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THE DEVELOPMENT OF CONNECTIVES

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The general developmental processes common to the acquisition of connectives are described for a single child from age 15–36 months. These processes are defined on the basis of tracing systematic changes in the form, content, and use of language in a hand-recorded daily diary. Pragmatic and Piagetian concepts are combined to determine if there are common antecedents to the acquisition of connectives and similarities in the developmental process of emergence across individual connectives. Three general and sequential developmental steps were found: the conjoining of two thoughts in a single contexts of use < the discovery of the form of a connective < the meaningful connecting of thought and form. Connectives emerged in the following order: 'and' < 'because' < 'when' < 'so' < 'if' < 'for' < 'but' < 'or'. In terms of developmental processes, the emergence of connectives is indicative of and contributes to a general, but gradual, evolution in the interrelationship among language, thought, and intentionality.

1. Introduction

Connectives provide the linguistic means to organize one's knowledge of the world into larger interrelated chunks of information and to express qualitative distinctions in the nature of that interrelationship. For example, adult speakers of English realize that in the sentences *I'll wear my hat if it is sunny* and *I'll wear my hat because it is sunny*, the connectives convey different information about the speaker's certainty as to the weather and the need for a hat. This ability to use and to understand connectives depends upon recognizing how linguistic forms relate 'arbitrarily' (in the sense of Saussure) to systematic semantic and pragmatic differences in the expression of intentionality and thought across communicative contexts.

From a developmental perspective, children face the formidable task of learning the systematic differences in meaning among connectives on the basis of searching for and experimenting with various patterns of use in discourse. Pragmatics offers the developmental psychologist a useful conceptual framework for identifying and describing some of the strategies that children may use to acquire connectives. It also provides a theoretical language for speculat-

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ing about the meanings of these contextually amorphous connecting words in the speech of very young children.

In this paper, I combine a pragmatic and a Piagetian approach in order to identify and to describe the developmental processes that appear to be relevant to the emergence of connectives in the speech of a single child, my own daughter, Laura. Since very little is known about the possible developmental antecedents to connectives in the speech of children under two, I focus on the period of Laura's language acquisition for age 15–36 months. Thus, I try to discover what a longitudinal analysis of one child's daily speech reveals about the developmental interplay among language, thought, and intentionality with respect to the acquisition of connectives.

2. Method

2.1. Data

The data in this study come from a hand-recorded daily diary of my daughter's language acquisition. The data are for Laura age 15–36 months and contain 7,613 speech events. The length and complexity of a speech event varies from single word utterances to conversations involving multiple turns.

The diary data are based on a cross-contextual sample of emergence in the sense of the subject's awareness of new words, forms, and uses. Hence, these data reflect the upper limit of Laura's communicative competence at any given point in her development. Additional information about the scope and format of Laura's diary is available elsewhere (Braunwald and Brislin (1979)).

As in any case study, these data should not be interpreted as if they were indicative of a universal process or generalizable in a statistical sense. These data are a longitudinal description of the systematic changes that can be noticed, if development is observed as an ongoing and continuous process.

2.2. Analysis

Developmental patterns of use and of processes were found in the data by reading through the diary multiple times. Comparable examples of a given pattern or process were copied onto coding sheets. Bloom et al.'s (1980: 239) criterion of "five or more different utterances in successive observations" was used with modification as a definition of productivity.

In order to apply Bloom's definition of productivity to diary data, the criterion was modified to five or more examples from different speech events over a period of time. This modified criterion was used to isolate the developmental patterns and processes that emerged from copying examples onto individual coding sheets. Some of these productive patterns and processes

served a brief developmental purpose and disappeared, whereas others continued to be used with increasing frequency. Thus, a criterion of productivity was used to identify discrete but temporary steps in an evolving process and to indicate the beginning of a lasting developmental advance.

The data on the coding sheets were analyzed in two steps. The first step was to describe the acquisition of each individual connective. In order to do so, the data were organized into detailed descriptions of productive changes in Laura's patterns of use. The second step was to integrate this information into a single, more general developmental description in order to search for common processes in the acquisition of connectives. The present paper describes the developmental processes that were common to the acquisition of connectives in general.

2.3. Examples

The examples were selected because they are clear instances of the systematic developmental processes found in the data. Laura's age is stated in years, months and days. The abbreviations *L.*, *M.*, *F.*, and *J.* refer respectively to Laura, her mother, her father, and her older sister, Joanna.

The examples illustrate that Laura was acquiring an organized vocabulary of connectives that ultimately could be used to express intentional distinctions in meaning. However, at this initial point in her development, it was hard to judge if Laura's use was indicative of an intentional communicative choice, or of her tentative discovery of contrasting word order and forms. The examples are annotated so that readers may follow my theoretical reasoning and decide for themselves if they would make comparable interpretations.

3. Conjoining thoughts

One of the goals of this study is to explore how the development of thought relates to the onset and use of connectives. The content of some of Laura's language suggests that she tried to express a relationship between two thoughts and/or events prior to the acquisition of connectives. These attempts to conjoin thoughts into a larger unit of information differ from the expansion of the linguistic encoding of a single event.

Expanding versus conjoining
Expansion: The family is talking about buying Joanna a hamster. (Laura 2; 2.18)
L: Wanna have a guinea pig. I wanna have a guinea pig.
Conjoined thoughts: Laura came in to her mother to request help in opening a heavy glass door. (Laura 2; 0)

M: Why don't you go outside and ride the tricycle?
L: Open door, Mommy. Can't get out there.
'Open the door, Mommy, because I can't get out there.'

The term 'implicit' is used to refer to content in which the conjoining of two thoughts implies the need for explicit linguistic marking with a connective. Given Laura's idiosyncratic language and the simplicity of her thought, it was only on the basis of rich interpretation (Bloom et al. (1980)) that her implicit combinations would be related to the acquisition of specific connectives. In most cases, I was able to identify a specific implicit connective on the basis of contrasting word order, contextual information, and my knowledge of the details of Laura's life.

Contrasting implicit connectives
Laura's father reprimanded her while her mother was out on an errand.
Both examples refer to this event. (Laura 1; 10.0)
Because implicit: Laura's mother just returned home.
L: Laura crying. Daddy said stop it. (Effect/Cause)
'Laura was crying because daddy said stop it.'
So implicit: Later in the day and in the absence of contextual cues, Laura came to her mother and spoke about this event.
L: Daddy said no. (pause) Cried. (Cause/Effect)
'Daddy said no so I cried'

Examples such as these were classified and analyzed according to the connective which seemed to be missing in the sense of being necessary to the explicit marking of the interrelationship between two thoughts.

There was an orderly developmental progression in the complexity of the types of thought that Laura tried to conjoin. Table 1 summarizes the developmental order in which implicit combinations emerged in her speech. As can be seen from table 1, these implicit combinations seem to reflect Laura's initial efforts to refer to two thoughts and/or events in a single context of use.

There are two unusual developmental sequences in table 1 which require explanation. One is the violation of the developmental order in meaning relations of Additive < Temporal < Causal < Adversative reported for the production of connectives in the speech of children between the age of two and three (Bloom et al. (1980)). The reversal of Causal < Temporal is an artifact of organizing the data on the basis of the specific form of a connective. Laura's speech did reflect the sequential temporal ordering of events prior to causality, but not in combinations that implied the need for the word 'when'.

A second theoretically unforeseen pattern is the early productivity of combinations that imply causality. While this pattern could be interpreted as an artifact of rich interpretation, there is an alternative developmental explanation. This alternative explanation is discussed in the next section.

Table 1
Implicit connectives.

Connective	Example	Context
And 1; 7.8 combines two parallel meanings.	*L*: Mommy, Mimi home. -- Gluck home.	Laura is at breakfast. She refers to the people at her baby sitter's.
1; 8.29 adds factual information within a sentence	*L*: Hurry up Dee-Dee (Joanna) -- Judie.	Judie just took Joanna to school.
So 1; 10.15 implies the meaning therefore.	*L*: This is hot coffee. -- Have to careful.	Laura is filling a toy pan with water. The water is not hot.
Because 2; 0.11 implies a reason why.	*L*: Carry me. -- This hard hill.	Laura is at the bottom of a steep hill.
When 2; 1.15 defines a temporal relationship.	*L*: I don't want scary man pick me up. *L*: Scary man said like that (Laura jumps). *M*: Who's a scary man? *L*: -- I fell. *M*: Oh, when you fell in the shoe store.	Earlier that day, a stranger in a store accidentally knocked Laura over and then picked her up.
For 2; 2.1 implies a reason why. (And is possible but less precise.)	*L*: Lift me up -- wave bye-bye.	Laura's father and sister just left. Laura asks her mother to hold her up to the window.
If 2; 2.17 implies a possibility.	*L*: Look -- you have more graham crackers. *M*: I don't. I might in the playroom.	There are no more graham crackers. Laura is standing on a stool by the crackers cupboard.
But 2; 4.25 implies a contrast. (And is possible but less precise.)	*L*: I wanna go out -- not wake up the neighbors. *M*: No, you can't. It's too early.	It is early in the morning. Laura is not allowed outside at this hour.

4. Discovering forms

A second aim of this study is to describe how Laura discovered the 'arbitrary' association between the form of a connective and its meaning. In order to search for patterns of regularity in her initial association between form and meaning, the data were sorted onto coding sheets on the basis of her use of the form of the word per se. Productive patterns in Laura's initial use of the form of a given word were noted irrespective of a specific meaning.

Table 2
First use of the form.

Use	Example	Context
And 1; 11.12 second utterance adds information to the first.	*L*: I love Big Doll. *And* blankety.	Laura is on an airplane. She is agitated and is hugging Big Doll (pillow-like toy).
When 2; 1.26 asks question with a single fixed meaning.	*L*: *When I be seven*? *M*: You'll be seven in five years.	Laura is riding in the car. There is no contextual cue.
Because 2; 1.28 practices the form.	*L*: *Because, because, because. Because* so much do. *Because* so much do, Mommy. *M*: That's right.	Laura is playing with water in the sink and talking to herself.
Because 2; 1.28 answers a question.	*M*: How come the mommy doesn't go outside? *L*: *Because* it's raining. *M*: Oh, because it's raining she doesn't wanna get wet.	Laura is listening to a story. The discourse refers to a picture in the book.
When 2; 2.3 occurs in sentence initial position.	*L*: *When* I wake up, I make pee-pee.	Laura woke up in a wet diaper.
So 2; 4.10 occurs in idiom 'think so' and as an adverb.	*L*: I don't *think so*. *M*: You don't what? *L*: I don't *think so* need any more egg.	The family finished breakfast. Laura is eating a second egg.
	L: Corney (a cat) *so* nice.	Laura is bringing the cat inside.
So 2; 5.1 means therefore.	*L*: Yes it has more gum. *So* I take more gum.	Laura finds gum in package on the table.
If 2; 5.2 expresses a single fixed intention.	*L*: See it's not broken. I can do it, *if I want* (refers to forbidden action).	Laura is showing her mother how record player arm goes down backwards.
For 2; 5.4 expresses reason why.	*L*: I wanna save it out *for* allbody (everybody) drink it all up.	Laura is objecting to putting away a bottle of ginger-ale.
But 2; 6.19 expresses a contrast.	*L*: Do you have a fountain pen, daddy? *F*: Yes. *L*: *But* it has a blue lid. Sue's has a red lid.	Laura is watching her mother write with a red fountain pen.
Or 2; 7.7 specifies alternatives.	*M*: But a big birthday bear hug is a nice present. *L*: I'm giving you a green one *or* a purple one.	Laura, her mother and her sister are discussing a story 'Ask Mr. Bear'.

Table 2 summarizes the developmental order in which regularities in the form of the words per se appeared in Laura's speech. 'When' and 'so' appear twice, since Laura initially used them in a homonymous form prior to their emergence as connectives. Two initial contexts for 'because' appear in table 2. These two, simultaneously emerging but separate uses reached a criterion of productivity on the same day. Each of the examples illustrates Laura's initial productive use of a word and is the fifth instance of a pattern found in the data.

As can be seen from table 2, Laura's first productive use of the actual words which can be used as connectives, is contextually restricted.

Laura initially uses the words 'and', 'when', 'because', 'so', and 'if' in fixed patterns or routines. These routines are fixed in the sense that she associates the form of the word to some specific context of use. Irrespective of whether this initial association is the sentence position, the meaning, or the intention being expressed, her developmental strategy is the same. Laura begins with a limited association between a form and its meaning and gradually decontextualizes the use of the word.

The patterns of emergence for the last three connectives in table 2, 'for', 'but', and 'or' are less contextually restricted than those for the developmentally earlier forms. Moreover, a number of other connectives are also emerging in Laura's speech during this developmental period. However, none of them has yet reached a criterion of productivity by her third birthday.

Once Laura begins to use the form of a given connective, its omission is indicative of the process of decontextualization. As with explicit errors in which connectives are misused, the absence of a connective occurs in contexts involving Laura's attempt to use the form in a linguistically and/or conceptually advanced manner.

Omitting known connectives

Linguistic advance: A neighbor rode by on a new bicycle.
The entire family noticed this event through a window and began to discuss repairing the father's bicycle. (Laura 2; 1.25)

L: *When* my bigger have bicycle. (3 times) *When* my big.	*Explicit connective* (1) Incorrect pronoun.
F: When you're bigger, you want a bike?	*Omitted connective*
L: I big girl. I big girl ride bike. Ride sharp bike. *I big girl ride sharp bike.*	(1) Repairs pronouns (2) Expands the linguistic encoding of thoughts.

Conceptual advance: Laura is bringing her pull-toy dog into a room in which there are other family members. (Laura 2; 6.26 and 2; 6.30 respectively)

L: See this is a friendly dog, *and* he never bites. See I got his leash.	*Explicit connective* (1) Describes the dog as safe

L: *This is a friendly dog.*	*Omitted connective*
He doesn't bite.	(1) Implies a reason why the dog is friendly

In sum these errors of omission are indicative of the gradual developmental emergence of more complex language and thought.

As noted earlier, there is a considerable developmental delay between Laura's first productive use of conjoined thoughts implying causality and the emergence of causal connectives in her speech. In general, this delay reflects the fact that the relationship among form, content, and use is not transparent from the discourse context. Indeed, there is an almost seven months' delay between the first productive use of implicit conjoined thoughts requiring 'so' with the meaning 'therefore' and the emergence of the appropriate use of 'so' in Laura's speech.

Distinguishing among causal connectives

Laura has been running on a neighbor's lawn. She is now speaking to her mother. There is a bird in the tree overhead. (Laura 2; 3.22)

L: Can't go up there *so* bird up there. Can't go up there *cause* bird up there. *So* can't go up there.

Thus, Laura relies a on trial-and-error strategy in order to figure out the arbitrary distinctions in meaning among the various causal connectives. Like other children of this same age, she is just beginning to discover the subtle shifts in psychological focus and meaning that can be expressed by different causal connectives (Bloom et al. (1980), Hood and Bloom (1979)).

5. Connecting form and thought

The gradual emergence of explicit connectives in Laura's speech coincides with multiple developmental indications that the relationship among language, thought, and intentionality is becoming more abstract. By age two, Laura has reached a level of language development that makes it possible for her to acquire information that cannot be discovered on the basis of concrete experience alone. In sum, Laura begins to relate to the environment in a qualitatively new way that is both based on and reflected in the content of her language.

5.1. Expressing intentionality

Connectives first appear in Laura's speech at the same time as a general developmental advance in her ability to relate her concrete objective experiences to internal psychological processes. The content of her language indicates

that Laura is discovering intentionality in the concrete sense of an emerging awareness that people are separate individuals with wills, feelings, and minds of their own. Her language begins to reflect this significant new interest in internal psychological processes, albeit with a toddler's concrete mentality.

Discovering intentionality
Inquiring about motivation: Laura's mother sat at Joanna's place at the table instead of her own. (This example is indicative of Laura's inquiries about any unexpected variation in household or personal routines.) (Laura 2; 0)
L: *How come* you sit Dee-Dee (Joanna) chair? (4 times)
M: How come? Because it's comfortable.
L: Oh.
Expressing motivation: Laura and her sister have been fighting. Both girls were screaming and are now being comforted by their mother. (Laura 2; 0)
J: Why did you pull my hair?
L: *Because* daddy, mommy coming.

In their diary data for 30 28-months-olds, Bretherton and Beeghly (1982) found a comparable developmental correspondence between the emergence of intentionality and the appearance of language that referred to internal states.

During the period from age two to three years, Laura continues to use connectives as a communicative device for exploring a realm of experience that requires language as an explicit means of expression.

Expressing interpersonal experiences
Expressing affect: Laura is stroking the cat. (Laura 2; 11.10)
L: She (the cat) doesn't have to worry about we don't love her *because* we do.
Clarifying an interpersonal relationship: Laura is lying in bed. In the past few days, she has expressed concern about her relationship to her mother. (Laura 2; 11.7)
L: *When* Joanna's at school, you're only my mother.
M: No, I'm still Jo's mother, but I only take care of you.
L: *When* I'm at school, you only take care of Jo.
M: No, when you're at school, I only take care of Sue.
You and Jo are both at school.

Thus, Laura's use of connectives both reflects the emergence of the psychological differentiation between self and other and contributes to the further development of this process as an underpinning to the expression of intentionality.

5.2. Reducing uncertainty

Connectives are simultaneously a reflection of and necessary to Laura's continued construction of the language-based bridge between an external world of shared reality and an inner experiential world known only to the self. From a pragmatic perspective, Laura's acquisition of each new connective leads to the systematic reduction of psychological and communicative uncertainty between herself and her listeners. Indeed, there is an orderly and gradual developmental progression of qualitative changes in the type of new information that each connective marks.

Table 3 summarizes one possible theoretical description of how connectives may have functioned to reduce communicative uncertainty between Laura and her listeners. This description is based on observable developmental changes in the form, content, and use of connectives in her speech. The function of each connective is identified from my own adult perspective by answering the question: What type of information does this connective encode? These functional definitions summarize patterns of regularity in the data and are not intended to be formal descriptions of meaning.

In sum, these functional descriptions illustrate how the acquisition of each new connective marks a developmental advance in Laura's ability to communicate complex and abstract information.

5.3. Reflecting thought

Initially, the implicit conjoining of thoughts is in advance of the emergence of the form of connectives in Laura's speech. However, at this latter period of development, Laura sometimes uses connectives in syntactically complete sentences to express ideas that reflect the illogic of her rudimentary attempts to think abstractly.

Expressing rudimentary reasoning

(1) Laura is very excited because she has received a box of new clothes in the mail. She is jumping up and down. (Laura 2; 7.8)

L: I won't bump my eye anymore *because* I got new clothes.

M: You won't bump your eye anymore because you got new clothes?

L: Yep.

(2) Her mother is helping Laura to undress. The record of the story of 'The Three Little Pigs' is on. (Laura 2; 9.8)

L: *If* I saw a real wolf, I would kick the real wolf. *If* he bit me,
I would suck my thumb.

Thus, the content analysis of Laura's use of connectives confirms Piaget's

Table 3
How connectives reduce uncertainty.

Functional definition	Emergence	35–36 Months
And. Mark the addition of new information. 1. Omit redundant information and combine parallel meanings. 2. Combine two meanings of equal importance.	1. (Laura has covered herself and her doll with mud) Me *and* my baby all wet. 2. (Laura is being put to bed) *M*: Dont'wake up early. *L*: You come *and* get me early you can.	1. (Laura is watching her mother put the cat out) I hope she (the cat) have a good breakfast to eat *and* a nice day. 2. (Laura agrees to play gas station with her mother instead of her father) I'll stop off *and* get some woman gas. *And* I have a dead battery.
When. Mark a temporal reference point. 1. Define a time continuum with respect to knowledge of one's own life. 2. Specify a temporal contingency; often in reference to psychological motivation.	1. (Laura finds an old pair of baby shoes) That *when* I have tiny baby. That was shoes for me *when* I tiny baby. 2. (Laura is waiting for some salt) Give me salt *when* you're done.	1. (Laura is coming home from a car showroom) *When* I grow to be five, I wanna drive a Mercedes with a wagon. 2. (Laura and her mother are setting the table) *When* I eat, I wanna sit next to you.
Causal Connectives. Mark new information that relates cause and effect. *Because* 1. Provide new information that answers a question; may omit information given in the question. 2. Combine cause and effect into a single relationship to explain reason why.	1. (Laura's mother is spreading out a clean diaper) *L*: My diaper had go hospital. *M*: Why did your diaper have to go to the hospital? *L*: *Because* had broken ankle. 2. (Laura is trying to roll up a car window) Roll up my window *cause* wind blowing.	1. (Laura is talking to her parents about her grandfather's visit) *L*: Suddenly Poppy woke me up. *F*: I wonder why? *L*: *Because* he was taking a shower. That's why he woke us up. 2. (Laura is trying to untie a shoe lace) I don't ask for help *because* I don't need it.
So 1. mark new information that shifts the psychological focus to the consequence. 2. Mark new information that justifies an intention or action with a reason why.	1. (Laura is waiting for a friend whose car is broken) Her have broken car *so* she can't come. 2. (Laura is watching over a gate as a guest walks on a steep hill) I just wanna peak *so* allbody be safe.	1. (Laura is pointing to a picnic bench) There's a bench *so* you could eat. 2. (Laura is in a seat belt rather than her carseat) I really want my carseat *so* I can see out.

Table 3 (continued)

Functional definition	Emergence	35–36 Months
For. Mark new information that justifies an intention or action with a reason why.	(The family is trying to coax hamsters out of a cage) Need sunflower seeds *for* they come out.	(Laura is putting a glass of milk in the refrigerator) I'm gonna save this for dinner time *to* drink. I'm gonna save this for dinner time *for* drinking.
If. Mark new information that specifies a contingency. 1. Relate an action and its psychological motivation. 2. Relate two contingent actions.	1. (Laura is eating cereal instead of toast) *If* you want toast, then you take it. 2. (A visiting child cries because the light is left on at night) Karen will cry *if* I turn on the light.	1. (Laura is taking peanuts from her mother's place mat) Do you mind *if* I take peanuts away? 2. (Laura is having a bedtime chat) *If* a tiger comes, I'm gonna let Santa hold me.
But. Mark new information that expresses a contrast.	(Laura is pointing to a decal of a bear on her crib.) That looks like a monkey, *but* it's not.	(Laura is taking the last piece of hard boiled egg.) The rest of you don't like hard boiled egg, *but* I do.
Or. Mark new information as an alternative.	(Laura found her toy helicopter covered with crayon marks.) Maybe Devon *or* Joanna draw on my helicopter.	(Laura behaved well on her mother's work day at nursery school.) Since I did that I'm gonna have two *or* five (special times along with her mother).

observations that at times children's language reveals qualitative differences between their reasoning and an adult's (Piaget (1955 [1923])).

6. Conclusion

Laura's ability to use connectives to express abstract reasoning and psychological intentions, no matter how rudimentary, is a progressive step in a long and gradual process of modifying and refining the interrelationship among language, thought, and intentionality. For any given connective, the implicit conjoining of thoughts is a developmentally rare occurrence that increases in frequency prior to the appearance of the form of the word in her speech. Laura acquires the form of the connective in a limited context and then gradually decontextualizes its meaning and use. She begins to use a given connective in a meaningful way once she discovers the arbitrary association between the lexical

form and the type of information it conveys.

The acquisition of connectives permits Laura to clarify her perceptions of the relationship between the external objective world and her own and others' subjective psychological experiences. Hence, these last words belong to Laura.

Clarifying thoughts and intentions
Laura is sitting on a beach and playing with her father. She is wearing a paper hat. (Laura 2; 5.25)
L: I have a hat *so* I won't get sun in my eyes.
(Laura gives the hat to her father but promptly discovers that the sun is too bright.)
L: You look perfect. There Jack, you look pretty.
Sun coming in my eyes.
F: Okay, you wear it.
L: Okay, *because* sun coming in my eyes.

Although Laura is just beginning to acquire the complex conceptual knowledge and semantic distinctions of an adult's lexicon of connectives, she now shares a number of socially agreed upon words for expressing conventionalized differences in meaning. Thus, Laura is in the developmental position to use these commonly shared words to acquire meaning, including the agreed upon distinctions in meaning among connectives themselves.

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