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Going Younger To Do Difference: The Role of Children in Language Change

Julie Roberts

1 Introduction

Some of the critical questions explored in research on language change are those of who initiates the changes, who participates, and who retains more conservative forms. Gender, race, socioeconomic class, and ethnicity have all been widely studied in terms of their effect on linguistic change. While the age of the speaker has also been found to be important in predicting their participation in change in progress, it is only recently that the age range examined has been extended to include preschool children. The current study seeks to explore the findings of these studies of preschool children, as well as some new data, in order to examine the ways in which these young children can participate in language change and the possible learning mechanisms which enable this participation.

1.1 Role of Children in Language Change

Because most of the earliest work on language change centered on adolescents through adults, the first step in extending this range was to ascertain whether or not children participated at all in this phenomenon. To this end, Roberts and Labov (1995) examined the acquisition of the complicated Philadelphia short *a* pattern in 3- and 4-year-old children. They found that the children were well into the process of learning this pattern. They had acquired some of the constraints on raising and tensing short *a*, such as in environments preceding nasal consonants and in the words *mad*, *bad*, and *glad* but not the similar word, *sad*. They were in the process of acquiring other features of the pattern, such as raising before voiceless fricatives and affricates, in that the 4-year-olds were significantly more accurate than 3-year-olds in their raising of short *a* in these environments. Finally, and most critically to the current questions, the children extended the pattern of short *a* raising by producing the tensed and raised vowel significantly more often than their parents in a new, lexically conditioned raising environment – the word *planet*. These findings support the argument that children not only ac-

quire even the most complex parts of their dialect at a very young age, but they also actively participate in changes by extending their parameters.

In an extension of this study, Roberts (1997a) examined the role of language input on children's participation in change in progress. All of the variables in question in that study were undergoing change in progress and varied in the complexity of this change. (See Payne 1990, for a description of Philadelphia vowels undergoing change and their complexity.) All of the children were found to have acquired the simpler, phonetic changes (e.g., fronting of (aw) as in *cow*). On the other hand, more complex changes (e.g., raising of checked (ey) as in *cake* and raising and tensing of short *a*) were acquired only by those children who had parents who were native Philadelphians. Finally, none of the children had acquired the centralization of long (ay) before voiceless consonants, as in *kite*. This change had been found to be led by male speakers in Philadelphia (Labov 1990), so it was not surprising that the children, whose child care situation consisted primarily of women – their mothers and female child care workers – had not learned this change. These findings supported the prediction made by Labov (1990) that in a community in which child care was provided mostly by women, female-led changes would be accelerated, as opposed to male-led changes.

Although these findings do indeed underscore the participation of children in their speech community and the importance of including them in its description, the question remains as to how extreme the individual vowel productions of these children are relative to those of their parents and other adults in their community. Kerswill (1996) provided some insight into this issue in his study of the acquisition of a new dialect in Milton Keynes, Great Britain by preschool children through adolescents. Using a methodology based on researcher judgement coding, he found that although in general the productions of preschool children were less extreme than those of adolescents, there were some important individual variations. Two of his 4-year-old speakers' productions were similar to those of older peers; one child's productions were much like those of his father; and one child produced forms that appeared to reflect a compromise strategy between his parents' productions. These findings underscore the importance both of input in dialect acquisition and that of data interpretation encompassing individual differences as well as group trends.

The advent of normalization techniques allows the direct comparison of computer analyzed vowel tokens which could previously only be compared qualitatively as complete systems (Neary 1977). Therefore, one of the purposes of the current study is to examine the normalized data of the Philadelphia children discussed above to see if their vowel productions match those of their parents.

1.2 Role of Input on Children's Early Phonological Acquisition

The role of language input directed to children by parents and other care takers has been widely researched by psycholinguists. Those favoring a more nativist explanation of child language acquisition minimize the importance of this child-directed speech (CDS), noting that minimal input is sufficient for a child to acquire a full linguistic system at an amazingly fast rate (Pinker 1984, Gleitman and Wanner 1982). Others, noting both the ways in which those producing CDS simplify, shorten and otherwise tailor their language to the child learner, argue that this language is specifically fitted to the language acquisition process and has an effect on the rate of acquisition, at minimum, and perhaps the style and quality of acquisition as well (Murray, Johnson, and Peters 1990, Clarke-Stewart 1973).

As we explore the child's participation in language change, it is important to consider what the possible mechanisms are that allow or promote the acquisition of dialect features. Related work on the acquisition of language-specific phonology is somewhat more limited than that concerning morphology and syntax, but Patricia Kuhl and colleagues have looked at maternal vowel input to infants acquiring English, Russian and Swedish (Andruski and Kuhl 1996, Kuhl, Andruski, Chistovich, Chistovich, Kozhevnikova, Ryskina, Stolyarova, Sundberg, and Lacerda 1997). Using acoustically analyzed natural language input of mothers to 2- to 5-month-old infants and to adult interviewers, they found that the vowels measured, (long (iy), (ah), and long (uw)), were significantly more peripheral (i.e., toward the edges of the vowel space) when addressed to infants than to adults. This resulted in an "expanded vowel space, one that is acoustically 'stretched'" (Kuhl et al. 1997:84). The 'stretching' of the vowel triangle was substantial in all three languages studied - 91% for English, 94% for Russian, and 90% for Swedish. The authors concluded that the vowels were therefore more distinct from each other providing greater featural contrast among vowels while

minimizing acoustic overlap. This well-specified vowel information would ultimately aide phonological acquisition. A further study revealed that infants attended to and increasingly imitated these productions (Kuhl and Meltzoff 1996).

Whereas the arguments made by Kuhl and colleagues center on the process of language acquisition regardless of the particular language involved, they raise intriguing possibilities for those of us interested in the learning of specific dialect features as well. For example, it seems reasonable to hypothesize that this more extreme vowel input, which children receive during infancy, could become the targets of their own early productions. Therefore, in the cases in which the innovative dialect variant is also the more peripheral variant, these early CDS productions might become the children's typical productions as they mature, resulting in a more peripheral, or extreme, innovative form. Hence, the language-learning situation could be seen as specifically aiding the children in their participation in some aspects of language change (i.e., those involving peripheral vocalic movement).

Of course, there are many unanswered questions raised by these studies. Among them, does this peripheralization of CDS vowels at the 'points' of the vowel triangle extend to other vowels as well, particularly those involved in change in progress? What are the acoustic features for vowels during CDS in which the changing target is moving away from the periphery (i.e., fronting of Philadelphia (ow) and (uw))? Do the children's fathers and other male care takers also participate in this phenomenon, and, if not, would this further the deceleration of certain changes, as suggested by Labov (1990) and Roberts (1997a)? How long does the vowel triangle stretching take place, and do the children's first vowel productions match these 'stretched' targets? These are questions necessitating several studies, but it is an additional purpose of the current one to begin this process by examining the productions of 3- and 4-year-old children and their mothers and comparing vowel extremity, both in terms of changing Philadelphia changing vowels and the three vowels examined by Kuhl.

1.3 Social Interaction and Children's Role in Language Change

Social interaction has played a prominent role in both developmental accounts of child language acquisition and in variationist accounts of language change, but in both cases, the traditional emphasis has been on the interaction

produced by speakers as a reflection of particular immutable biological categories (i.e., sex, race, ethnicity, age). (See Eckert 1990 and Thorne 1993 for discussions of this issue.) Similarly, in child socialization literature, children have been viewed as the receivers of local cultural norms from their care takers by means of particular socializing strategies, many of them linguistic (Schieffelin 1990, Ochs 1988, Heath 1983).

West, Zimmerman, and others have argued that these categories are not immutable but rather socially defined and constructed. Community members can be described not as demonstrating or reflecting race, sex, age, etc. in their behavior but as constructing their identities on a day-to-day basis or "doing" difference" (West and Zimmerman 1987, West and Fenstermaker 1995). Eckert (1989, 1988) has applied this approach to variationist research and argued that gender is constructed by women through their adoption and use of certain dialect forms as through other forms of behavior. The position taken in the current study is that children, too, 'do' community from their earliest acquisition and use of dialect features and that this behavior is negotiated and constructed beginning in the early care taker-child interactions and continued later through peer interactions. As shown in Roberts and Labov (1995) and Roberts (1997a), these early interactions can result in the influencing of the parameters of change and, possibly, the favoring of some changes over others. In other words, these earliest interactions could initiate the child into the possible domains of language change. The final purpose of the current study will be to see if the comparison of the extremity of vowel tokens suggests that children's early forays into the domains of change may result in their having an effect on the ultimate targets of change.

1.4 The Current Study

In summary, the study of childhood dialect variation is, like its subjects, in its infancy. There are many questions to be answered and issues to be explored. The overall purpose of the current study is to bring together some of the information, theoretical and empirical, from several sources which may bear fruit in this research. It is critical not only that we document children's acquisition of dialect forms and their participation in speech communities, but also that we begin to explore the mechanisms by which this participation takes place. The findings from the fields of adult language variation and change, psycholinguistics, and social interaction appear to hold much promise in the

future of this research. The data to be presented here is intended as an initial step in the integration of some of this research and an exploration of the importance it may have in the interpretation of some normalized data on Philadelphia preschool children and their mothers. It is hoped that the resulting analysis will suggest other avenues of study in this area.

2 Methodology

2.1 Participants

Six children, aged 3;4 to 4;11, were tape recorded over a four-month period at their day care center, Kid's Land, located in a working class to lower middle class area of South Philadelphia. The group comprised three girls and three boys, all of whom were native to Philadelphia. Four of the children, Evan, Jenny, Shelly, and Danny, had parents who were also Philadelphia natives. The children with non-native parents were Gia, 3;11, who lived with her father, a Philadelphia native, and her mother, who had moved frequently throughout her childhood, and Mike, 3;4, whose parents were born and raised in Italy and spoke Italian at home.

The primary care takers of the four children with native Philadelphia parents also participated in the study. These included the mothers of Evan, Shelly, and Danny and the paternal grandmother of Jenny. For further information about these participants, please see Roberts (1996, 1997ab).

2.2 Procedure

Play-interview sessions, described in Roberts (1996, 1997ab), were used to gather the child data. The adults were interviewed using sociolinguistic interview techniques (Labov 1984). All sessions were recorded using a Nagra tape recorder and a Sony ECM 50 lavalier microphone. Single words taken from the spontaneous speech of the participants were digitized using the Kay Computerized Speech Lab (CSL) on a 386 personal computer. Single measurements of the first two formants (F1 and F2) of the vowels were taken as follows. For vowels containing both nuclei and glides (e.g., (iy), (ey), (ow), (aw), (uw), (ay), and tense short *a*), nuclei were measured. Specifically, if the extremity of raising or fronting was of interest, the measurement was taken at the most extreme point of the nucleus. For vowels without significant

glides (e.g., (ah) and lax short *a*), the measurement was taken a point along the steady state. The sample rate was 10k Hz with the filter set at 4k Hz. Normalization of the vowel tokens was accomplished with a vowel normalization algorithm based on geometric mean (Neary 1977). t-tests and One-Way ANOVAs were performed on the means of the vowels under consideration to allow for statistical comparison of adults and children and of individual speakers. Vowel charts were created using Lotus 123, Release 5 (1991, 1994) and Freelance Graphics (1991,1993).

2.3 Variables

The variables examined in the current study included those vowels listed in Table 1. The variable (uw) was an overlapping variable in that it has been found to have undergone change in Philadelphia as well as being one of the vowels studied by Kuhl et al. (1997).

Table 1 Variables examined in children's and mothers' speech

<i>Philadelphia Variables (Labov 1990)</i>	
Nearly completed change	short <i>a</i>
Midrange changes	(ow), (uw)
New change	(aw), (eyC)
<i>Triangle Variables (Kuhl et al. 1997)</i>	
	(iy), (ah), (uw)

Specific research questions comprise the following:

1. How do the vowel productions of the children compare with those of their mothers in terms of their extremity or innovation?
2. What do the findings mean in terms of the children's role in their speech community and their effect on change in progress?
3. What are the possible mechanisms of acquisition and change that may help to account for the children's participation in the process of language variation and change?

3 Results

3.1 Philadelphia Vowels

Results of the study revealed that in all cases the speakers vowels overlapped substantially. Two cases of significant difference were found between adults and children. In addition, individual differences were noted among the children which support the importance of input to acquisition of dialect features.

3.1.1 Comparison of mothers and children

For all of the vowels measured, the children's productions overlapped those of their mothers. There were no significant differences in the F1 and F2 measurements for short *a*, (*aw*), and (*uw*). In the case of long (*ow*), the mean F2 measurement of the adult vowels was significantly greater than that for the children ($t(93) = 4.32, p = .004$) indicating that the adults productions of (*ow*) are more fronted than the children's productions.

The reversal of the lowering of checked, long (*ey*), referred to as (*eyC*) raising, is the one instance in which the children were producing more extreme forms than their care takers ($F1, t(93) = 2.5, p = .014$; $F2, t(93) = 4.24, p = .000$). This is a finding that begs further study since it is one of the newer changes, and it does not appear to be stigmatized. This lack of stigma is important since it diminishes the possibility of the most obvious initial interpretation, that the adults are style shifting during the interview. The style shifting explanation is initially appealing because it would explain not only the adult's more conservative productions but also the children's more extreme ones, as children have been found in other research not to style shift (Roberts 1997b). However, as (*eyC*) raising does not appear to be associated with reduced prestige, the alternate explanation, that the children are in fact producing more extreme tokens of this variable, is possible.

3.1.2 Comparison of Individual Children

Analysis of the children's individual data was accomplished by graphing of their tokens for each of the variables in question. In addition, One-way ANOVAs with Tukey HSD post hoc analyses, with the significance level set at ($p < .05$) were run to compare individual speaker means for the critical

variables. That is, comparisons were made for F2 when the critical dialect feature was fronting (e.g., (uw) and (ow)) and for F1 and F2 when both raising and tensing or fronting were relevant (e.g., (eyC), (aw), and short *a*). The individual Ns are admittedly small, and the results of the statistical comparisons must be seen as preliminary. Nevertheless, the qualitative and quantitative analyses, taken together, both support the importance of early input to preschool dialect acquisition and resultant effects on change and provide direction for future research.

First of all, the children of native Philadelphia parents – Jenny, Danny, Evan, and Shelley – form a cohesive group. For only one of the five vowels do they differ significantly. For the fronting of (aw), Danny's productions are significantly more fronted than those of all of the other children. There is more individual variation when the two children with non-native parents are considered, however. The three simplest vowel changes, the fronting of (uw) and (ow), and the fronting and raising (aw), will be considered first. Roberts (1997a) found that when the rate of fronting was considered, these changes were among the easiest for these children to acquire. These comparisons of vowel extremity bear out these findings. There were no significant differences for any of the children in regards to (uw) fronting. Although Mike's tokens consistently among the less extreme, there was no significant difference between his mean and those of the others. In the fronting of (ow), there were also no significant differences, with the interesting exception that Gia's mean F2 measurement was significantly higher than that of the two lowest means, Mike's and Evan's. Mike's and Evan's productions did not differ significantly from those of the others, however. Finally, for (aw), in addition to the previously mentioned more fronted productions of Danny, the only significant difference for F2 was that of Mike, whose productions were less extreme than all of the other children's but Shelley's. For F1, there were several significant individual differences among the children. Most importantly, however, was the finding that Mike's tokens were significantly lower than those of Jenny, Danny, Evan, and Gia, whose productions were generally the highest. In summary, these simpler changes were produced similarly by all of the children, even those with non-native parents. Gia's productions were indistinguishable from the others for (uw) and (aw), and more extreme for (ow). Mike, whose parents are from Italy, generally showed less extreme productions, although this difference was not significant for (uw) and (ow).

The raising of (eyC) can be seen as a more complex change, since it is blocked by a word boundary, but not a syllable boundary. Roberts (1997a) found that it was more difficult for a child with less Philadelphia input to learn. Gia, however, exhibits no significant differences from the other children, although her tokens are generally clustered at the less extreme end of the range. Mike's productions, on the other hand, are significantly less extreme than the most extreme speakers in the group (Danny for F1; Danny and Jenny for F2), but not from those of the more midrange children. In other words, he is certainly acquiring this feature, but his productions are consistently among the least extreme in the group. Figure 1 illustrates this point with a vowel chart containing the individual (eyC) tokens of all of the children. Although there are more centralized tokens than those of Gia and Mike, these represent occasional tokens from several of the others, whose productions also included extreme tokens. Gia and Mike were responsible for none of the extreme tokens.

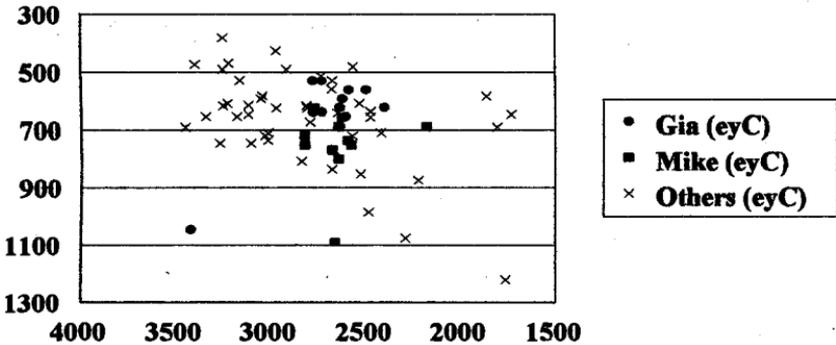


Figure 1: Raising of (eyC): Gia and Mike

Finally, short *a* is the most complex of the changes studied, with lexical, grammatical and phonological conditions affecting its occurrence. Not surprisingly, and in support of the findings of Roberts (1997a), the differences between the children with contrasting input situations shows up most for this variable. Significant differences for F1 between Mike and the two most extreme speakers (Danny and Jenny) show that his productions are among the least raised in the group. Similarly, significant differences between F1 and F2

for both Mike and Gia and the more extreme speakers (Jenny, Danny, and Evan for Mike; Jenny and Evan for Gia) reveal that their productions are also among the least raised.

Table 2 is provided as an illustration of the data analyzed and indicates the means, standard deviations, significance level, and numbers of tokens for the individual speakers for short *a*.

Variable	Speaker	N	Mean	S.D.	Significance
<u>short a F1</u>	Danny	19	639.5	89.9	NS
	Jenny	22	646.3	161.7	NS
	Evan	11	690.6	145.2	NS
	Shelley	12	715.8	152.7	NS
	<i>Gia</i>	14	817.4	331.2	NS
	<i>Mike</i>	10	897.7	281	$p < .05$
<u>short a F2</u>	Danny	19	2919.7	168.9	NS
	Jenny	22	3152.5	231.2	NS
	Evan	11	3169.5	509.1	NS
	Shelley	12	2854.4	169.5	NS
	<i>Gia</i>	14	2631	552	$p < .05$
	<i>Mike</i>	10	2535	211.9	$p < .05$

Table 2 Comparison of F1 and F2 means for short *a* for all children

In summary, these findings support those of Roberts (1997a). In addition to having more difficulty learning the more complex sound changes, the children with non-native parents also appeared to have generally less extreme productions. It is important to note, however, that their productions do overlap those of the other children. They are not out of "community range", merely on the less extreme end of it.

3.2 Triangle Point Vowels

The three vowels measured by Kuhl et al. (1997) and found to be more peripheral in the mothers' speech when talking to infants than when talking to adults were (iy), (uw), and (ah), described by the authors as the three points of the vowel triangle. These three vowels were also measured in the current study to ascertain whether the children's tokens were more extreme than those of their caretakers. If so, this could be seen as initial support for the idea that if the children are hearing more extreme tokens during CDS, these vowels may in fact become the targets of their future vowel productions. The results of this study showed that for (iy) and (ah) the children's productions were more extreme (i.e., toward the periphery of the vowel space) than those of their care takers. (See Figure 1 for an illustration of the following findings.) That is, for (iy), the children's mean F1 was significantly lower ($t(73.36) = 2.4, p = .019$) and their mean F2 was significantly higher ($t(79) = 2.27, p = .026$), resulting in productions that were more fronted than higher than those of their mothers.

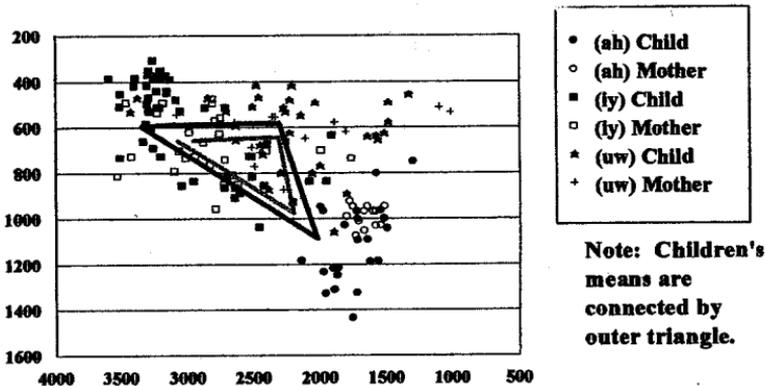


Figure 2: Vowel triangle for children and mothers, (iy), (uw), (ah)

For (ah), the children's mean F1 was significantly higher than that of their mothers ($t(39) = 3.77, p = .001$), but there was no significant difference between the F2 means resulting in a lowered production for the children. Long

(uw), a vowel which also occurs as a Philadelphia variable, demonstrated no significant differences between care takers and children.¹

4 Discussion

The results of the current study, in combination with those of previous work, underscore the role of young children as participants in and contributors to sound change in progress. Although the key role of adolescents in sound change has been well-documented, current research suggests that sound change does not begin in adolescence. The workings of dialect acquisition and change beginning in early childhood and extending into adolescence and beyond may provide fruitful avenues of research for some time to come. The purpose of this work has been to suggest possible domains in which this process can occur and potential learning mechanisms which could advance it to be explored in future research.

One mechanism considered by the current study is that of the input process of child-directed speech (CDS), familiar to researchers of language acquisition. The findings of Kuhl and colleagues are that during CDS, mothers' speech was characterized by a significantly expanded vowel triangle. They argued that this feature of CDS would aid the child in acquiring a phonological system by providing them more specific vowel information. The results of the current study revealed that the children's productions of two of the three triangle vowels, ((ah) and (iy), but not (uw)), were significantly more peripheral than those of their mothers. The possibility suggested by these findings is that the more peripheral input heard by the children in infancy may then become the targets for their own eventual productions. For the dialect variables in which an innovative variable is also the more peripheral variable (e.g., (eyC) and short *a* in Philadelphia), these early peripheral productions may become the typical productions of children as they mature, resulting in a more peripheral innovative form. A second, related possibility is that these early peripheral forms, in which children match the expanded

¹To minimize the possibility that the normalization process had an effect on these results, means of short vowels (e.g., (I), (e)), in which no prediction of vowel triangle stretching would pertain, were made. There were no significant differences between adults and children in these results.

CDS productions, may become the domains in which adolescents, having experienced the expanded model, may further push the limits of the vowel space. The current findings, that children's productions of (iy) and (eyC) were more extreme than those of their mothers provide rudimentary support for these suggestions. Clearly, further research is needed, particularly into the question of what happens when the most innovative dialect form is *not* the most peripheral form, as in the case of the fronting of (ow) and (uw). Kuhl does not provide dialect background information on the speakers in her studies, so we do not know if this dialect situation would change the CDS productions of the mothers. The current study cannot answer this question either. The facts that (uw) was the only one of the triangle vowels not to result in more peripheral productions by the children, and that the mothers produced more extreme tokens of (ow) than the children suggests that something different is happening in the back of the vowel space than in the front. Unfortunately, exactly what that something is will have to be the subject of future research. Two predictions to be explored at a later time, however, include the following: Children appear to be in a unique position to contribute to language change in the situations in which the more innovative form is also the more peripheral form. Secondly, like the situation in which the child care situation appears to lead to the favoring of female-led changes, it is predicted that the CDS situation could encourage a preference for changes involving vowel shifts toward the periphery of the vowel space.

The newness of this area of inquiry and its complexity leave us with many areas to explore. However, the results of previous and current research clearly converge on the point that children can and do contribute to change. Early indications from the current study are that this contribution may be aided by the same learning mechanisms that are relevant to language acquisition in general.

Like gender, ethnicity, and age, the construct of speech community is not fixed but socially negotiated and continually changing. Sociologists have argued that, rather than merely reflecting their identities as a function of biologically-influenced roles, adults and children construct, or 'do' race, ethnicity, gender, etc. I suggest that children, like adults, also 'do' community. Thorne (1993), in her research on the construction of gender by kindergarten children, argues "that within the complexities, within the 'play of gender', indeed lie possibilities of social change." By the same token, within the in-

teractions in which children and adolescents participate, with their care takers, with their peers, with their community, lie the possibilities of language change.

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