How bilingual development is the same as and different from monolingual development*

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Abstract

Based on data from two longitudinal studies of 2- to 5-year-old Spanish- and English-learning bilingual children and English-learning monolingual children, we compare the processes and outcomes of simultaneous bilingual development to those of monolingual development. We find, in essence, that the processes are the same. The outcomes differ, however, because the immediate environments and larger sociocultural contexts of bilingual and monolingual development differ. Common processes include a dependence of language growth on the quantity and quality of language exposure and a relation between children's own language use and their language growth. Differences in outcomes include the rate of language development and the profiles of expressive and receptive skills.

Key words: bilingual trajectories, minority–majority language bilingualism, input effects, output effects

Résumé

À partir des données de deux études longitudinales menées sur des enfants âgés de 2 à 5 ans (un groupe de bilingues acquérant l'espagnol et l'anglais, et l'autre composé de monolingues anglais), nous comparons les processus et résultats de l'acquisition langagière bilingue simultanée face à son pendant monolingue. Il en résulte, essentiellement, que les processus sont identiques. En revanche, les résultats divergent en fonction des environnements immédiats du développement langagier — qu'il soit bilingue ou monolingue — et de contextes socioculturels plus larges. Les processus communs sont liés, d'une part, à la croissance langagière en matière de qualité et de quantité d'exposition, et, d'autre part, à la

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relation entre cette même croissance et l'usage que les enfants en font eux-mêmes. Les divergences en matière de résultats reposent sur les différences dans le taux de développement langagier et sur les profils de compétences expressives et réceptives des locuteurs.

Mots-clés : trajectoires bilingues, bilinguisme minoritaire vs. majoritaire, effets de l'intrant (input), effets de l'extrant (output)

Introduction and background

A central question in the study of simultaneous bilingualism is whether language acquisition is different when two languages are being acquired at the same time. In this paper, we summarize the findings from two longitudinal studies of Spanish–English bilingual children in the U.S. as they address that question. In both these studies, we collected data on the language environments and language development of children who were born in the U.S. to families in which at least one parent was an immigrant from a Spanish-speaking country. The children were exposed to both English and Spanish from birth. We also collected parallel data on children from monolingual English-speaking homes for the purpose of comparison. The aims of these studies were to describe trajectories of English and Spanish growth in the bilingual children, to explain why the trajectories have the shape they do, and to account for individual differences.

We begin with a description of Spanish–English bilingualism in Florida because it is relevant to the interpretation of our results and the implications of our findings. Bilingualism in Florida is an immigrant phenomenon, consistent with the three-generation rule that has been described for immigrants more generally (Eilers, Pearson, & Cobo-Lewis, 2006). That is, the first generation of immigrants tends to stay fairly monolingual in their first language, the second generation tends to be bilingual, speaking both the heritage language of their parents and the new language of the country in which they live, and the third generation tends to be monolingual in that new language. The children we study are the second generation. They hear Spanish at home and in their neighborhoods. In the counties from which most of our participants are drawn the percentage of Spanish-speaking households is over 20% (for Broward county) and over 60% (for Miami–Dade county) ("Languages in Broward County"). They also hear English at home to varying degrees, and they live in an English-speaking country and attend school in English. The Spanish-speaking population of South Florida differs from many minority language, immigrant populations in that its members are frequently affluent and highly educated. Thus, in South Florida it is possible to study bilingualism unconfounded by factors of poverty and low levels of education. It is still the

case, however, that English is the language of the larger society and Spanish is less prestigious. As we will see, this fact is not lost even on 2-year-olds.

Participants and procedure

The data to be presented come from two different samples, each followed longitudinally. The first sample included 47 children from Spanish–English bilingual homes and 56 children from English monolingual homes. The children's language environments and language skills were assessed at 22, 25, and 30 months of age (Hoff, Core, Place, Rumiche, Señor, & Parra, 2012; Place & Hoff, 2011). A subsample of these children were available for a follow-up at age 4 years (Hoff, Rumiche, Burridge, Ribot, & Welsh, 2014). The second sample includes over 100 children from bilingual homes and 36 children from monolingual homes; the exact number of participants varies depending on the analysis because there are missing data at some time points and for some measures. These children and their environments were assessed at 6-month intervals from 30 months to 5 years, so far (Hoff & Ribot, 2016; Place & Hoff, 2016; Ribot & Hoff, 2014). A bilingual home is defined as one in which Spanish and English are both spoken and have been since the target child's birth. The less frequently used language must constitute at least 10% of the child's language exposure.

All the children had normal hearing and were developing typically at the time they were enrolled in the study. Parents' levels of education were relatively high. In the first sample, 73% of the parents of bilingual children and 68% of the parents of the monolingual children had college degrees. Because these proportions were so similar (and not significantly different by Chi-square test, $p = .62$), a direct comparison of the monolingual and bilingual children was a test of the effect of bilingualism unconfounded by parental education. In the second sample, 61% of the parents in monolingual households and 37% of the parents of the bilingual children were college educated. This difference is substantial and also statistically significant by Chi-square test, and therefore all analyses of the children's language included a measure of mothers' and fathers' mean years of education as a covariate in order to ask the same question as in Study 1: what is the effect of dual language input on language development separate from the often confounded effects of parental education level? English and Spanish use in the home was approximately balanced for the children in the first sample, based on caregiver estimates obtained in interviews (English was 51% of exposure at 22 months, 59% at 25 months, and 55% at 30 months).

Language exposure was slightly Spanish dominant in the second sample, English exposure ranged from 41% to 48% of language exposure across the period from 30 to 60 months. In both studies, data on the children's language

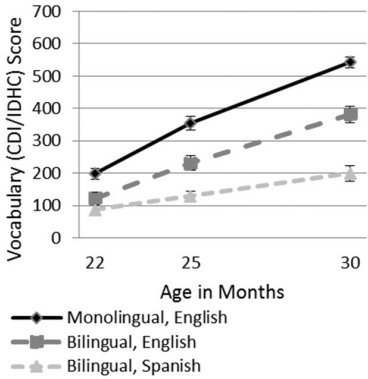

FIGURE 1

Growth in productive vocabulary in English for monolingual children and in English and Spanish for bilingual children

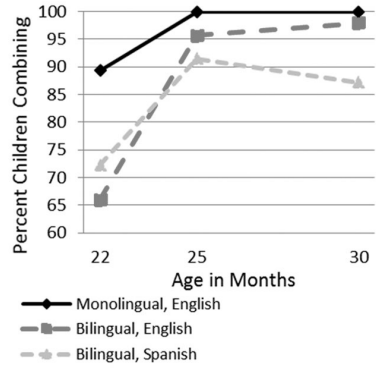

FIGURE 2

Growth in mean length of the longest three utterances produced in English for monolingual children and in English and Spanish for bilingual children

exposure were collected in a lengthy interview with the child's primary caregiver by fully bilingual research assistant in the language of the caregiver's choice. The children's language skills were assessed with standardized tests appropriate to the children's age. Data are reported here from the MacArthur–Bates inventories in English, the *Communicative Development Inventory* (CDI; Fenson, Dale, Reznick, Thal, Bates, Hartung, Pethick, & Reilly, 1993) and Spanish, *El inventario del desarrollo de habilidades comunicativas* (IDHC; Jackson–Maldonado, Thal, Fenson, Marchman, Newton, & Conboy, 2003), the *Expressive One Word Picture Vocabulary Test* (EOWPVT), monolingual English and bilingual versions (Brownell, 2000, 2001), and the *Preschool Language Scale — Fourth Edition* (PLS-4), auditory comprehension scale (Zimmerman, Steiner, & Pond, 2002). We administered the EOWPVT separately in English and in Spanish to obtain measures of the bilingual children's expressive vocabularies in each language. We administered only the auditory portion of the PLS-4 because the conversational nature of the test made it impossible to constrain the children to use only one language in the expressive portion, thus making it impossible to obtain separate measures of their English and Spanish skill (Hoff & Rumiche, 2012).

Trajectories of language growth

Trajectories of English growth for the monolingual children, and English and Spanish growth for the bilingual children are plotted in Figures 1 through 3 for

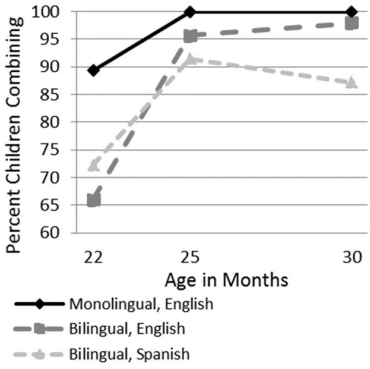

FIGURE 3

Growth in the percentage of children combining words in English for monolingual children and in English and Spanish for bilingual children

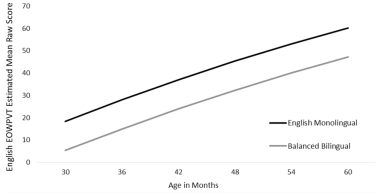

FIGURE 4

Estimated expressive vocabulary growth in English for levels of relative English input equal to 100% and 50%

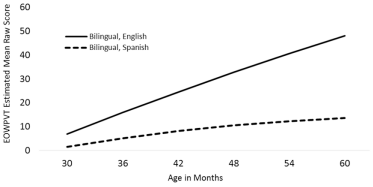

FIGURE 5

Estimated growth in English and Spanish expressive vocabulary for bilingual children with level of relative English input equal to 50%

Study 1 and in Figures 4 and 5 for Study 2. The plots from Study 1 are of raw vocabulary scores, mean length of the longest three utterances produced, and the percent of children combining words at each age, based on the MacArthur–Bates inventory data. In contrast, the plots from Study 2 are estimated growth curves yielded by the results of multilevel modelling. This allows for both entering a measure of parents' years of education as a covariate and for including participants with missing data, and also calculates a function that relates relative input to the outcome measure. Figure 4 plots the estimated English score on the EOWPVT for the values of the relative amount of English input of 100% and 50%, based on a model that included data from all participants. Figure 5 plots estimated English and Spanish growth on the EOWPVT for the value of

the relative amount of English input equal to 50%, based on a model that included data from only the bilingual participants.

As is apparent from Figures 1–5, both studies yield the same general picture of the effects of bilingualism on single language growth: it takes longer to acquire two languages than to acquire one. Children who are simultaneously learning two languages lag behind children who are learning only one when that comparison is made in terms of the children's skills in the one language that the monolingual children are learning full time. Another finding that appeared in both studies is that it seems to require less exposure to acquire English than Spanish. When English and Spanish raw scores are plotted, as in Study 1, or estimated, as in Study 2, for children with balanced home input, English skill levels are higher than Spanish. We know that children's language exposure outside the home is more English dominant than their home exposure (Place & Hoff, 2011) and parents may underestimate their use of English in the home. It may also be that other factors contribute to the observed English dominance in children with balanced home language input. We will return to that possibility in the Conclusion.

Effects of input quantity

The most obvious explanation for the difference between the monolingual and bilingual children's growth in English is that all of the monolinguals' language exposure is to English, while the bilingual children's exposure is divided between two languages. Although relative amount of exposure is not the same as absolute amount of exposure, it must be the case that, on average, children whose exposure is divided between two languages receive less exposure to each language than monolingual children do. Amount of language exposure has a well-established relation to language growth in monolingual children (Hart & Risley, 1995; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991), so it should not be surprising that exposure influences development in bilingual children.

A further test of the hypothesis that quantity of language exposure predicts language skill can be accomplished within bilinguals, comparing children whose balance of English and Spanish exposure differs. Figures 6 through 11 present the findings for English and Spanish outcomes in Study 1. Figures 12 and 13 present the results of our work in progress in Study 2. In Study 1, the children were grouped on the basis of their input into English dominant (English $\geq$ 70% of input, *n* = 18), balanced (English = 40–60% of input, $n = 14$), and Spanish dominant (English $\leq$ 30% of input, $n = 15$) groups. In Study 2, trajectories were estimated using multilevel modelling, with relative English input entered as a continuous variable. What both studies show is that differences in English and Spanish skills among bilinguals are systematically and

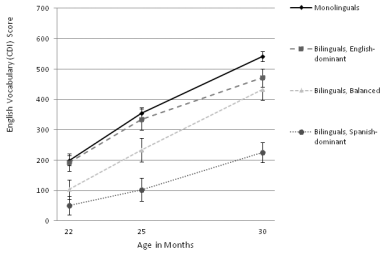

FIGURE 6

English vocabulary growth for English monolingual children and for bilingual children with English-dominant, balanced, and Spanish-dominant input

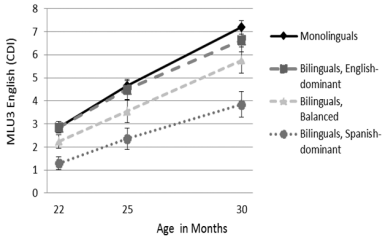

FIGURE 7

Growth in the mean length of the three longest utterances in English for English monolingual children and for bilingual children with English-dominant, balanced, and Spanish-dominant input

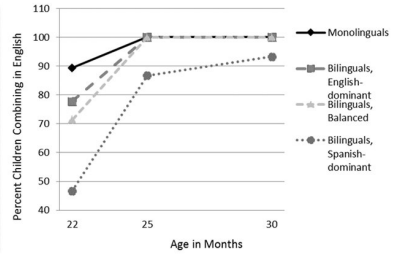

FIGURE 8

Growth in the percentage of children combining words in English for English monolingual children and for bilingual children with English-dominant, balanced, and Spanish-dominant input

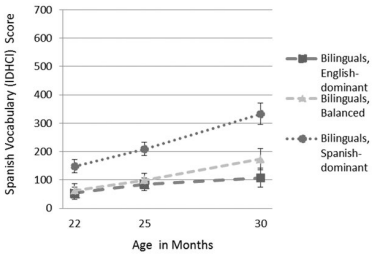

FIGURE 9

Spanish vocabulary growth for bilingual children with English-dominant, balanced, and Spanish-dominant input

significantly related to the relative quantity of English and Spanish input they hear and that the size of the lag between bilinguals and monolinguals differs depending on the balance of English and Spanish in the bilingual children's language exposure. In addition to supporting the hypothesis that quantity of input paces language growth, these findings directly contradict the hypothesis that there is a threshold of English exposure that is less than 100% but that is sufficient for monolingual-like acquisition. We find that every increment in language exposure matters.

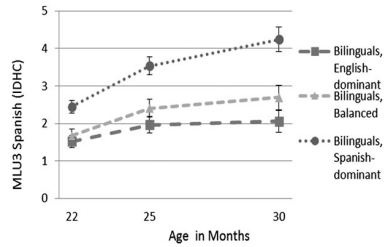

FIGURE 10

Growth in the mean length of the three longest utterances in Spanish for bilingual children with English-dominant, balanced, and Spanish-dominant input

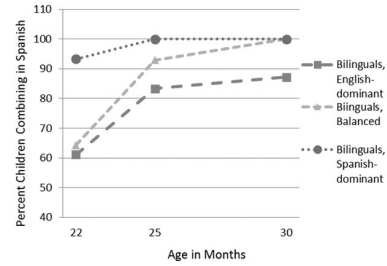

FIGURE 11

Growth in the percentage of children combining words in Spanish for bilingual children with English-dominant, balanced, and Spanish-dominant input

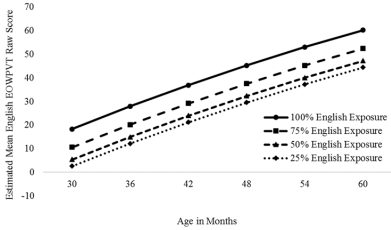

FIGURE 12

Estimated English expressive vocabulary growth for levels of English input equal to 100%, 75%, 50%, and 25%.

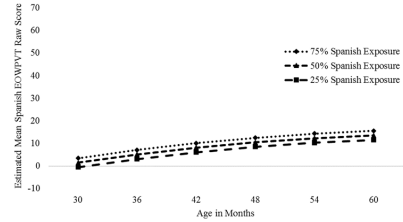

FIGURE 13

Estimated Spanish expressive vocabulary growth for levels of Spanish input equal to 75%, 50%, and 25%.

Effects of input quality

The analyses of the data from Study 2 revealed something else about the relation between exposure quantity and language skills that may also reflect the influence of exposure quality. The relation between English exposure and English skill was best captured by a quadratic function, which is evident in Figure 1, as the increasing distances between the trajectories of language growth and the amount of English exposure increases by equal amounts. Increases in the amount of exposure at the high end of the range of exposures resulted in a greater benefit to children's English skills than similar increases at the low range.

Other evidence suggests this quadratic function relating English exposure to English vocabulary reflects differences in the quality of English exposure that are associated with differences in quantity. In other work we have found that the percentage of bilingual children's English exposure that is provided by native speakers predicts the children's English skill, over and above the effects of how much English the children hear (Place & Hoff, 2011, 2016); English use in the home is strongly related to children's English skills among bilingual children who have one native English-speaking parent and English use at home is only weakly related to children's English skills among children with two native Spanish-speaking parents (Hoff et al., 2014).

To return to the finding from Study 2, we propose that the quadratic function is related to the fact that in the monolingual English homes, where English approaches 100% of the children's language exposure, it is almost always the case that both parents were native English speakers. In contrast, in the bilingual homes sometimes one and sometime no parent is a native speaker of English. And further, among bilingual homes, more English is used in homes in which one parent is a native English speaker than in homes in which both parents are native Spanish speakers. The children who hear more English are also hearing a greater percentage of that English from native speakers. One avenue of research currently being pursued in our lab makes use of the recordings of mother-child conversation we collected in Study 2 to compare the child-directed English of mothers who are native speakers of English to the child-directed English of mothers who are late learners of English as a second language. The goal is to identify differences that might explain why native speech is more useful for language learning.

Effects of output

In addition to the quantity and quality of children's language input, we have investigated children's own output as a potential contributor to their language development. Other studies have found measures of bilingual children's language use were related to children's language skill and have suggested that using a language plays a role in acquiring that language (Bedore, Peña, Summers, Boerger, Resendiz, Greene, et al., 2012; Bohman, Bedore, Peña, Mendez-Perez, & Gillam, 2010). Language use, or output, has not received much attention in the first language acquisition, but in the field of second language acquisition the Output Hypothesis has been proposed to explain why immersion students, who experience a great deal of high quality input, nonetheless fail to achieve high levels of proficiency in their second language (de Bot, 1996; Swain, 2005). This description of the experience of immersion students is actually much like the experience of many children raised in language minority homes. They hear the heritage language a great deal, but they choose to speak

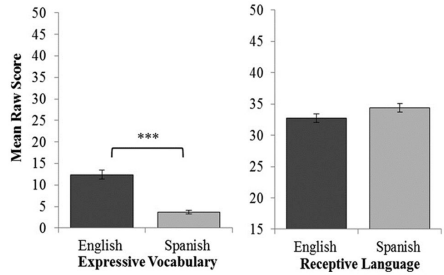

FIGURE 14

Bilingual children's expressive vocabulary and receptive language scores in Spanish and English

the dominant language of the larger society. Conversations in which the parents address their children in Spanish and the children respond in English are not rare (Valdés, 2001). It is also the case that as adults, many who were raised in bilingual homes describe themselves as passive bilinguals — able to understand two languages, but able to speak only one. If the language choices of children with Spanish-speaking parents are related to the bilingual skills of adults from Spanish-speaking homes, that suggests the hypothesis that language use is particularly beneficial to the acquisition of expressive language skills.

We tested the hypothesis that language use would be related to expressive language proficiency in the Spanish–English bilingual children of the second sample. One of the questions asked of caregivers concerned children's language choices in conversation. We asked "When your child is addressed in Spanish does he answer in Spanish?" and "When your child is addressed in English, does he answer in English?" The first finding, based on a sample of 90 30-month-old bilingual children who on average had balanced Spanish–English exposure, was that more children sometimes switched to English when addressed in Spanish (52%) than sometimes switched to Spanish when addressed in English (39%). On average, then, the children used English more than they heard it. The second finding in this sample is that the children's receptive skills measured by the PLS-4 in English and Spanish were comparable, while their raw expressive vocabulary scores on the EOWPVT were higher in English than in Spanish (Ribot & Hoff, 2014). These data are presented in Figure 14.

This concurrent correlation between use and skill is not evidence that use causes skill. The children could be choosing to speak the language in which they are stronger. To ask if language use benefitted language growth, we followed two groups of bilingual children from this same study to see if use predicted growth (Ribot, Hoff, & Burridge, 2017). On the basis of caregivers' an-

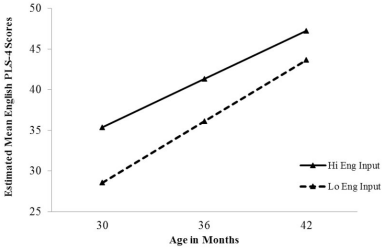

FIGURE 15

Estimated growth in English receptive skills as a function of relative English exposure

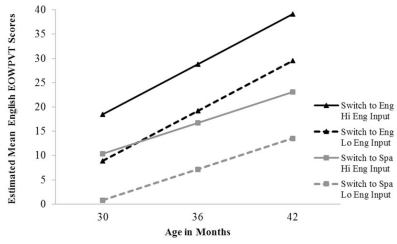

FIGURE 16

Estimated growth in English expressive vocabulary as a function of relative English exposure and use of English

swers to the question about whether children answered in the same language as the language in which they were addressed, we identified two groups of children. One group sometimes switched to English when addressed in Spanish but never vice versa, thus their use of English was greater than their exposure to English. The other group showed the less frequent pattern — they sometimes switched to Spanish when addressed in English but never vice versa, thus their use of English was less than their exposure. We compared the effects of this difference in language use by modelling growth first with child age and child exposure as variables and then by adding language use group to ask if the model that included language use better fit the data than the model without language use. When the outcome measure was receptive English skill (the PLS-4, auditory comprehension scale), language use did not result in better model fit. The development of comprehension skill was a function of age and exposure. In contrast, when the outcomes measure was expressive skill (the EOWPVT score), adding language use to the model did improve model fit. The development of expressive skill appears to be a function of age, exposure, and use. These relations are plotted in Figures 15 and 16.

Conclusion

How is bilingual development the same as monolingual development?

These studies of simultaneous bilingual development yielded three findings that suggest ways in which the process of bilingual development is like the process of monolingual development:

Finding 1: Quantity of input matters. Previous research has shown that monolingual children who have more language experience acquire language more rapidly than children with less (Hart & Risley, 1995; Huttenlocher et

al., 1991). The language experience of bilingual children is divided between two languages, thus, on average, bilingual children must hear less of each and therefore it takes longer to learn those two languages than it takes a monolingual child to learn one.

Finding 2: Quality of input matters. The present studies found that English input from native English speakers is more useful to children's language growth than English input from late learners of English (Hoff et al., 2012; Place & Hoff, 2011, 2016). Work in progress is examining properties of native and non-native child-directed English to ask why this should be the case.

Finding 3: Output matters. We can only speculate that this last finding may also be true for monolingual development. It is possible that children who are not talkative, or children in cultures where they are talked to but not expected to talk back develop a different constellation of language skills. They may have receptive abilities that exceed their expressive abilities by a greater amount than is characteristic of children who talk a great deal. This is a topic for future research.

How is bilingual development different from monolingual development?

The contexts in which children are exposed to two languages often differ from the contexts of monolingual development. If different contexts lead to differences in the quantity of input, the quality of input, or output, then different outcomes are to be expected. Input in each language must be less, on average, with the result that single language development in bilinguals will lag behind single language development in monolinguals. The present data do not say by how much this diminution of input will delay language development, because other variables are not held constant. In the immigrant environment of Spanish–English bilingualism in the U.S., much of the English input bilingual children hear is from late learners of English and that speech may be less supportive of children's language growth than the speech of native speakers. Furthermore, one of these children's languages is more prestigious than the other. This is the likely reason many children from Spanish-speaking homes choose to use English. As they use English, their English skills benefit and their Spanish skills do not. This may be part of why it appears to take more input to acquire Spanish than English — output also matters and output augments input in English, but not Spanish.

To sum, the studies of Spanish-English bilingual development among second-generation immigrants in South Florida tell us a great deal about the landscape of one form of bilingualism. The studies have also corroborated and revealed some of the factors that support language development. But the language environment of this community is not a perfect experiment that allows us to draw conclusions about the capacity of the human child to learn two

languages simultaneously under conditions of optimal input and support. This last conclusion is actually a hopeful one because it implies that simultaneous exposure to two languages from infancy could lead to more successful bilingual outcomes under more optimal and supportive conditions. The parameters to address in optimizing conditions include the quantity of input, the quality of input, and the circumstances that would lead children to choose to use both languages in communicative interaction.

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