movement, because speech, like enactment and gesture, continues to be “grounded in action and material experience” (McNeill, 2005). If the processes of longer-term language change are “sped up” in microgenesis, then this proposal may explain the tendency for gestures to accompany new, but not old utterances (McNeill, 1992). We have seen the same importance of materialization in D’s mesogenetic build-up to the target utterance in the role played by enactment. This account contributes a new perspective on Vygotsky’s (1987) claim that *meaning does not exist and develop in isolation of its material carrier*.

### **‘Mind-blindness’ seen through the ‘mind-microscope’**

Simon Baron-Cohen (e.g., 1990 and elsewhere) has pioneered the argument that autistic children are “...impaired in their ability to attribute mental states (such as beliefs, knowledge states, etc.) to themselves and other people” (from Baron-Cohen 1990, abstract), a condition he labels ‘mind-blindness’. In a tangle of metaphors, how does mind-blindness look through the mind-microscope? More straightforwardly, what role might an impaired ‘theory of mind’ play in the slow-motion emergence of GPs and catchments that we have observed, or the theoretically parallel and even more slow-motioned emergence of ontogenesis?

D was asked to engage in a task that required descriptions of events he had witnessed but had not participated in – different, for example, from a request to produce a narrative of personal experience. The task required that D describe events from the perspective of a third-person, central character, an activity that the research of Baron-Cohen and others has shown to be especially difficult for individuals with autism. D’s extensive reliance on first-person enactments, what are sometimes called ‘character viewpoint’ gestures in which narrative events expand out from his own enacted center, is consistent with this portrayal. This characteristic of

the task most likely compounded a second difficulty facing a language-impaired child, that is, describing a silent film in which events had not already been propositionalized, or previously articulated, as they might be in a film with words. The adults helped D overcome the second difficulty, providing propositionalizations of events that scaffolded his own later descriptions. But the “borrowing” of adult words did not, by itself, make D’s retellings “take off.” We suggest that this was because D remained ‘mind-blind.’

On Day 1E D’s narratives did seem to take off when he overcame mind-blindness through his first-person retellings, grounded in his own actions in physical space. Then, he was both a participant in and observer of “the movie” As a participant events unfolded from his own perspective, and as an observer he watched a third-person character participate in them. When events unfolded from D’s perspective, he was provided with insight into the mind of the central character, and thus created prerequisites for the construction of the central “thematic character” of his later third-person retellings (Karmiloff-Smith, 1986). There is something about viewing the events as a member of the audience (the observer perspective) that facilitated this, his own first-person enactment of the observer bridging to his eventual attainment of third-person perspective. It is in this context that D re-used lexicogrammatical categories supplied earlier by adults. (It appears that he now actually *used* linguistic categories, rather than simply parroting adult utterances.)

Combining with the “I”/“me” analysis, the gestural component of the GP is where the “I” would require insight into other minds (the linguistic component, the “me”, arises more passively from intuitions of linguistic form). So, if mind-blindness plays a role, it would be here in the Meadean scheme. How might this apply to D’s enactment approach? If enactment is a means to get around mind-blindness, it could explain how the mesodevelopmental passage to full (if temporary) GPs began in enactment. As Tomasello (1992) put it with respect to the development of cognitive functions more broadly, in this instance as well D may overcome mind-blindness by looking at his own behavior “as if someone else were looking at it” (p. 261) – giving a role to both poles of the self.

This account is consistent with the view that ‘mind-blindness’ arises from a complex constellation of causes (Waterhouse, Fein, and Modahl, 1996; Bruner & Feldman, 1993; Loveland, 2001; de Villiers, 2000). It is a view of cascading effects, in which an autistic child’s fragmented understanding of social events arises from “low-level” sensory and linguistic deficits – and it could stand alongside missing “high-level” forces (Frith, 2003; Joliffe and Baron-Cohen, 1999) or modules (Leslie, 1987) (Baron-Cohen 1995), although we doubt that the module concept is conceptually appropriate at this level of function. The present account emphasizes that those who achieve coherence are grounded in a social world, and it is the social world, via linguistic experience, that influences one’s perception of it. From this perspective, “sensory and linguistic functions create cascading effects, whose outcome is an ability to construct stories about human motivations (Levy and Fowler, 2005).”<sup>xii</sup>

And it is *this* (“it is the social world, via linguistic experience, that influences their perception”) that we find through the mind-telescope, the build-up through linguistic experience of D’s perception, albeit limited, of coherence in this particular narration.

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