J. Child Lang. **30** (2003), 557–581. © 2003 Cambridge University Press
DOI: 10.1017/S0305000903005646 Printed in the United Kingdom

J's rhymes: a longitudinal case study of language play*

SHARON INKELAS
Department of Linguistics, University of California, Berkeley

(*Received* 12 *July* 2000. *Revised* 6 *January* 2003)

ABSTRACT

A longitudinal study of one child aged 2;5 documents an invented language game consisting of suffixal reduplication and onset replacement. Initially, reduplication is partial: the reduplicant enlarges in discrete increments over the five stages of the game until by the last stage reduplication is total. Reduplication is accompanied by a process of onset replacement, in which the reduplicant always begins with /b/. Early in the game, this replacive onset 'dissimilates' to /p/ whenever the reduplicant would independently have begun with /b/. In subsequent stages, other voiced obstruents trigger dissimilation as well. Though similar in many ways to adult language reduplication, it is argued that J's game may more closely resemble adult rhyme (both poetic and word rhyme). Regardless, the structure of the game clearly reveals the child's awareness, in the third year of life, of stress and metrical feet, segmental natural classes, and segments themselves (phonemic awareness).

INTRODUCTION

Children's language play can shed light on the nature of language acquisition. Yet, due to its typically quixotic and spontaneous nature, play is hard to document systematically. According to Ferguson & Macken (1983)

> 'The speech of children between 2 and 5 years is full of … sound play …; yet there is very little systematic study of the phenomenon … we have not found a single study in which children's use of a particular [play language] is followed developmentally.'

[*] Earlier versions of this paper were presented at the Trilateral Phonology Weekend at the University of California, Santa Cruz in 2000 and at the University of California, Davis in 2001. I am grateful to those audiences for useful feedback, to Orhan Orgun for his participation in all phases of this study, and to Kristin Hanson and Yvan Rose for their detailed and influential comments on an earlier version of the paper. My most profound thanks go to J for proving once again that toddlers are the real linguists. Address for correspondence: Sharon Inkelas, Department of Linguistics, University of California, Berkeley, CA 94720, USA. e-mail: inkelas@socrates.berkeley.edu

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

This study documents a language game played by one child over a period of twenty-five months. The game involves reduplication and onset substitution, phenomena noted by Ferguson & Macken (1983) as common elements in language play. Of particular interest are five discrete developmental stages of the game, differing along prosodic and segmental dimensions.

The paper begins with a presentation of data from the longitudinal study, including characterizations of the five developmental stages of the language game. In subsequent sections the five stages are compared to crosslinguistic parameters of reduplication and rhyme in adult language. These investigations show that the game, while clearly a creative use of language, employs the same structural elements found crosslinguistically in adult reduplication and rhyme, and that the development of the game's later stages may be related ultimately to the child's acquisition of English rhyming conventions.

The child

J invented the language game in question at age 2;5. J's mother is a native speaker of West Coast American English. J's father, a native speaker of Turkish and a fluent though non-native speaker of English, spoke to J only in Turkish for J's first two years; by the period documented in this study, however, he was speaking to J only in English. J's day care provider spoke a Midwest variety of American English. J himself spoke exclusively in English during the period studied. From the age of 17 months J's speech was recorded in a diary by his parents, both trained phonologists, who transcribed his utterances for short periods on a near-daily basis for one year. The diary also contains more sporadic entries over the following 6–7 months (through the age of 3 years).

By the onset of the game, at 2;5.28, J had a large vocabulary and had mastered significant amounts of syntax and morphology. Examples of complex sentences recorded at that time include: *I want to tell you about the early Amtrak train that Daddy took* [2;5.2], *If it* [=a blueberry] *was green, we call it greenberry* [2;5.3], *At Larry's house the water was fizzy* [2;5.7], *In this tender there is coal* [2;5.10], *There is a shirt. It doesn't have any snaps or buttons* [2;5.11]; *I'm busy reading this book about Max and Ruby* [2;5.12], *The people will help them out of the sticky icky mud* [2;5.12]. J regularly inflected nouns for plural and possessive, and verbs for progressive *-ing*, past tense and 3rd person singular. He could create agentive nouns from verbs ([Mother: *What's this Lego piece? It wiggles.*] J: *It's a wiggler* [2;6.21]). Most relevant to the present study, J had mastered the essentials of adult phonology. Stress was adultlike; intonational contours were exaggerated but otherwise appropriate; consonants were adultlike except for the interdentals /θ/ (realized as [f]) and /ð/ (realized as [d]), and J had a full phonemic vowel inventory, though phonetically his vowels were not all yet adultlike.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 1. *Elicitation sessions*

Session	Stage	Age	Number of forms elicited
1	I	2;5.28	31
2	I	2;5.29	24
3	II	2;10.0	29
4	II	2;10.6	4
5	II	2;10.16	3
6	III	3;2.7	11
7	III	3;2.17	54
8	III	3;2.24	3
9	III	3;2.25	4
10	III	3;2.27	3
11	III	3;2.28	25
12	IV	4;3.18	15
13	V	4;6.3	14
	Total number of forms:		220

The language game

J's game consisted of reduplicating words, either partially or totally, and imposing a fixed onset consonant at the beginning of the (postposed) reduplicant. Examples from the earliest period (2;5.28) include *ant-bant* and *Minnesota-bota*. J played the game off and on for over two years, with the last documented instance of play occurring at 4;6. Impossible to establish with any certainty, the initial stimulus for this game most likely consisted of a nonsense rhyme occurring in a book or produced by one of J's parents (J's mother recalls uttering *come-bum* and *Eli-b'deli*). Initially J volunteered his reduplications, which came to be called, by J as well as by his parents, 'J's rhymes'. Soon J's parents began supplying him with words to 'rhyme'. Many of these words (e.g. *engineer*, *agapanthus* (a plant growing near J's house)) were familiar to J, but others (e.g. *Aztec*, *catamaran*) were not. No differences in J's treatment of familiar vs. unfamiliar words were noticed, either at the time of elicitation or in retrospect. The elicitation process was treated as a humorous game. Positive feedback was given to every response; elicitation sessions ended only when J tired of the enterprise or when other events – a ringing phone, a baby's cry – intervened.

Thirteen elicitation sessions took place at irregular intervals between 2;5.28 and 4;6.3, resulting in reduplication attempts for 220 words. (Words occurring more than once in the corpus were counted separately when occurring in different sessions but not when repeated in a given session. In three instances, all in sessions 2 and 3, J was unable to come up with a reduplicant.) The numbers in Table 1 reflect the number of attempts recorded in this manner.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 2. *Total reduplication of monopedal words, with onset replacement, in Stage I*

	Reduplicated form	Session no.
a.	ant-bant	1
	Jem-bem	1
	stem-bem	1
	plate-bate	1
	Ian-bian	2
	towel-bowel	2
b.	ball-pall	1
	bread-ped	1
	brave-prave	1
	Batya-patya	2
	bowl-powl	2
	blanket-planket	2

J's reduplications were transcribed, usually orthographically, by one or the other of J's (phonologist) parents. IPA was generally used to record any deviations from adult pronunciation. Stress, which was adultlike, was recorded only when it served to disambiguate words (e.g. *contént* vs. *cóntènt*).

Five basic stages of the game emerged over the 13 sessions; these stages differ in terms of the prosodic size of the reduplicant and patterns of onset replacement they reveal. Though the individual elicitation sessions varied considerably in length, each developmental stage is represented by at least one reasonably long session. The following sections describe each stage in turn.

Stage I : final foot reduplication with fixed reduplicant onset

The first two elicitation sessions (55 words, over a span of two days) manifest the robust conditions in (1). The term 'base word' refers to the first, full word, 'base' to that portion of the base word which is reduplicated, and 'reduplicant' to the potentially truncated copy:

(1) The reduplicant begins with /b/, unless the corresponding base segment is already /b/, in which case the reduplicant begins with /p/.
The reduplicant corresponds to the final foot of the base word, truncated (if necessary) to two syllables

Table 2 presents some of the 20 monopedal words which reduplicate in their entirety in Stage I. (For one monopedal word, *swing*, J declined to produce a reduplicated form.) In the forms in (a) the reduplicant begins with /b/, which replaces an existing onset, if any; in the forms in (b) the base itself begins with /b/, and /p/ is used rather than /b/ as the replacive onset in the reduplicant. All six such forms appear in the table. Numerals indicate session number.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 3. *Partial (final foot) reduplication of longer words in Stage I*

Reduplicated form	Session no.	Isolation stress pattern
a. Minnesota-bota	1	Mìnnesóta
alive-bive	1	alíve
Kalamazoo-boo	1	Kàlamazóo
Tatamagouchi-bouchi	1	Tàtamagóuchi
engineer-beer	1	èngінéer
aorta-borta	1	aórta
stegosaurus-baurus	2	stègosáurus
pterodactyl-bakyl	2	ptèrodáctyl
b. Clementine-bine	1	Clémentìne
lumberjack-back	1	lúmberjàck
linguistics-bics	1	lìngúistìcs
catamaran-ban	1	cátamaràn
Aztec-bec	1	Áztèc
eleanor-bor	2	Éleanòr
helicopter-bopter	2	hélicòpter
triceratops-bops	2	trìcératòps

Partial reduplication occurs in words longer than one metrical foot. Two words exceed a foot by virtue of containing a word-initial unstressed syllable; that syllable does not reduplicate, as in *alive-bive*, *aorta-borta* (session 1). 21 words in Stage I contain two metrical feet. As seen by the 16 forms in Table 3, only the final foot is normally reduplicated. This is true whether primary word stress falls on the final foot (a) or earlier in the word (b). The italicized forms show the location of primary and secondary stress on the words in isolation. (In the reduplication construction, the reduplicant bears the main stress.)

Only one exception to final foot reduplication occurs in Stage I: *Eli* (session 1), which contains two stress feet (Élì), reduplicates as *Eli-beli*, rather than *Eli-bi*. However, as recalled above, *Eli-b'deli* was a nickname used at the time by J's family, thus providing a model outside the rules of J's game.

The exceptionless onset dissimilation seen in Table 2 is maintained in the truncated reduplicants as well: if the portion of the base corresponding to the truncated reduplicant begins with /b/, then the reduplicant receives a substitute /p/ onset rather than the usual /b/. All four such forms are shown in Table 4.

Notice that the reduplicants in Tables 3 and 4 are maximally disyllabic. Consideration of the eleven inputs whose final (in fact, only) metrical feet are trisyllabic suggests that disyllabicity is a formal constraint on the reduplicant in Stage I. The trisyllabic final feet in the (a) examples in Table 5 reduce to two syllables, typically by omission of a medial unstressed syllable, when reduplicated.

In two cases (the (b) examples in Table 5), trisyllabic forms fail to reduplicate altogether. In two other cases (the (c) forms), trisyllabic reduplicants are

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 4. *Onset dissimilation in partial reduplication in Stage I*

Reduplicated form	Base onset	Session no.	Isolation stress pattern
Alabama-pama	b	1	Àlabáma
calabash-pash	b	1	cálabàsh
alphabet-pet	b	2	álphabèt
Elizabeth-peth	b	2	Elízabeth (Elízabèth?)

TABLE 5. *Truncation to two syllables in Stage I reduplicants*

Reduplicated form	Session no.
a. Inkelas-binkas	1
family-bamy	1
camera-bama	1
Pamela-bama	1
Valerie-bærry	1
animal-bamḷ	2
b. medicine-Ø	2
cereal-Ø	2
c. elephant-befelant	1
elephant-belefant ~ bat	2
hostabel-bostabel ('hospital')	2

produced, though in the case of *elephant*, an aberrant monopedal variant (*bat*) also occurs in the same session. The pronunciations given for 'hospital' and 'yellow' were J's standard pronunciations for these words at the time.

Stage II : onset dissimilation trigger extended from /b/ to voiced obstruents

Five months later, J's reduplication pattern changes abruptly into what we may call Stage II, represented by three elicitation sessions (36 forms, over a span of 17 days). The prosodic conditions on reduplication are similar to those of Stage I; what changes most noticeably are the conditions under which the replacive onset /p/ is used. In Stage II /b/ gives way to /p/ whenever the corresponding base begins with a voiced obstruent, rather than strictly the /b/ which triggers dissimilation in Stage I.

Table 6 illustrates the maintenance of the final foot reduplication conditions from Stage I. In 14 of the 15 words containing more than one stress foot, it is the final stress foot that reduplicates, whether it bears primary (a) or secondary (b) stress within the word. The one counterexample to final foot reduplication is *goldfish*, which at this stage is expected to reduplicate as *goldfish-bish*. Instead, in session 3 J produces both *goldfish-boldfish* and *goldfish-poldfish*, both of which violate the generalization that the final foot reduplicates and, as we will see below, the generalization about onset substitution in Stage II. Three words in the Stage II corpus consist of

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 6. *Partial* (*final*) *foot reduplication and onset dissimilation in Stage II*

Reduplicated form	Session no.	Isolation stress pattern
a. Minnesota-bota	3, 5	Mìnnesóta
violin-bin	3	vìolín
macaroni-boni	3	màcaróni
little_fish-bish	3	lìttle_físh
big_fish-bish	3	bìg_físh
violin-pin	3	vìolín
b. placemat-bat	3	plácemàt
linguistics-bics	4	linguístìcs
syllabary-pary	4	sýllabàry
c. beautiful-peautiful	3	béautiful
peony-beony	3	péony
piano-bano	3	piáno [pi.jæ.no]

a trisyllabic foot; in two cases, the reduplicant is also trisyllabic and in one case it is reduced to two syllables (c).

What is new in Stage II is the pattern of onset substitution. While in Stage I the reduplicant is assigned the onset /p/, rather than /b/, only when the base already begins with /b/, in Stage II /p/ is used in the reduplicant whenever the corresponding consonant in the base is a voiced obstruent. Examples illustrating this enlargement of the set of /p/ triggers are given in Table 7. In the (a) forms, the base of reduplication, i.e. the final metrical foot of the original word begins with a sonorant voiceless or consonant. Six of 26 such forms in the corpus are shown in Table 7. As in Stage I, the reduplicants of these forms begin with /b/. The forms in (b) have a /b/-initial base, and, also as in Stage I, the reduplicant begins with dissimilatory /p/. All six such forms in the Stage II corpus are present in Table 7. (c) illustrates the new development. Here, the final metrical feet of the input words have onsets beginning with a voiced obstruent other than /b/ – namely /d/, /ʤ/, /g/, /v/ – and, in all four cases the reduplicant begins with /p/.

Of the 36 forms elicited in Stage II, two, both from session 3, show irregular onset substitution patterns. *violin-pin* shows unexpected /p/ in the reduplicant onset, and *goldfish-boldfish* shows unexpected /b/. However, both forms co-occur in the same session with variants showing the expected reduplicative onset: *violin-bin* and *goldfish-poldfish*.

Stage III : reduplicant grows to include main stressed syllable

Stage III, represented by six elicitation sessions yielding 100 forms over three weeks, is marked by another abrupt change, this time in the prosodic characterization of the reduplicant. No longer limited to the final metrical

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 7. *Voiced obstruents trigger /b/→/p/ onset dissimilation in Stage II reduplicants*

	Reduplicated form	Base onset	Session no.
a.	stove-bove	st	3
	Mozart-bozart	m	3
	placemat-bat	m	3
	cab-bab	k	4
	Irene-bene	r	4
	yah-bah	j	5
b.	bright-pight	br	3
	babble-pabble	b	3
	Abbado-pado	b	3
	boppy-poppy	b	3
	brown-prown	b	3
	syllabary-pary	b	4
c.	bandanna-panna	d	3
	jay-pay	ʤ	3
	goldfish-poldfish	g	3
	Vivaldi-paldi	v	3
d.	violin-bin	l	3

TABLE 8. *Reduplication of word-final main-stressed foot in Stage III*

	Reduplicated form	Session no.	Stress pattern
a.	alyssum-byssum	6	Alýssum
	ivy-bivy	6	Ívy
	Alaska-baska	7	Aláska
	maroon-boon	7	Maróon
	content-bent	11	Conténт
b.	Arizona-bona	7	Àrizóna
	baboon-poon	7	Bàbóon
	agapanthus-bankus	7	Àgapánthus
	all_aboard-poard	7	àll abóard
	Chicka_Chicka_Boom_Boom-poom	7	Chìcka Chìcka Bòom Bóom (name of book)
	Zingeroo-boo	10	Zìngeróo
	Halloween-been	11	Hàlloween
	Young mee-bee	11	Yòung-mée
	tin_woodman-boodman	11	Tìn Wóodman
c.	agapanthus-bagapanthus	7	Àgapánthus

foot, the Stage III reduplicant includes the primary stressed syllable (the main stress foot) of the input and everything that follows (including other metrical feet).

Table 8 illustrates reduplicated words in which stress falls on the rightmost metrical foot. Those words with only one foot are given in (a), and those

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 9. *Reduplication of nonfinal main-stressed foot (plus all following material) in Stage III*

	Reduplicated form	Session no.	Isolation stress pattern
a.	lambs_ears-bamsears	6	lámbs èars
	sidewalk-bidewalk	6	sídewàlk
	Amtrak-bamtrak	7	Ámtràk
	aztec-baztec	7	áztèc
	elbow-belbow	7	élbòw
	Eli-beli	7	Élì
	stop_sign-bop sign	7	stóp sìgn
	seatbelt-peatbelt	9	séatbèlt
	Eunjey-beunjey	11	Éunjèy
	content-bontent	11	cóntènt
	scarecrow-barebow	11	scárecròw
	B'deli-peli	11	b'délì
	hairbrush-pairbush	11	háirbrùsh
b.	rosemary-bosemary	6	rósemàry
	triangle-biangle	7	tríàngle
	blueberry-pueperry	8	blúebèrry
	cranberry-panberry	9	cránbèrry
	blueberry-pueberry	9	blúebèrry
	peaberry-beaberry	9	péabèrry
c.	Albuquerque-balbuquerque	7	Álbuquèrque
	Abernathy-bannernathy	7	Ábernàthy
d.	Elizabeth-pizabeth	7	Elízabèth
	bullet_train-pullet train	7	búllet tràin
	appetite-battepite	10	áppetìte

with more than one foot in (b). All of the forms in Table 8 reduplicate as they would have in Stages I and II (bases are represented to the right with their isolation stress marked, for reference).

Of the 16 Stage III words in which a final, primary-stressed metrical foot is preceded by another foot within the word, all but one undergo final foot reduplication. In session 6, *àgapánthus*, with two metrical feet of which the second has primary prominence, reduplicates as *agapanthus-agabanthus*; however, in session 7 the same word reduplicates (metrically) normally as *agapanthus-bankus*. All other words reduplicate their final foot, as expected.

It is the 25 words in which main stress falls on a *nonfinal* foot that reveal the innovation in Stage III: as shown by the 24 forms in Table 9, the reduplicant contains the foot that in isolation bears main stress, along with all following material, regardless of the position of the main stressed foot in the word. The forms in (a) contain two monosyllabic feet; those in (b) contain a monosyllabic foot followed by a disyllabic foot; (c) illustrates words with two disyllabic feet, and (d) shows words with a disyllabic foot followed by a monosyllabic foot. In each case, the first foot has main stress, and it delimits the beginning of the string that reduplicates.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 10. *Trisyllabic feet reduplicate as trisyllables in Stage III*

Reduplicated form	Session no.	
elephant-belephant	7	
bicycle-picycle	7	
Connecticut-beggidut	10	
Pamela-bamela	11	(*cf. Pamela-bama*, in Stage I)

TABLE 11. *Voiced obstruents trigger /p/ substitution in Stage III reduplicants*

	Reduplicated form	Base onset	Session no.
a.	Berkeley-perkeley	b	6
	baboon-poon	b	7
b.	Dorfy-porfy 'Dorothy'	d	7
	linguistics-pingdis	g^w	7
	bandanna-panna	d	11
	B'deli-peli	d	11
c.	grass-bass	gr	6
	Arizona-bona	z	7

Only one of the 25 forms with a nonfinal main stress foot shows prosodically exceptional reduplication: *refrígeràtor* (session 9) reduplicates as *refrigerator-bator* instead of the expected *refrigerator-bigerator*.

As a result of the new condition that the main stressed syllable must be included, reduplicants in Stage III are commonly polysyllabic. Stage III does not impose the disyllabic upper bound on reduplicants seen in Stage I and, sporadically, in Stage II; Table 10 shows the four forms with trisyllabic feet, whose medial unstressed syllables are all preserved under reduplication.

The pattern of onset replacement in Stage III remains essentially the same as in Stage II; /p/ substitutes for /b/ in the reduplicant when the source of the copied portion begins with a voiced obstruent. The dataset contains 23 forms with voiced obstruents in the relevant position; 17 have /b/ and six have one of the voiced obstruents /d/, /g/, /z/. Of these 23, 21 trigger /p/ in the reduplicant. Representative examples of forms containing /b/ are shown in part (a) of Table 11; the full set of forms with other voiced obstruents is given in (b) and (c).

As seen in part (c) of Table 11, there are two exceptional forms, *grass-bass* and *Arizona-bona*. Note that this latter form is the only one in Stage III with a voiced fricative in the relevant position. There is also only one relevant voiced fricative in Stage II, namely /v/, which in *Vivaldi-paldi* triggers /p/ in the reduplicant. Thus evidence bearing on the behaviour of voiced fricatives is thus scant.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 12. *Nasal reduplication patterns in Stage III*

	Reduplicated form	Base onset	Session no.
a.	Connecticut-beggidut	n	10
	Noah-boah	n	11
	Youngmee-bee	m	11
b.	Ebenezer-pezer	n	7
	Amanda-panda	m	7
	banana-pana	n	7, 11
	Amana-pana	m	11
	tomato-pato	m	11
	vanilla-pilla	n	11

Nasals (i.e. /m/, /n/) reduplicate somewhat inconsistently in Stage III, sometimes triggering reduplicative /b/ and sometimes /p/. This pattern represents a change from Stages I and II, in which all three examples of nasal-initial bases reduplicate with /b/, i.e. *engineer-beer* (session 1), *Eleanor-bor* (session 2), and *placemat-bat* (session 3). Of 10 nasal-initial bases in Stage III, Table 12 shows that three reduplicate with /b/ and 7 with /p/.

It might seem from part (b) of Table 12 that nasals are being included in the set of consonants triggering dissimilation. However, there is another generalization that may be relevant. Of the six words in which a voiced sonorant triggers /p/ in the reduplicant, notice that two begin with voiced obstruents; if, as will be suggested later, onset dissimilation in the reduplicants of forms is attributed to the influence of the word-initial consonant, the behaviour of base-initial nasals is about evenly split between /b/-triggering and /p/-triggering.

Stage IV (one year later): whole word reduplication

By Stage IV, represented by one elicitation session and 15 forms, and occurring a full year after the most recent Stage III elicitations and almost two years after the onset of J's game, the reduplicant increases to its maximal prosodic size: reduplication is now total, as illustrated in Table 13 by the four relevant forms from Stage IV. The form in (a) begins with an initial unstressed syllable, which would not have reduplicated even in Stage III. The three forms in (b) have main stress on the final foot; the initial foot would not have reduplicated in Stages I–III, but does so here.[1]

Onset substitution in the reduplicant appears to continue as before, as illustrated in Table 14. The consonants replaced by /b/ or /p/ in the reduplicant are /d/, /h/, /m/, /p/, /pl/, /r/, /s/, /t/, /v/, /z/. The one voiced plosive in

[1] The kinds of alternations in the reduplicant illustrated in *tomato-bodado* and *Minnesota-binnedota* are discussed later (see Table 21).

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 13. *Total reduplication in Stage IV*

Reduplicated form	Session no.	
a. tomato-bodado	12	(*cf. banána-pana*, in Stage III)
b. Minnesota-binnedota	12	(*cf. Mìnnesóta-bota*, attested three times in Stages I and III)
violin-piolin	12	(*cf. violín-bin*, in Stage II)
mancala-bancala	12	(*cf. bàndánna-panna*, in Stage III)

TABLE 14. *Reduplicant onsets in Stage IV* (*session* 12)

Reduplicated form	Base onset
a. diamond-piamond	d
b. mancala-bancala	m
pox-box	p
ribbon-bibbon	r
happy-bappy	h
sandal-bandal	s
apple-bapple	Ø
tomato-bodado	t
c. money-poney	m
d. violin-piolin	v
zebra-pebra	z
zipper-bipper	z

this set (/d/, in part (a) of Table 14) triggers /p/ in the reduplicant, as expected; the sonorants and voiceless consonants in part (b) all trigger /b/, with the exception of one of the three forms in /m/ (part (c)). Part (d) lists the three forms with voiced fricatives, of which two reduplicate with /p/ and one reduplicates with /b/.

The unpredictable behaviour of voiced fricatives (/v/, /z/) and nasals (/m/) continues from Stages II and III. It appears as though the language game has not determined whether voiced fricatives and nasals (especially labial /m/) are sufficiently similar to /b/ to motivate dissimilation of the reduplicative onset consonant to /p/.

Stage V (*residue*) *: whole word reduplication and random onset dissimilation*

In the waning days of the rhyming game, represented by one session and 14 forms, reduplication continues to be prosodically total and to show systematic onset substitution. However, in Stage V the replacive onset is no longer limited to /b/ or /p/. Instead, it ranges over /b/, /m/, /p/, /sn/, /n/, /t/, /s/, /pl/, /f/, /tʃ/ and even [Ø] (=onset deletion). While the variation is wide, it is not entirely random. First, the reduplicant onset consonant is always

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 15. *All data from elicitation session* 13 (*Stage V*)

Reduplicated form	Dissimilating features
house-bouse	major class, place
table-mable	major class, place
chocolate-poclate	place
bouch-snouch	major class, place, voice
moon-noon	place
Jem-em	C→Ø
nose-tose	major class
picture-micture	major class
toothpaste-soothnaste	cont
Daddy-pladdy	major class, place
Totoro-fotoro	cont, place
Mommy-chommy	major class, place
virus-pirus	cont, voice
bed-ped	voice

different from the one it replaces: thus dissimilation is systematic. Second, the reduplicant onset consonant always differs from the one it replaces in either major class, place, continuancy, or voicing, and it often differs along more than one of these dimensions. To illustrate, all 14 forms from elicitation session 13 are given in Table 15, with dissimilating features shown on the right.

Note that, despite the expansion of the set of replacive consonants beyond labials, that there is still a discernible trend towards labiality (/b/, /m/, /p/, /pl/) in the replacive consonant. In eight of the 14 forms, the replacive consonant is labial, even though only four of the 11 attested onset replacement strategies involve labial consonants.

SUMMARY OF DATA

Table 16 summarizes the developmental trends discussed above.

The five stages of J's game are distinct from one another not only in terms of phenomena exhibited but also in time. No two stages were closer together than three months; the duration of the longest stage was 21 days.

Subpatterns

Several types of deviations from the general descriptions of the stages summarized in Table 16 emerge only when the entire corpus of data is examined. Three subpatterns will be discussed here. The first is overapplication of /b/ to /p/ dissimilation in the reduplicant. There are 15 such forms, distributed over Stages I–IV. In Stage V, the conditions on dissimilation are so lax that no such errors could be defined.

Table 17 illustrates an interesting finding: of these 15 instances of /p/ overapplication, seven (shown in (a)) are words in which the word-*initial*

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 16. *Summary of data*

Stage	Number of sessions	Age range	Onset replacement pattern	Prosodic description of reduplicant
I	2	2;5.28–2;5.29	/b/, but /p/ when base begins with /b/	Final foot (maximally disyllabic)
II	3	2;10.0–2;10.16	/b/, but /p/ when base begins with voiced obstruent	Final foot
III	6	3;2.7–3;2.28	/b/, but /p/ when base begins with voiced obstruent	Head foot through word end
IV	1	4;3.18	/b/, but /p/ when base begins with voiced obstruent	Whole word
V	1	4;6.3	/b, m, p, sn, n, t, s, pl, f, ʧ, Ø/, dissimilating from base consonant along various dimensions	Whole word

TABLE 17. *Apparent overapplication of /b/→/p/ dissimilation in reduplicant*

Form with unexpected replacive /p/	Stage	Session no.	Other forms with same or similar base-initial consonant triggering replacive /b/ in same stage (session no.)
a. backpack-pack	I	1	Pa**m**ela-bama, **pl**ate-bate (1)
violin-pin	II	3	vio**l**in-bin, I**r**ene-bene, maca**r**oni-boni (3)
Beethoven-poven	II	3	Bee**th**oven-boven (3); linguis**t**ics-bics (4)
balloon-poon	III	7	**l**eaf-beaf, a**l**yssum-byssum, A**l**aska-baska (7)
Biloxie-poxie	III	9	Cowardly_**l**ion-bilon, **l**ellow-bellow ('yellow') (11)
banana-pana	III	7, 11	Co**nn**ecticut-beggidut (10); **N**oah-boah (11)
vanilla-pilla	III	11	Co**nn**ecticut-beggidut (10); **N**oah-boah (11)
b. Elizabeth-pizabeth	III	7	**l**eaf-beaf, a**l**yssum-byssum, A**l**aska-baska (7)
Ebenezer-pezer	III	7	Co**nn**ecticut-beggidut (10); **N**oah-boah (11)
seatbelt-peatbelt	III	8	**s**idewalk-bidewalk (6); **st**op_sign-bop_sign (7); **sp**it-bit (11)
hairbrush-pairbrush	III	11	**h**ouse-bouse (6); Or**h**an-ban (7)
c. Amana-pana	III	11	Young_**m**ee-bee (11)
tomato-pato	III	11	Young_**m**ee-bee (11)
aranga-panga	III	11	refrige**r**ator-bator (9); Zinge**r**oo-boo (10)
money-poney	IV	12	**m**ancala-bancala (12)

consonant (though not the onset of the reduplicating material) is of the type that triggers reduplicative /p/ in the relevant stage. (Recall that in Stage I, the reduplicant begins with replacive /p/ only when the base begins with /b/; in Stages I–IV, replacive /p/ is used whenever the base begins with a voiced obstruent.) Four, shown in (b), have a /b/ elsewhere in the word

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 18. *Words in corpus whose initial consonant would trigger reduplicant /p/ if base-initial*

Reduplicated form	Reduplicant onset	Stage	Session no.
backpack-pack	p	I	2
bandanna-panna	p	II	3
violin-pin	p	II	3
Vivaldi-paldi	p	II	3
Beethoven-boven ~ poven	b ~ p	II	3
big_fish-bish	b	II	3
baboon-poon	p	III	7
banana-pana	p	III	7
balloon-poon	p	III	7
Biloxie-poxie	p	III	9
banana-pana	p	III	11
bandanna-panna	p	III	11
B'deli-peli	p	III	11
vanilla-pilla	p	III	11

(foot-initially, even, in *Elizabeth*, *seatbelt* and *hairbrush*). Of the remaining four words triggering unexpected reduplicant-initial /p/, in (c), three have /m/ in base-initial position, and we have already discussed the schizoid behaviour of base-initial nasals in triggering /b/ vs. /p/ in reduplicant-initial position.

Ignoring the forms in (c), the emergent generalization, not apparent in any single stage because of the small number of forms but robustly detectable when the entire corpus is considered, is that the reduplicant-initial replacive onset consonant dissimilates not only with respect to the initial consonant of the base but also with respect to the initial consonant of the whole word, and possibly with respect to base-internal foot-initial /b/ as well. The influence of word-initial /b/ and other voiced obstruents on the reduplicant onset can be confirmed by looking at the entire list of words in the corpus which begin with such consonants but whose initial syllable is not reduplicated. The 15 words meeting this description are collected in Table 18. As shown, 12 reduplicate with /p/, and only three with /b/ – and in one of those three, a /p/-initial reduplicant was offered as a variant. (Note that the three forms which reduplicate with /b/ do have the expected relationship between the base-initial and reduplicant-initial consonants.)

Another emergent subpattern in the corpus as a whole is the occasional overapplication of onset substitution internal to the reduplicant. The five forms in Table 19, from three sessions and two stages, show total reduplication (normal for the stages represented). The reduplicant exhibits a replacive onset not only initially, but also at the beginning of the second (final) metrical foot.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 19. *Overapplication of onset substitution*

Reduplicated form	Stage	Session no.
blueberry-pueperry	III	9
cranberry-panperry	III	9
scarecrow-barebow	III	11
hairbrush-pairbush	III	11
toothpaste-soothnaste	V	13

Note that both *cranberry-panperry* and *hairbrush-pairbush* also show unexpected reduplicant onset /b/→/p/ dissimilation, as discussed earlier; it appears that reduplicant-internal feet can not only occasionally trigger onset dissimilation but can even undergo it.

A third pattern over the whole corpus involves the behaviour of complex onsets which are subject to onset replacement in the reduplicant. As Table 20 indicates, the general pattern, especially in the earlier stages, is for a complex onset to be replaced in its entirety with /b/ or /p/, even when /b/ or /p/ could join with the cluster-final consonant into a legitimate complex onset; thus, in session 1, *tree* reduplicates as *tree-bee*, rather than **tree-bree* (part (a)). However, in a minority of such cases, listed in (b), in all of which the cluster-initial consonant is already /p/ or /b/, replacive /b/ or /p/ does substitute just for the first consonant in the cluster, leaving the cluster-final consonant intact. Onsets of the form C^j tend to preserve the palatal offglide under onset replacement (c); only two words with complex base-initial onsets fail to reduplicate (d).

The fourth somewhat systematic pattern involves the distribution of production errors. As shown in Table 21, random production errors such as metathesis, deletion, substitutions, and consonant harmony occur in 14 reduplicants, across six sessions and three different stages.

Significantly, errors of this sort never occur in base words. Only two base words, *hostabel* ('hospital') and *lellow* ('yellow'), deviated from adult pronunciation. However, as mentioned earlier, these were J's standard pronunciations for these words at the time, not speech errors.

J's game as reduplication: parallels with adult language

Much literature on child language operates from the assumption that child language data can be analysed in terms of theories developed for adult grammars. As Bernhardt & Stemberger, (1988: 3) put it, 'Variability notwithstanding, child phonology does not appear at any point to be otherwordly'. It is clear that J's game is not derived from any grammatical constructions in the variety of English to which J was exposed. However, there is a connection between J's game and adult language: the parameters

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 20. *Onset replacement in complex onsets*

Stage	Session	Reduplicated form	Base onset	Reduplicant onset
a. I	1	tree-bee	tr	b
I	1	stem-bem	st	b
I	1	plate-bate	pl	b
I	1	bread-ped	br	p
I	2	Clinton-binton	kl	b
I	2	triangle-bai.ml [ˌtɹaɪŋ.gl̩-ˈbaɪ.ml̩]	tr	b
I	2	spoon-boon	sp	b
II	3	stove-bove	st	b
II	3	plate-bate	pl	b
II	3	plop-bop	pl	b
II	3	bright-pight	br	p
II	6	step-bep	st	b
II	6	grass-bass	gr	b
II	7	stroller-boller [stɔlɚ bɔlɚ]	st	b
II	7	street-beet	str	b
II	7	triangle-biangle	tr	b
II	7	trunk-bunk	tr	b
II	7	stop_sign-bop_sign	st	b
II	8	blueberry-pueperry	bl	p
II	8	cranberry-panperry	kr	p
II	9	blueberry-pueberry	bl	p
II	11	conspire-bire	sp	b
II	11	spit-bit	sp	b
II	11	scarecrow-barebow	sk, kr	b, b
II	11	hairbrush-pairbush	br	p
b. I	1	brave-prave	br	pr
I	2	blanket-planket	bl	pl
II	3	prank-brank	pr	br
II	3	Brahms-??∼prahms	br	Ø∼pr
II	3	brown-prown [hesitant]	br	pr
IV	12	planet-blanet	pl	bl
c. I	1	cute-boot∼butte	k^j	b∼b^j
I	2	few-bew∼boo ([bju]∼[bu])	f^j	b^j∼b
II	3	cue-bue	k^j	b^j
d. I	2	swing-??	sw	Ø
II	3	Brahms-??∼prahms	br	Ø∼pr

that characterize J's evolving reduplication system are precisely those that characterize crosslinguistic variation in adult reduplication (although with at least one interesting difference, as noted below).

Numerous adult languages have reduplication constructions like J's in which total reduplication is accompanied by the assignment of a fixed onset to the second copy, supplanting any existing syllable onset, (see e.g. Moravcsik, 1978; Yip, 1992; McCarthy & Prince, 1999). As illustrated in Table 22, this occurs, for example, in Turkish, where the construction means 'X and stuff

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 21. *Production errors*

Reduplicated form	Stage	Session no.	Error type
elephant-befelant	I	1	metathesis
elephant-bat	I	2	deletion
triangle-bai.ml	I	2	place harmony (?)
tulip-buwp ~ buwip	I	2	substitution (/l/→/w/)
pterodactyl-bakyl	I	2	deletion
Concord-bongord	III	7	voice harmony/assimilation
agapanthus-bankus	III	7	place harmony (?)
Abernathy-bannernathy	III	7	nasal harmony
linguistics-pingdis	III	7	deletion, voicing
appetite-battepite	III	10	metathesis
Connecticut-beggidut	III	10	place metathesis, oralization
cowardly_lion-bilon	III	11	metathesis
tomato-bodado	IV	12	consonant harmony
Minnesota-Binnedota	IV	12	voicing, noncontinuant harmony

TABLE 22. *Onset overwriting in total reduplication*

a. Turkish reduplication: second copy has m onset:
otel-**m**otel 'hotel'
kitap-**m**itap 'book'

b. English-Yiddish reduplication: second copy has ʃm onset:
hotel-**shm**otel 'hotel'
book-**shm**ook 'book'

like that', as well as in English, where the construction (borrowed from Yiddish) has a sarcastic or ironic meaning.[2]

McCarthy & Prince (1999) call this pattern of onset replacement MELODIC OVERWRITING. In adult language, melodic overwriting is often subject to a constraint, exhibited also in J's game, that the replacive material should not be identical to the pre-existing material. Lewis (1967) claims for Turkish, and McCarthy & Prince (1999) claim for English-Yiddish, that reduplication involving melodic overwriting fails to apply when the word to be reduplicated already starts with /m/ or /ʃm/, respectively. Thus (at least for some speakers) Turkish *motel* 'motel' and English-Yiddish *schmaltz* cannot reduplicate. The alternative to reduplication failure is to dissimilate: this strategy, employed by J, is also common in adult reduplication (see e.g. Yip, 1998). For example, Abkhaz (Northwest Caucasian; see Bruening, 1997 and references therein), which has an /m/-replacement construction similar to

[2] As noted earlier, J's father spoke Turkish to him initially but not during the years during which the game was played. It is unlikely that J would have been exposed to the *otel-motel* construction; in any case the prosodic reduction exhibited in his reduplicants, as well as the nature of the replacive consonant, differ from what occurs in Turkish. The English speakers to whom J was regularly exposed in his first few years were not users of the *hotel-shmotel* construction.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 23. *Dissimilation in Abkhaz reduplication*

a. Second copy has [m] onset:		
čə́-k'	čə́k'-**m**ə́k'	'horse'
gaʒá-k'	gaʒák'-**m**aʒák'	'fool'
pəstəh˚-k'	pəstəh˚-**m**əstəh˚-k'	'fog, mist'
b. When base is [m]-initial, second copy begins with [c'']:		
maʒá-k'	maʒák'-č'aʒák'	'secret'
maát	maát č aát	'money'
mäš˚ə́r-k'	maš˚ə́rk'-č'aš˚ə́rk'	'miracle'

TABLE 24. *Intensive adjective prefixing reduplication in Turkish*

/r/	ter-temiz	'very clean'
	tor-top	'fully round'
/m/	sɯm-sɯkɯ	'very tight'
	bem-beyaz	'very white'
/p/	kap-kara	'jet black'
	sap-sarɯ	'fully yellow'
/s/	bes-belli	'very obvious'
	kas-katɯ	'extremely hard'

that of Turkish, provides an alternative /č'/ onset for words beginning in /m/, as illustrated in Table 23.

The pattern of dissimilation in Abkhaz is clearly parallel to J's system of requiring the reduplicant to start with /b/ unless the reduplicating material already begins with /b/ (or a voiced obstruent, at later stages), in which case the replacive onset dissimilates to /p/.

One further dimension to J's onset replacement pattern can be related to adult reduplication patterns in other languages as well. This is the interaction of word-initial consonants with the replacive reduplicant onset. As was illustrated in Table 17, J uses /p/ in the reduplicant not only when the reduplicant would otherwise begin with /b/ (Stage I) or a voiced obstruent (Stages II–IV), but also when the word as a whole begins with the relevant consonant type.

Although no adult reduplication pattern has been described in exactly these terms, Turkish (Lewis, 1967; Demican, 1987), as well as many other Turkic languages (Johanson & Csato, 1998) and even some dialects of Armenian (Vaux, 1998) have a phenomenon that comes close. As illustrated in Table 24, Turkish forms intensive adjectives by means of a CVC prefixing reduplication construction in which the reduplicant ends in one of the following four consonants: /p, m, r, s/.

Which consonant the reduplicant of any given lexical item takes is not completely predictable, but is subject to several constraints. The most obvious of these is that the reduplicant-final consonant may not be identical

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

TABLE 25. *Final foot reduplication in Diyari*

kanku	kanku-kanku	'boy'
tʲílparku	tʲilpa-tʲilparku	'bird sp.'
kú[ku.ˑa	ku[ku-ku[kuŋa	'to jump'

to the first postvocalic base consonant. But reduplicants also strongly tend not to end in consonants occurring elsewhere in the base. No reduplicant ends in the same consonant with which the base begins, and none ends in a labial when the base contains a labial beyond the first CVC sequence. In that the fixed reduplicant consonant is subject to dissimilatory influences from more than one base consonant, the Turkish pattern resembles J's.

In its prosodic patterning, J's game also finds parallels in adult reduplication systems. Setting aside onset subsitution, the total reduplication pattern that J ultimately arrives at is common in adult languages (e.g. Moravcsik, 1978; McCarthy & Prince, 1999), including creoles (see Sebba, 1997 for an overview). Also common in adult language is partial reduplication of the sort characterizing J's Stage I, in which the final metrical foot of the base is reduplicated (see e.g. Moravcsik, 1978; Marantz, 1982; McCarthy & Prince, 1999). In their pioneering paper on prosodic morphology, McCarthy & Prince (1999) discuss the Pama-Nyungan language Diyari, one of many languages in which the reduplicant is a metrical foot consisting of material from the first two syllables of the base, as shown in Table 25. Following Poser (1989) and sources therein, McCarthy & Prince (1999) provide evidence from stress and from minimal word size conditions that Diyari has trochaic stress feet. The reduplicants in Table 25 thus consist of the first metrical foot of each word. (According to McCarthy & Prince (1999), the reduplicant is also a minimal word, accounting for why in forms like *tʲilpa-tʲilparku* the reduplicant does not retain the coda consonant of the second base syllable. Diyari words cannot end in consonants.)

Problems with treating J's game as reduplication

Despite the strong parallels with adult reduplication patterns, the claim that J's pattern represents true reduplication faces certain challenges. First, as noted earlier, onset substitution is a common property of total reduplication constructions. Yet J's game begins as *partial* reduplication; onset substitution in adult partial reduplication is rare. (Alderete *et al.* (1999) discuss some examples, but analyse the relevant onset consonants as the result of neutralizating a reduplicated consonant to the unmarked consonant in the language, which is not the case with /b/ in English.) Thus J's game is not typical, in this respect, of existing adult reduplication patterns.

A second unusual characteristic of J's game is the prosodic pattern of Stage III, in which the reduplicant consists of the head foot and all following

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

material up to the end of the word. This significant aspect of J's game is not paralleled, to my knowledge, in any adult reduplication or truncation constructions.[3] Rather, as McCarthy & Prince (1999) and others have documented, the crosslinguistic evidence shows that in partial reduplication, the reduplicant is typically the size of a member of the prosodic hierarchy: foot, syllable, or mora. The description 'main stressed syllable to end of word' does *not* correspond to a single prosodic constituent; in words like *Abernathy* and *Connecticut*, the reduplicants (*bannernathy* and *beggidut*) correspond to two metrical feet.

Perhaps the most troubling obstacle to understanding J's game as reduplication is the metamorphosis from Stage I to Stage V – and, for that matter, the very existence of the game itself. What is motivating the various stages of the game? There is clearly no linguistic model in English, which lacks partial reduplication altogether. Moreover, the pattern of development does not mirror what is commonly believed to be the diachronic path of reduplication, in which total reduplication gives rise to partial reduplication, rather than the reverse (Niepokuj, 1997). While the parameters of adult reduplication help us to describe the stages of J's game, they offer no explanation of its origin or trajectory.

J's game as the acquisition of rhyme

Closely related in many ways to the grammatical construction of reduplication is the extragrammatical pattern of rhyme (see e.g. Kiparsky, 1973; Holtman, 1996; Yip, 1999). This section, following a suggestion by Kristin Hanson (p.c.), explores the possibility of accounting for J's game in terms of rhyme, with its various stages representing J's stepwise acquisition of English rhyming conventions.

Two types of rhyme coexist in English: poetic rhyme, which varies along a number of parameters (see e.g. Preminger & Brogan, 1993), and linguistic, or word, rhyme. J's Stages I–II represent poetic rhyme, for which the standard definition is, as offered by Stallworthy (1983), matching 'the last stressed vowel and all speech sounds following that vowel' or more accurately, according to Holtman (1996: 7) and Hanson (in press), the portion of the line beginning with the last strong metrical position. According to Hanson (p. 9), 'It is in fact not final stressed syllables but rather the syllables which are in the final strong positions of the meter which normally define the beginning of the domain of end-rhyme in English [verse]'. J was amply

[3] Contemporary theories of reduplication (e.g. CORRESPONDENCE THEORY (McCarthy & Prince, 1995; see also Kager (1999) for an overview) do permit such patterns to be described, although they do not occur.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

exposed to this kind of rhyme in children's literature, including lines such as the following.[4]

(2) a. Mountains and fountains / rain down on *me* /
s w s w / s w s w
Buried in berries / What a jam jambo*ree*!
s w s w / s w s w

b. Good night stars Good night *air* /
s w s w s w s w /
Good night noises every*where*
s w s w s w s w

c. They left the house at half past *nine*
w s w s w s w s
in two straight lines in rain or *shine*
w s w s w s w s
The smallest one was Made*line*
w s w s w s w s

d. Higgety-piggety, my fat *hen*
s w s w s w s w
She lays eggs for gentle*men*
s w s w s w s w

In all four sets of lines the rhyming sequence contains a proper subset of the syllables in the final word. In lines (a) and (b), each rhyming sequence (*me*/*-ree*, *air*/*-where*) constitutes the final stress foot of the word containing it. In line (a), the final metrical foot corresponds to a primary lexical stress (*jàmborée*); in the last lines of (b), (c) and (d), the final metrical foot has secondary stress in the words containing it (*éverywhère*, *Mádelìne*, *géntlemèn*). This is exactly J's pattern at Stages I and II. Reduplication is partial (i.e. the rhyming sequence is smaller than the whole word, in longer words), and the rhyming sequence corresponds to the final metrical foot, regardless of whether it bears primary or secondary word stress. Even J's truncation of reduplicants to two syllables has precedent in English poetics, in which a medial unstressed syllable is often ignored for purposes of matching of lexical stressed and unstressed syllables to metrically strong and weak positions (see e.g. Hanson & Kiparsky, 1996).

J's Stage III, by contrast, reflects the behaviour of adult English speakers when asked to rhyme words: outside of a poetic context (and the rhyming dictionaries geared toward poetic rhyme), primary word stress counts as the metrically strong position identifying the beginning of the rhyming

[4] Line (a) is from Degen, 1983; line (b) is from Brown, 1947; line (c) is from Bemelmans, 1963; line (d) is from Opie, 1996.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

sequence. Thus (according to J's mother's intuitions and confirmed by the Carnegie-Mellon University Pronouncing Dictionary) *háckbèrry* rhymes with *bláckbèrry* but not with *stráwbèrry*, despite the identity of the post-onset material ([ɛɹi]) in the final metrical foot of all three words.[5] *Mádelìne* rhymes with *Ádelìne*, but not with *Cárolìne* or *túrpentìne*. Similarly, *Àlabáma* rhymes with *pajáma*, and *Mìnnesóta* with *Dakóta*; like J in Stage III, adults rhyming words out of context tend to match main stressed syllables (and what follows), regardless of where in the word they fall.

Viewing J's game as reflecting his evolving understanding of rhyme explains a number of factors that are mysterious under a reduplication account. First, it explains onset dissimilation. The literary rhyming conventions to which J was exposed require onsets to be different, whereas there is no such principle in reduplication.[6] Second, as observed just above, the rhyming hypothesis is consistent with the facts of Stage III, while the reduplication hypothesis is not. Finally, the rhyming hypothesis alone offers insight into why Stages I and II precede Stage III, rather than the reverse: J arguably had more exposure (through hearing books read aloud) to literary rhyme than to linguistic word rhyme at the time when he initially invented his game.

CONCLUSION

J's rhyming game shares with reduplication what poetics and adult language games share with natural language generally: the prosodic and segmental representations in the grammar of the language in question. As Halle & Keyser (1971), Hanson & Kiparsky (1996), Kiparsky (1973) and many subsequent writers have argued, versification relies on the same parameters that define variation in the metrical and melodic patterns of natural language; rhyme, in particular, is characterized by the same parameters that define adult reduplication patterns (see also Holtman, 1996 and Yip, 1999) for recent discussion of the same idea in Optimality Theory. Thus it comes as no surprise that J's pattern, while ultimately better analysed as rhyme than as reduplication, mirrors adult reduplication systems in a number of minute details.

One particular parameter of language manifested in reduplication and stylized in rhyming conventions is prosodic structure. J's game sheds new

[5] The Carnegie-Mellon pronouncing dictionary can be accessed at http://www.speech.cs.cmu.edu/cgi-bin/cmudict. Users may search the dictionary for rhyming words via the RhymeZone web site at http://www.rhymezone.com. RhymeZone is operated by Lycos®, a registered trademark of Carnegie-Mellon University.

[6] Yip (1998) relates onset replacement and dissimilation in total reduplication to a general anti-identity constraint. In partial reduplication like J's, however, perfect identity is by definition disrupted anyway, removing anti-identity as the motivation for onset replacement and dissimilation.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

light on the salience of prosodic structure in child language. As has been noted many times before, children's language play provides an important window into the child's grammar at that point in acquisition. J's game highlights the important role that metrical feet, syllables, and syllable-internal structure play in children's language, a role recently argued for on the basis of unrelated data by Rose (2000); see also Echols & Newport, 1992; Fikkert, 1994; Gerken, 1994, 1996, among many others.

J's rhyming game also suggests that phonemic awareness – not to mention the ability to rhyme – occurs earlier than has standardly been assumed. The fact and nature of J's onset substitution clearly reveals phonemic awareness, for which ability to rhyme is a common test. Previous estimates of four years of age for the ability to rhyme (e.g. Menn & Stoel-Gammon, 1995: 351) may reflect the difficulty of communicating the rhyming task to a child in an experimental setting (see Lenel & Cantor, 1981); Menn & Stoel-Gammon (1995) make a similar point about segmentation tasks that have been used to assess phonemic awareness. The fortunate circumstance of volunteered rhymes allows phonemic awareness and rhyming abilities to be documented in very young children.

REFERENCES

Alderete, J., Beckman, J., Benua, L., Gnanadesikan, A., McCarthy, J. & Urbanczyk, S. (1999). Reduplication with fixed segmentism. *Linguistic Inquiry* **30**(3), 327–64.

Bemelmans, L. (1963). *Madeline*. New York: Viking.

Bernhardt, B. H. & Stemberger, J. P. (1998). *Handbook of phonological development: from the perspective of constraint-based nonlinear phonology*. San Diego: Academic Press.

Brown, M. W. (1947). *Good Night Moon*. Illus. by Clement Hurd. New York: Harper.

Bruening, B. (1997). Abkhaz mabkhaz: m-reduplication in Abkhaz, weightless syllables, and base-reduplicant correspondence. In B. Bruening, Y. Kang & M. McGinnis (eds), *PF: Papers at the Interface*, Vol. 30. Cambridge, MA: MIT Working Papers in Linguistics.

Degen, B. (1983). *Jamberry*. New York: Harper & Row.

Demircan, Ö. (1987). Emphatic reduplications in Turkish. In H. Boeschoten & L. Verhoeven (eds), *Studies in modern Turkish: proceedings of the 3rd conference on Turkish*. Tilburg: Tilburg University Press.

Echols, C. & Newport, E. (1992). The role of stress and position in determining first words. *Language Acquisition* **2**, 189–200.

Ferguson, C. & Macken, M. (1983). The role of play in phonological development. In K. Nelson (ed.), *Children's language*, Vol. 4. Hillsdale, NJ: Erlbaum.

Fikkert, P. (1994). *On the acquisition of prosodic structure*. Dordrecht: Holland Institute of Generative Linguistics.

Gerken, L. (1994). A metrical template account of young children's weak syllable omissions from multisyllabic words. *Journal of Child Language* **21**, 565–84.

Gerken, L. (1996). Prosodic structure in young children's language processing. *Language* **72**(4), 683–712.

Halle, M. & Keyser, J. (1971). *English stress; its form, its growth, and its role in verse*. New York: Harper & Row.

Hanson, K. (in press). Formal variation in the rhymes of Robert Pinsky's *The Inferno of Dante*. *Language and Literature*.

Hanson, K. & Kiparsky, P. (1996). A parametric theory of poetic meter. *Language* **72**(2), 287–335.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press

Holtman, A. (1996). *A generative theory of rhyme : an Optimality approach*. Utrecht : LEd.
Johanson, L. & Csato, E. (eds) (1998). *The Turkic languages*. New York : Routledge.
Kager, R. (1999). *Optimality theory*. Cambridge : CUP.
Kiparsky, P. (1973). The role of linguistics in a theory of poetry. *Proceedings of the American Academy of Arts and Sciences* **102**(3), 231–44.
Lenel, J. C. & Cantor, J. H. (1981). Rhyme recognition and phonemic perception in young children. *Journal of Psycholinguistic Research* **10**(1), 57–67.
Lewis, G. (1967). *Turkish grammar*. Oxford : Oxford University Press.
Marantz, A. (1982). Re Reduplication. *Linguistic Inquiry* **13**, 483–545.
McCarthy, J. & Prince, A. (1995). Faithfulness and reduplicative identity. In J. Beckman, L. Dickey & S. Urbanczyk (eds), *University of Massachusetts Occasional Papers in Linguistics* **18** *: Papers in Optimality Theory*. Amherst, MA : GLSA.
McCarthy, J. & Prince, A. (1999). Prosodic morphology (1986). In J. Goldsmith (ed.), *Phonological theory : the essential readings*. Malden, MA : Blackwell.
Menn, L. & Stoel-Gammon, C. (1995). Phonological development. In P. Fletcher & B. MacWhinney (eds), *The handbook of child language*. Oxford : Blackwell Publishers Ltd.
Moravcsik, E. (1978). Reduplicative constructions. In J. Greenberg (ed.), *Universals of Human Language*, Vol. 3. Stanford : Stanford University Press.
Niepokuj, M. (1997). *The development of verbal reduplication in Indo-European*. Washington : Institute for the Study of Man.
Opie, I. (ed.) (1996). *My very first Mother Goose*. 1st edn. Cambridge, MA : Candlewick Press.
Poser, W. J. (1989). The metrical foot in Diyari. *Phonology* **6**, 117–48.
Preminger, A. & Brogan, T. V. F. (eds) (1993). *The new Princeton Encyclopedia of poetry and poetics*. Princeton : Princeton University Press.
Rose, Y. (2000). *Headedness and prosodic licensing in the L1 acquisition of phonology*. Unpublished Ph.D. Thesis. McGill University.
Sebba, M. (1997). *Contact languages : pidgins and creoles*. New York : St Martin's Press.
Stallworthy, J. (1983). Versification. In A. W. Allison, H. Barrows, C. R. Blake, A. J. Carr, A. M. Eastman & H. M. English Jr. (eds), *The Norton Anthology of Poetry*. New York : W. W. Norton & Company.
Vaux, B. (1998). *The Phonology of Armenian*. Oxford : Clarendon Press.
Yip, M. (1992). Reduplication with fixed melodic material, *Proceedings of NELS 22*. Amherst : GLSA.
Yip, M. (1998). Identity avoidance in phonology and morphology. In S. LaPointe, D. Brentari & P. Farrell (eds), *Morphology and its relations to phonology and syntax*. Stanford : CSLI Publications.
Yip, M. (1999). Reduplication as alliteration and rhyme. *GLOT International* **4**(8), 1–7.

https://doi.org/10.1017/S0305000903005646 Published online by Cambridge University Press