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Do older bilinguals tell better stories?

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Abstract

Efforts to understand changes in language development and variations in language production across lifespan have increased considerably in the past several decades (Sankoff, 2017). In narrative discourse production, although several studies have reported age-related differences, the findings are not consistent. Additionally, previous research has investigated age-related changes in discourse production either with monolingual participants or with bilingual participants cross-linguistically in their first and second languages. This case study attempts to investigate age-related changes in narrative speech produced by 6 bilinguals aged between 6 and 53 years in L3-English. The narratives produced by the participants were analyzed with respect to quantity, informative content and narrative cohesion. The findings obtained on each of the measures showed increase in fluency and informative content, yet a fluctuation in cohesion across age.

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Keywords: Bilingualism; narrative speech; quantity; informative content; narrative cohesion

1. Introduction

Efforts to understand changes in language development and variations in language production across lifespan have increased considerably in the past several decades (Sankoff, 2017). Most of the studies conducted as part of this effort have focused on monolingual participants; however, a substantial proportion of today's world population is speaking more than one language on a daily basis and less is known about age-related variations in language production of these individuals.

Two main strands of research shape the frame of this study. The first research strand, cognitive literature, has provided ample evidence that age-related differences are observed in language production, and that language processing and production speed declines by age (Birdsong, 2006). At macro-level discourse processes, studies with elderly adult participants have reported reduced narrative coherence (Glosser & Deser, 1992; Marini, Boewe, Caltagirone & Carlomagno, 2005; Saling, Laroo & Saling, 2012), and relatively lesser informational content (Juncos-Rabadán, Pereiro & Rodríguez, 2005) than that of younger counterparts in monologic tasks, such as short talk and oral narratives. Findings of previous studies also suggest that older adults may experience difficulty in maintaining story focus

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(Bluck, Alea, Baron-Lee & Davis, 2016) and are more prone to introduce irrelevant material (Arbuckle, Pushkar, Bourgeois & Bonneville, 2004). At microstructure level, on the other hand, previous studies with elderly adult participants indicate that reduced syntactic complexity might characterize their discourse (Kemper, Kynette, Rash, O'Brien & Sprott, 1989). The second related research strand includes the studies on bilingual language users. Previous studies have well documented that there is a bidirectional influence between the languages acquired by bilinguals (Kroll & Bialystok, 2013) and that older bilinguals use the executive control networks more efficiently than monolinguals (Costa, Hernández & Sebastián-Gallés, 2008).

Within the frame of language production, this study investigates age-related changes in bilinguals' narrative discourse produced in L3-English. In the present exploratory case study, we investigated the quality and quantity of narrative texts produced by bilinguals in their third language. In line with the changes identified in literature concerning discourse production across ages, we anticipated that the narratives produced by our participants who came from different age groups would show differences.

1.1. Literature review

Discourse production, which is a complex and goal-directed task, goes beyond sentence level organization, operating not only at micro but also at macro levels (Kintsch & Van Dijk, 1978). When producing discourse one has to integrate not only linguistic but also non-linguistic knowledge. During production, the speaker organizes discourse around a central theme or topic and at the same time tries to retain essential linkage between individual utterances (Glosser & Deser, 1990). This requires an array of cognitive processes such as retrieving information from memory, deciding what and how to formulate propositional content, remembering what has already been said, planning upcoming utterances, and maintaining topic over the course of interaction (Alexander, 2006; Rogalski, Altmann, Plummer-D'Amato, Behrman, & Marsiske, 2010). In line with this stipulation, it is natural to assume that similar cognitive processes are required for the production of coherent narrative discourse.

Discourse analysis approach has been used as a method to examine language performance in healthy and clinical populations. Several studies analyzing discourse coherence in diverse groups of populations such as normal older adults (e.g., Glosser & Deser, 1992), individuals with dementia (e.g., Dijkstra, Bourgeois, Allen, & Burgio, 2004) and individuals with Alzheimer's disease (e.g., Glosser & Deser, 1990) have reported a close relationship between coherence and cognition. Previous studies with healthy populations have provided evidence for lifespan differences in ensuring micro and macro level coherence in language production. For example, while Au et al. (1995) reported an increase in word knowledge, Glosser and Deser (1992) reported a decrease in global coherence. Similarly, Capilouto, Wright and Wagovich (2005) compared the discourse ability of younger and older healthy adults as measured by correct information unit analysis and found that young adults produced more accurate, relevant, and informative content than old adults. Recently, Capilouto, Wright and Maddy (2016), using a picture description task, compared the micro linguistic processes (informativeness, syntactic complexity, and lexical diversity) in young, middle-aged and older adults. They found that older groups' narratives were significantly less informative compared to the young and middle-aged groups, and that the young and middle-aged participants produced more diverse vocabulary than older participants.

In narrative discourse, although age-related differences have been reported in several studies, the findings are not consistent. For example, while some studies have reported findings favouring young adults in the quality of the discourse narratives and the proportion of main events (Wright, Capilouto, Wagovich, Cranfill, & Davis, 2005; Wright, Capilouto, Srinivasan & Fergadiotis, 2011), some other studies have reported an advantage of old age in story quality (James, Burke, Austin, & Hulme, 1998; Kemper et al., 1998). Still, some other researchers reported no age differences. In an earlier study, for

example, Cooper (1990) investigated processing efficiency differences in adults between the ages of 20 and 78 years and found no differences in the number of relevant propositions produced per minute. In their study investigating age-related changes in microlinguistic, macrolinguistic and informative aspects of narratives produced by 69 healthy Italian adults, Marini and his colleagues (2005) found a sudden drop in local coherence accompanied by a drop in overall performance in the oldest group. The authors also reported several effects suggesting a gradual decrease in performance across age groups. As for the quantity of discourse, studies have reported no age effect (Cooper, 1990; Heller & Dobbs, 1993; Mackenzie, 2000).

The studies on bilingual language users have well documented that there is a bidirectional influence between the languages acquired by bilinguals (Kroll & Bialystok, 2013) and that bilingual individuals outperform their monolingual counterparts on executive control tasks (Bialystok, 2011). These effects have been found to exist in bilinguals across lifespan beginning from early childhood (Yang, Yang & Lust, 2011) and continuing through young adulthood (Bialystok, Craik & Luk, 2008; Costa, Hernández & Sebastián-Gallés, 2008; Hernández, Costa, Fuentes, Vivas, & Sebastián-Gallés, 2010) and older ages (Bialystok, Craik, Klein, & Viswanathan, 2004). In their study assessing working memory, lexical retrieval, and executive control in 96 younger (20 years) and older (68 years) adults Bialystok, Craik and Luk (2008) found that younger participants performed better than older participants in most of the tasks. They concluded that their results confirmed the effect of aging on these processes.

The studies using narratives in bilingual participants are fewer in number. Bennett-Kastor (2002) compared narratives produced by four bilingual speakers of Irish (Gaelic) and English, and found differences, within and across narratives, in the number of components included, the number of planning components explicitly marked for purpose, the marking of tense and aspect, and the use of extended aspectual categories. Montanari (2004) examined the development of narrative competence in the two languages of three Spanish-English bilingual children with different proficiency levels in each language over a six-month period. She found that without an array of linguistic devices at their disposal, the children failed to produce coherent and cohesive narratives in their L2. However, in her study investigating discourse cohesion in the elicited narratives of early Russian-German sequential bilinguals, Gagarina (2012) found that bilinguals of all age groups produced longer utterances and used more referential and relational cohesive devices in comparison to monolinguals.

1.2. Research questions

All the aforementioned studies have investigated age-related changes in discourse production either with monolingual participants or with bilingual participants cross-linguistically in their first and second languages. The present case study, however, attempts to examine age-related differences, if there are any, in bilinguals' narrative discourse produced in L3-English. More specifically, this study aims to answer the following research question:

1. Do narratives produced in L3-English by bilinguals change across age? If so, how do they differ with respect to three indices (quantity, informative content and cohesion)?

2. Method

2.1. Participants

The study group comprised 6 female bilinguals, aged between 6 and 53 years. All were bilinguals (with different L1-L2 pairings) speaking English as L3. Since early bilingualism is quite rare in our context, we used snowball sampling, which is a non-probability sampling method (Creswell, 2002) and

requested our participants to indicate other potential members with similar characteristics to take part in the study. All of the participants were recruited through personal contacts. Data was collected from individuals who volunteered to take part in the study. Specifically three main inclusion criteria were used: a) healthy early bilinguals, b) language proficiency in English and c) representing different age categories. The following age categories were set prior to recruitment: child, young adult, adult, middle-age and old age.

All of the participants were healthy sequential bilinguals, and had no history of previous neurological episodes or sensory or motor skills impairment that could have affected their task performance. Except for our very young bilingual, who was six years old, all the participants were literate in all of their three languages at the time of data collection. The participants were from different countries and spoke different languages. Their self-reported English language proficiency level was B1. Information related to the age and language background of our participants is provided in Table 1 below.

Table 1. Participant information

Participant	Age	Language background
A	6	Turkish-English
B	12	Persian-Turkish
C	21	Turkish-Pomak
D	32	Arabic-French
E	46	Turkish-Persian
F	53	French-German

2.2. Data collection tools and procedure

The participants completed a spoken production task requiring narrative construction from 11 pictorial representations. To elicit spoken production, an internationally known story "The Little Red Riding Hood" was used. The participants were requested to tell the story in as much detail as possible, without any time or word limit. All pictorial representations were presented on a single piece of paper and the paper remained in front of the participants for the duration of the procedure in order to reduce the demand on memory sources. The narratives were digitally recorded and transcribed for analysis.

2.3. Data analysis

Following the methodology of Field, Saling, and Berkovic (2000) and Goldman-Eisler (1968), three indices were used to analyze the narratives produced by the participants: quantity, informative content and narrative cohesion.

1. *Quantity*: The quantity of the speech was analyzed through four measures: (1) duration (the time (in seconds) taken to produce the narrative); (2) word count (number of words used); (3) fluency (number of words uttered per minute); and (4) lexical diversity (range of different words used in a text=type/token). Audacity software was used to calculate duration. Following the transcription of the narratives word count for each narrative was recorded and fluency was calculated by dividing the total number of words by duration. Lastly, for lexical diversity, which is a measure of how language users deploy their active vocabulary (Malvern & Richards, 2002), we preferred to use an online software (*Vocabulary Profiler*) which was developed based on Laufer, Nation, and Coxhead's Lexical Frequency Profiler (LFP) (https://www.lextutor.ca/vp/).

2. *Informative content*: To analyse informative content the number of core propositions produced in each narrative was recorded, and the narratives were compared with respect to the story schema. Following the methodology of Joanette and Goulet (1990) and Saling, Laroo, and Saling (2012), we determined the core propositions for the story of The Little Red Riding Hood (the story used as discourse elicitation task in the present study). Each of the investigators compiled a list of propositions for each of the stimuli. Lists were then compared and the propositions identified by two of the three investigators were included in the final core propositions list (see Appendix A). Each independent clause was marked as a proposition while calculating the number of propositions uttered by each participant. The informative content was labeled using a three-category coding system: (1) faithful proposition (number of core propositions), (2) irrelevant proposition (number of propositions irrelevant to the story schema), and (3) additional proposition (number of propositions expressing coherent additions). The overall informative content quality was calculated using the following formula:

   Overall informative content quality= [(total number of faithful propositions + total number of additional propositions) - total number of irrelevant propositions] / total number of propositions

3. *Narrative cohesion*: Narrative cohesion analysis was done through cohesion/coherence error comparison. Following Joanette and Goulet (1990) and Saling et al. (2012), the following four types of errors were extracted: (1) semantic errors: errors pertaining to semantic relations between different parts of the narrative (i.e., the inconsistent use of pronouns, or referents for the same object or character); (2) non-progression errors: repetition of previously presented information; (3) contradiction errors: presentation of new information which contradicts with previously presented information; and (4) relation errors: presentation of new information without any relationship to previously presented information. The error rate was calculated using the formula:

   Error rate = number of errors / total number of words.

3. Results

3.1. Narrative Quantity

The measures used to evaluate the quantity of narratives produced by the participants were duration (in seconds), total number of words, fluency and lexical diversity. The relevant measures obtained for each participant are displayed in Table 2 below. With respect to the first measure, the time taken to narrate the story by the youngest participant and 21-year-old young adult was longer than the other participants. The raw word counts of the narratives ranged between 108 and 379. Although raw word count scores seem to point the youngest and the oldest participants as the most productive language users, when number of words uttered per minute was calculated, our 46-year-old middle-aged participant was found to be the most fluent user.

Table 2. Narrative Quantity

	Participant					
Measure	**A**	**B**	**C**	**D**	**E**	**F**
Duration (in sec.)	256	78	215	106	68	194
Wcount[a]	379	108	301	193	243	319
Fluency	88.8	83	84	109.2	214	98.6
Lex-Div[b]	0.29	0.53	0.40	0.45	0.41	0.46

[a]**Wcount**= Word count, [b]**Lex-Div**= Lexical Diversity

As illustrated in Figure 1, fluency showed a left-skewed curving pattern; almost stable during childhood through 21 years of age and increasing later in young adulthood, peaking in middle-age, and finally decreasing in old age. This decrease in fluency in old age might not only indicate an increase in pauses and hesitations, but also a reduction in basal ganglia function which controls movement sequences. The fourth quantity measure, lexical diversity, on the other hand, seems to increase in childhood, from age 6 to 12, and then stabilizes after a slight decrease during young adulthood. This observed increase in type and token production suggest that lexical diversity as expressed by the variety of words used in production increase throughout childhood, which may be considered as an indication of improvement in vocabulary knowledge. Figure 1 below illustrates the changes observed in duration, word count and fluency across age.

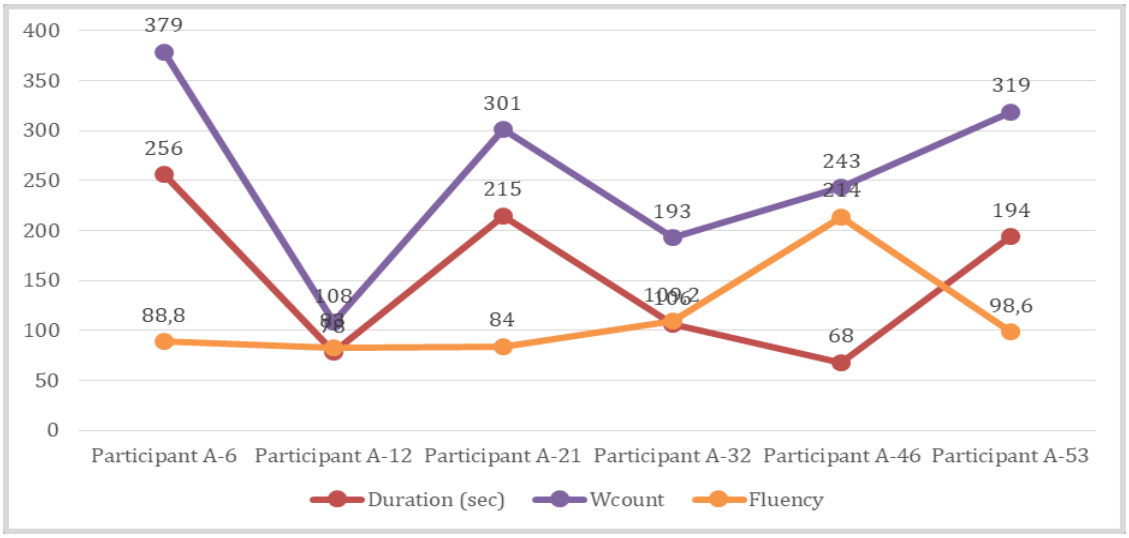


Figure 1. Changes in duration, word count and fluency in narratives across age

3.2. Informative content

For the informative content three variables were taken into consideration: 1) faithful propositions (FaProp), 2) irrelevant propositions (IrrProp) and 3) additional propositions (AddProp). The number of propositions produced by each participant in each category is presented in Table 3.

Table 3. Informative content

	Participant					
Variable	**A**	**B**	**C**	**D**	**E**	**F**
Total P[a]	40	15	13	15	23	26
FaProp[b]	12	7	11	10	10	10
IrrProp[c]	5	2	0	0	0	6
AddProp[d]	23	6	2	5	13	10
Overall CQ[e]	0.75	0.73	1	1	1	0.53

[a]**Total P:** Total number of propositions [b]**FaProp:** Faithful Propositions,
[c]**IrrProp:** Irrelevant Proposition, [d]**AddProp:** Additional Proposition [e]**CQ:** Content Quality

As displayed in the table above, the number of faithful propositions dropped substantially from age 6 to 12, which again increased by age 21 and remained more or less stable afterwards. While irrelevant propositions were detected only in the narratives of children and the oldest participant, a fluctuation was observed in the number of additional propositions for all of the participants. As for the calculated overall content quality of the narratives, an increase was observed from childhood to young adulthood, which was followed by a decrease in the old-age period. This change in the overall quality indicates that the narrative discourse of the children and the oldest participant is less accurate and informative than that of the young adults and the middle-aged participant.

3.3. Narrative cohesion

Following the methodology of Joanette and Goulet (1990), narrative cohesion was analyzed through extracting the four types of cohesion errors. An error rate was measured dividing the total number of errors to total number of words. Table 4 displays the results pertaining to narrative cohesion.

Table 4. Narrative cohesion

	Participant					
Category	**A**	**B**	**C**	**D**	**E**	**F**
SemE[a]	1	-	1	-	-	7
Non-progE[b]	3	2	2	3	1	3
ContrE[c]	-	-	1	-	-	2
RelE[d]	-	-	-	-	-	5

[a]**SemE:** Semantic Error**;** [b]**Non-progE :** Non-progression Error**;**
[c]**ContrE:** Contradiction Error**;** [d]**RelE:** Relation Error

In the cohesion category, notable differences were found with respect to the errors committed by the participants. In the present study, the use of inconsistent referents indicating the main character or the setting was one example of a semantic error. For example, to refer to the main character, 'Red Riding Hood' and 'Snow White', and to refer to the setting, 'the rain forest', 'the Amazon forest' and 'the wood' were used interchangeably by the oldest participant. In semantic relation error category, no visible pattern was observed for distinct age groups, although the oldest participant produced a substantially

large amount of semantic error. Non-progression errors, on the other hand, involved repetitions such as "… I am not sure who and the woman an old woman in a strange place which is not a forest". Presentation of new information contradicting with previously presented information was coded as contradiction errors. This type of error appeared as in the following example; "these threes look like men," followed later by "these men looking mushrooms". While non-progression errors were identified in all the narratives, contradiction errors were present in the narratives produced by only two of the participants from different age groups, suggesting no identifiable patterns across the age groups. The last category of errors, relation errors, was indicated by failures to establish link between new and previously presented information. Such instances were observed only in the narrative produced by our old-aged participant; "now I see a very angry looking fat man," followed by "Snow White is walking happily" without establishing any causal relation between the two propositions. This type of error was detected only in the narrative produced by the oldest participant and in a rather large amount. Similarly, Saling et al. (2012) reported finding relation errors only in the narratives of elderly group.

As for the overall error rate which was calculated by dividing the number of errors by total number of words, although a fluctuation was observed among participants, the oldest participant had the highest error rate among all, which we think indicates a decrease in cohesion by age (Figure 2).

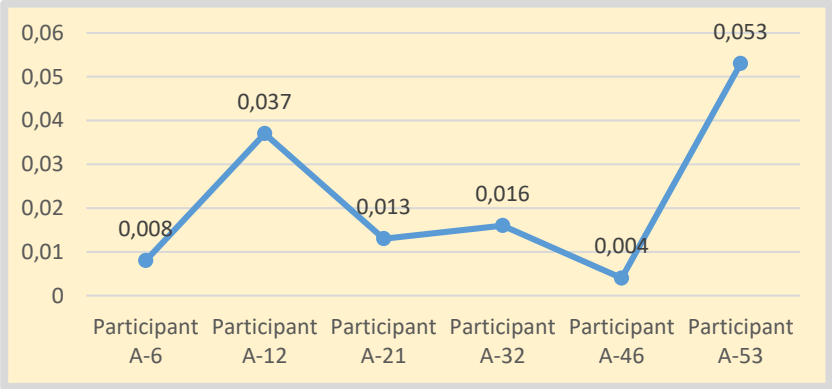


Figure 2. Overall error rate

4. Discussion

The overall measures of quantity and overall content quality demonstrated that the ability to express semantic content tends to increase from childhood to adulthood but decreases in old-age. At the same time, in our oldest participant the overall error rate in narrative speech was the highest. Unlike the narratives produced by the other participants, the narrative of this participant contained all types of errors: semantic relation, non-progression, contradiction and relation errors.

The observed decrease in faithful content and overall content quality accompanied by an increase in irrelevant and additional content and increase in the type and amount of errors detected in the narrative produced by our old-age participant appear to signal a possible decrease in the ability to organize propositional information. These findings agree with previous research showing an aging-related decrement in the amount of information in narrative production (Juncos-Rabadán et al., 2005; Kemper & Summer, 2001; Pratt, Boyes, Robins, & Manchester, 1989).

In this study, the narrative cohesion was measured only through errors. Still, our finding that the amount of clear referential usage and the proportion of overall quality of reference decrease with age is consistent with those of Kemper, Rash, Kynette, and Norman (1990) and Juncos-Rabadán et al. (2005).

5. Conclusions

To the best of our knowledge, this is the first study to investigate age-related changes in narratives produced by bilinguals in L3-English in our context. Overall, the means from absolute measures showed (a) an increase in fluency (number of words per minute) from childhood to adulthood with a peak in middle-age followed by a decrease in old age; (b) an increase in informative content (overall content quality) from childhood to young adulthood followed by a decrease in old age; and (c) a fluctuation in cohesion (error rate) across ages. These findings indicate that the narratives produced by bilinguals in their L3 change with respect to quantity, informative content and cohesion by age. The increase in error rate across age might be an indication of decline in the capacity to improve the coherence of narratives. However, since the number of participants in our study is limited to 6 cases, and since we did not have data related to their cognitive, social and personal measures, our findings are not generalizable. Further studies with larger sample size representing the age groups targeted in this study are needed to explore the influence of aging on narrative discourse production in bilingual and/or multilingual individuals.

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Appendix A. List of core proposition

1. There is a little girl (the little red riding hood) and her mother.
2. The mother gives a basket full of cookies to the girl so that she could take it to her grandmother.
3. The girl walks into the woods.
4. In the forest she sees a wolf.
5. After that she gets lost.
6. She sits under a tree.
7. While sitting there she sees a hunter.
8. The hunter shows her the way to her grandmother's house.
9. Meanwhile the wolf arrives the granny's house.
10. The hunter and the little girl arrives the house afterwards.
11. The girl sees the wolf dressed as her granny
12. She is surprised because she understands that it does not look like her grandmother.
13. She is scared and screams.
14. The hunter enters the house and kills the wolf.
15. And the girl and the grandma are having breakfast with chocolate chips cookies on the plates.

Yetişkin iki dilliler daha iyi öykü anlatıcıları mıdır?

Öz

Dil gelişimindeki değişimleri ve dil üretimindeki farklılıkları anlamaya yönelik çabalar geçtiğimiz birkaç on yılda önemli ölçüde artmıştır (Sankoff, 2017). Biliş üzerine yapılan çalışmalar, dil üretiminde yaşa bağlı farklılıkların gözlemlendiğine dair yeterli kanıt sağlamış olmakla birlikte (Birdsong, 2006), iki dilli bireyler üzerine yapılan çalışmalar, edinilen diller arasında iki yönlü bir etkileşim olduğunu (Kroll & Bialystok, 2013) ve iki dilli bireylerin tek dilli bireylere oranla yönetsel yetkinlik ağlarını daha etkin kullandıklarını göstermiştir (Costa, Hernández & Sebastián-Gallés, 2008). Bu vaka çalışması, 6 ila 53 yaş arasındaki altı iki dilli bireyin anlatısal metin üretiminde yaşa bağlı değişiklikleri araştırmaktadır. Katılımcıların ürettikleri anlatılar nicelik, bilgilendirici içerik ve anlatı tutarlılığı açısından analiz edilmiştir. Elde edilen bulgular akıcılık ve bilgilendirici içerikte yaşa bağlı artış olmasına rağmen, tutarlılığın dalgalandığını göstermiştir.

Anahtar sözcükler: iki dillilik; anlatısal metin; nicelik; bilgilendirici içerik; tutarlılık

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