

An analysis of speech disfluencies of Turkish speakers: Influence of educational background

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Abstract

This research aims to analyze the influence of educational background on Turkish native speakers' production rates of speech disfluencies. 56 native speakers of Turkish between ages 33-50 years and over 50-year-olds took part in the study. Each group was divided into two sub-groups according to the educational background of the participants. Prepared and unprepared speech samples of each participant were gathered via face-to-face interviews that were recorded and transcribed. As a result, participants with higher education levels produced more filled gaps than elementary/middle school graduates. In the prepared speech, over 50-year-old male elementary/middle school graduates produced more hesitations than male professors, and 33-50-year-old male elementary/middle school graduates produced more slips of the tongue than males with higher education. In unprepared speech situation, 33-50-year-old male elementary/middle school graduates produced more false starts than bachelor's/master's-doctoral degree holder males; however, over 50-year-old female professors produced more false starts than elementary/middle school graduate females.

Keywords: Linguistics, speech production, Turkish speech, speech disfluencies, educational background

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1. Introduction

Human speech is not flawless. Numerous speech disfluencies are observed in spontaneous speech as a result of many different linguistic and non-linguistic factors. Speech disfluencies which are generally seen as hindrances for smooth and fluent speech have been classified into many different types by researchers. They could simply be divided into seven different categories as silent gaps, filled gaps, hesitations, prolongations, slips of the tongue, false starts, and repetitions. These different types of speech disfluencies are named, defined, and classified in different fashions in the research literature (Bell et al., 2000; Carter & McCarthy, 2006; Clark & Wasow, 1998; Dell & Reich, 1980; Hieke, 1981; Liu et al., 2003; O'Shaughnessy, 1992; Postma et al., 1990, etc.).

In our study, we did not analyze silent gaps since there is no consensus among researchers on how long the duration of a gap in speech must be to be considered a silent gap. Related to filled gaps, we have seen that the gaps in Turkish speech could be filled with [ee], [ıı], [aa], [ii], [uu] and [mm] sounds, so we counted these sounds as filled gaps in Turkish speech. We marked the disfluencies as hesitations when the speaker could not produce a whole word at once as a result of the hesitation s/he experienced. The sounds which were produced longer than they should have been were considered as prolongations. The disfluencies in which the speaker stops the flow of his/her speech and starts his/her utterance again were considered to be false starts. We have seen that slips of the tongue in Turkish speech may include sounds, words, and word groups, so we marked all of them as slips of the tongue. The repeated sounds, words, and word groups in an utterance were considered to be repetitions.

As mentioned earlier, many different linguistic and non-linguistic factors are at play in the production of speech disfluencies. Shriberg (1994) is one of the researchers who emphasize the possible influence of sociolinguistic variables such as education level and occupation. However, the number of research publications focusing on the influence of speaker's educational background on the production of speech disfluencies is very limited in the literature (Andrade & Martins, 2011; Tottie, 2011).

No research has been conducted regarding the impact of educational background on the production of speech disfluencies of Turkish native speakers. In this study, the role of the speaker's educational background in speech disfluency production in Turkish language was analyzed in two different speech situations, namely prepared and unprepared.

2. Method

2.1. Participants

A total of 56 fluent adult native speakers of Turkish between ages 33-50 years and those over the age of 50 participated in the study. These two age groups were divided into two sub-groups with 28 participants in each according to the participants' educational background (for 33-50-year-olds: elementary/middle school graduates vs. bachelor's/master's-doctoral degree holders, for over 50-year-olds: elementary/middle school graduates vs. professors). Gender distribution in each group was equalized. The participants had no hearing loss, language disorders or neurological problems.

2.2. Procedure for collecting and analyzing the speech data

Prepared and unprepared speech samples of at least 300 words were gathered from each participant by means of face to face interviews. All the samples were recorded and transcribed for

analysis. Topics of common interest such as jobs, hobbies, career, directions, cooking instructions, etc. were chosen for face to face interviews. In the prepared speech situation, participants answered the questions they had seen before, so they could think about their answers and plan their speech in advance this way. In the unprepared speech situation, they answered the questions they had not seen before spontaneously. The average number of each type of speech disfluency in every 100 words was calculated to identify the speech disfluency rates of each participant.

3. Data analysis and findings

The differences among the speech disfluency rates of the participants with different educational levels in prepared and unprepared speech situations were analyzed with Mann-Whitney U Test. The figure below presents the figures gathered from the statistical analysis of the speech data.

	PREPARED SPEECH			p	UNPREPARED SPEECH		
	Mean±SD	Median (Min_Max)			Mean±SD	Median (Min_Max)	p
FILLED GAPS							
<u>33-50-Year-Old Females</u>							
Elementary/Middle School	2.22 ± 1.96	1.89 (0-5.15)		2.22 ± 1.77	2.42 (0-4.66)		
Bachelor's/Master's-Doctoral Degree	7.54 ± 4.02	6.79 (2.30-13.38)	0.006**	7.58 ± 3.87	6.21 (3.92-14.18)	0.001**	
<u>33-50-Year-Old Males</u>							
Elementary/Middle School	4.14 ± 3.76	5.10 (0.18-10.30)	0.073	3.28 ± 2.66	3.41 (0.17-6.53)	0.004**	
Bachelor's/Master's-Doctoral Degree	9.81 ± 4.01	9.21 (4.84-14.95)		9.86 ± 4.58	8.78 (3.42-17.71)		
<u>Over 50-Year-Old Females</u>							
Elementary/Middle School	2.01 ± 3.32	0.60 (0-9.01)	0.02*	1.46 ± 2.62	2.46 (0-7.12)	0.007**	
Professor	7.28 ± 3.35	6.73 (3.07-13.74)		6.85 ± 3.73	5.39 (2.37-12.37)		
<u>Over 50-Year-Old Males</u>							
Elementary/Middle School	3.52 ± 4.27	1.55 (0.28-12.75)	0.07	2.65 ± 3.28	1.57 (0.32-9.92)	0.02*	
Professor	5.35 ± 1.99	5.56 (2.86-8.86)		5.87 ± 1.97	5.68 (2.76-8.31)		
HESITATIONS							
<u>33-50-Year-Old Females</u>							
Elementary/Middle School	2.00 ± 1.28	1.99 (0.60-4.29)	0.28	1.68 ± 1.10	1.45 (0.19-3.55)	0.15	
Bachelor's/Master's-Doctoral Degree	3.24 ± 2.05	3.37 (1.40-7.13)		2.95 ± 1.98	2.27 (0.73-6.88)		
<u>33-50-Year-Old Males</u>							
Elementary/Middle School	4.79 ± 3.01	3.84 (2.31-11.31)	0.053	4.08 ± 2.54	3.03 (2.01-9.20)	0.32	
Bachelor's/Master's-Doctoral Degree	2.23 ± 1.51	2.39 (0-4.36)		2.53 ± 1.76	2.32 (0.73-5.68)		
<u>Over 50-Year-Old Females</u>							
Elementary/Middle School	3.92 ± 2.53	3.59 (1.07-7.90)	1.00	3.80 ± 2.72	2.69 (1.22-8.60)	1.00	
Professor	3.67 ± 1.34	3.70 (2.15-5.45)		3.36 ± 1.82	3.01 (1.66-6.76)		
<u>Over 50-Year-Old Males</u>							
Elementary/Middle School	7.04 ± 3.73	4.46 (3.70-12.25)	0.03*	5.65 ± 2.10	5.74 (2.71-8.91)	0.07	
Professor	3.34 ± 0.99	3.36 (1.46-4.52)		3.44 ± 1.88	3.69 (1.40-5.07)		
PROLONGATIONS							
<u>33-50-Year-Old Females</u>							
Elementary/Middle School	2.93 ± 2.49	1.63 (0.97-7.35)	0.77	2.15 ± 1.79	1.40 (0.27-5.18)	0.86	
Bachelor's/Master's-Doctoral Degree	2.01 ± 1.23	1.98 (0.50-3.98)		1.86 ± 1.14	2.27 (0-2.94)		
<u>33-50-Year-Old Males</u>							
Elementary/Middle School	8.58 ± 1.63	9.15 (5.88-9.93)	0.097	6.47 ± 1.85	6.75 (3.89-9.58)	0.53	
Bachelor's/Master's-Doctoral Degree	6.59 ± 3.27	5.94 (3.88-13.57)		5.88 ± 2.79	5.03 (2.78-11.49)		
<u>Over 50-Year-Old Females</u>							
Elementary/Middle School	16.91 ± 2.45	17.23 (13.44-19.67)	0.71	14.00 ± 3.52	13.73 (9.42-17.94)	0.35	
Professor	15.60 ± 4.27	14.57 (9.60-21.90)		15.21 ± 4.46	14.18 (10.10-1.86)		
<u>Over 50-Year-Old Males</u>							
Elementary/Middle School	19.59 ± 7.67	17.98 (10.47-32.56)	0.09	17.46 ± 4.89	17.01 (11.14-22.79)	0.16	
Professor	12.96 ± 4.73	12.59 (7.86-22.0)		13.51 ± 4.62	11.69 (10.23-22.92)		

Figure 2. Speech fluency rates

Mean; Arithmetic mean, SD; Standard deviation

*p<0.05 **p<0.01 ***p<0.001

	PREPARED SPEECH			UNPREPARED SPEECH		
	Mean±SD	Median (Min Max)	p	Mean±SD	Median (Min Max)	p
FALSE STARTS						
<u>33-50-Year-Old Females</u>						
Elementary/Middle School	0.45 ± 0.40	0.33 (0-1.25)	0.23	0.39 ± 0.35	0.34 (0-1.09)	0.86
Bachelor's/Master's-Doctoral Degree	0.86 ± 0.65	0.88 (0-1.68)		0.40 ± 0.33	0.42 (0-0.97)	
<u>33-50-Year-Old Males</u>						
Elementary/Middle School	2.30 ± 1.83	1.68 (0.51-5.04)	0.16	1.81 ± 0.96	1.23 (0.90-3.37)	0.01*
Bachelor's/Master's-Doctoral Degree	0.89 ± 0.24	0.85 (0.53-1.25)		0.82 ± 0.35	0.90 (0.17-1.14)	
<u>Over 50-Year-Old Females</u>						
Elementary/Middle School	0.79 ± 0.47	0.96 (0.20-1.47)	0.53	0.53 ± 0.39	0.49 (0-1.24)	0.01*
Professor	1.02 ± 0.33	0.92 (0.61-1.49)		1.26 ± 0.49	1.19 (0.51-1.96)	
<u>Over 50-Year-Old Males</u>						
Elementary/Middle School	1.20 ± 0.73	0.97 (0.52-2.45)	0.80	0.86 ± 0.58	1.04 (0-1.55)	0.71
Professor	1.02 ± 0.52	0.77 (0.44-1.73)		1.09 ± 0.74	0.83 (0.28-2.34)	
SLIPS OF THE TONGUE						
<u>33-50-Year-Old Females</u>						
Elementary/Middle School	0.36 ± 0.30	0.38 (0-0.83)	0.33	0.21 ± 0.16	0.25 (0-0.39)	0.77
Bachelor's/Master's-Doctoral Degree	1.19 ± 0.19	0.09 (0-0.51)		0.18 ± 0.19	0.23 (0-0.49)	
<u>33-50-Year-Old Males</u>						
Elementary/Middle School	0.73 ± 0.30	0.69 (0.34-1.11)	0.03*	0.52 ± 0.24	0.61 (0.14-0.73)	0.21
Bachelor's/Master's-Doctoral Degree	0.36 ± 0.28	0.35 (0-0.92)		0.29 ± 0.22	0.24 (0-0.67)	
<u>Over 50-Year-Old Females</u>						
Elementary/Middle School	0.31 ± 0.26	0.27 (0-0.61)	0.80	0.51 ± 0.33	0.58 (0-0.98)	0.053
Professor	0.27 ± 0.18	0.33 (0-0.50)		0.18 ± 0.16	0.18 (0-0.39)	
<u>Over 50-Year-Old Males</u>						
Elementary/Middle School	0.63 ± 0.45	0.84 (0-1.13)	0.53	0.52 ± 0.30	0.34 (0.27-1.03)	1.00
Professor	0.46 ± 0.39	0.44 (0.11-1.24)		0.44 ± 0.20	0.38 (0.25-0.84)	
REPETITIONS						
<u>33-50-Year-Old Females</u>						
Elementary/Middle School	0.23 ± 0.19	0.25 (0-0.60)	0.61	0.02 ± 0.05	0 (0-0.12)	0.46
Bachelor's/Master's-Doctoral Degree	0.15 ± 0.15	0.08 (0-0.39)		0.02 ± 0.04	0.01 (0-0.12)	
<u>33-50-Year-Old Males</u>						
Elementary/Middle School	0.51 ± 0.81	0.21 (0-2.22)	0.38	0.48 ± 0.65	0.33 (0-1.84)	0.26
Bachelor's/Master's-Doctoral Degree	0.10 ± 0.18	0 (0-0.48)		0.11 ± 0.20	0 (0-0.46)	
<u>Over 50-Year-Old Females</u>						
Elementary/Middle School	0.14 ± 0.18	0 (0-0.40)	0.38	0.35 ± 0.45	0.24 (0-1.23)	0.45
Professor	0.31 ± 0.35	0.22 (0-1.01)		0.20 ± 0.02	0 (0-0.05)	
<u>Over 50-Year-Old Males</u>						
Elementary/Middle School	0.32 ± 0.46	0.16 (0-1.26)	0.80	0.14 ± 0.11	0.16 (0-0.27)	0.71
Professor	0.34 ± 0.35	0.24 (0-0.87)		0.32 ± 0.37	0.15 (0-1.05)	

Figure 2. Speech fluency rates

Mean; Arithmetic mean, SD; Standard deviation

*p<0.05 **p<0.01 ***p<0.001

As shown in the figure above, the educational background variable is partly effective in the production rates of filled gap, hesitation, false start, and slip of the tongue types of speech disfluencies in Turkish language.

In terms of filled gaps, more educated females produced more filled gaps both in prepared and unprepared speech situations. For 33-50-year-old females, the filled gap median in prepared speech is 1.89 (0-5.15) for elementary/middle school graduates, whereas it is 6.79 (2.30-13.38) for bachelor's or master's /doctoral degree holders (p= 0.006). The difference is meaningful (p<0.01). For over 50-year-old females, the filled gap median in prepared speech is 0.60 (0-9.01) for elementary/middle school graduates, and it is 6.73 (3.07-13.74) for professors (p= 0.02). The difference is meaningful (p<0.05). The results are similar for unprepared speech. For 33-50-year-old

females, the filled gap median in the unprepared speech is 2.42 (0-4.66) for elementary/middle school graduates, whereas it is 6.21 (3.92-14.18) for bachelor's or master's/doctoral degree holders ($p=0.001$). The difference is meaningful ($p<0.01$). For over 50-year-old females, the filled gap median in unprepared speech is 2.46 (0-7.12) for elementary/middle school graduates, and it is 5.39 (2.37-12.37) for professors ($p=0.007$). The difference is meaningful ($p<0.01$).

The results are a little different for males compared to females. A meaningful difference has been established in unprepared speech, but for prepared speech, the difference is not meaningful. For 33-50-year-old males, the filled gap median in the unprepared speech is 3.41 (0.17-6.53) for elementary/middle school graduates, and it is 8.78 (3.42-17.71) for bachelor's or master's/doctoral degree holders ($p=0.004$). The difference is meaningful ($p<0.05$). For over 50-year-old males, the filled gap median in the unprepared speech is 1.57 (0.32-9.92) for elementary/middle school graduates, and it is 5.68 (2.76-8.31) for professors ($p=0.02$). The difference is meaningful ($p<0.05$).

In terms of hesitations, the only statistically meaningful result was seen in prepared speeches of over 50-year-old male speakers. Over 50-year-old elementary/middle school graduate male speakers produced more hesitations than over 50-year-old male professors in prepared speech. The hesitation median is 4.46 (3.70-12.25) for elementary/middle school graduates, and it is 3.36 (1.46-4.52) for professors ($p=0.03$). The difference is meaningful ($p<0.05$).

In terms of false starts, the results are complicated. 33-50-year-old elementary/middle school graduate males produced more false starts in unprepared speech situation than bachelor's/master's-doctoral degree holder males. The false start median is 1.23 (0.90-3.37) for elementary/middle school graduates, and it is 0.90 (0.17-1.14) for bachelor's or master's/doctoral degree holders ($p=0.01$). The difference is meaningful ($p<0.05$). And over 50-year-old female professors produced more false starts in unprepared speech situation than females who were elementary/middle school graduates. The false start median is 0.49 (0-1.24) for elementary/middle school graduates, and it is 1.19 (0.51-1.96) for professors ($p=0.01$). The difference is meaningful ($p<0.05$).

In terms of slips of the tongue, the only statistically meaningful result was seen in the prepared speeches of 33-50-year-old male speakers. 33-50-year-old elementary/middle school graduate male speakers produced more slips of the tongue than 33-50-year-old bachelor's/master's-doctoral degree holder males in the prepared speech. The slip of the tongue median is 0.69 (0.34 -1.11) for elementary/middle school graduates, and it is 0.35 (0 -0.92) for bachelor's/master's-doctoral degree holders ($p=0.03$). The difference is meaningful ($p<0.05$).

4. Discussion and conclusions

Our results indicate that 33-50 and over 50-year-old fluent Turkish speakers' disfluency production is influenced by their educational background to some degree.

In prepared speech situation,

- 33-50 and over 50-year-old female speakers with higher educational level produced more filled gaps than female speakers who were elementary/middle school graduates in the same age group.

- Over 50-year-old male speakers who were elementary/middle school graduates produced more hesitations than over 50-year-old male professors.
- 33-50-year-old males who were elementary/middle school graduates produced more slips of the tongue than bachelor's/master's-doctoral degree holder males at the same age group.
- Educational background variable did not affect the production rates of prolongations, false starts, and repetitions.

In unprepared speech situation,

- 33-50 and over 50-year-old speakers with higher educational level produced more filled gaps than speakers who were elementary/middle school graduates at the same age group.
- 33-50-year-old males who were elementary/middle school graduates produced more false starts than bachelor's/master's-doctoral degree holder males at the same age group. Over 50-year-old female professors produced more false starts than females who were elementary/middle school graduates at the same age group.
- Educational background variable did not affect the production rates of hesitations, prolongations, slips of the tongue, and repetitions.

In sum, female participants with a higher education profile produced more filled gaps than elementary/middle school graduates both in prepared and unprepared speech situations and male participants with a higher education profile produced more filled gaps than elementary/middle school graduates in the unprepared speech situation. Although this kind of difference has also been observed in male speakers' prepared speech, it couldn't be statistically proven.

In the light of this result, one possible assumption could be that 33-50 and over 50-year-old male speakers are able to suppress their filled gap production to some degree by using the monitoring phase of speech more effectively than female speakers in the prepared speech situation.

From a psychological point of view, Christenfeld and Creager (1996) observed that anxiety is sometimes accompanied by increased attention to the content of one's own speech, and this self-consciousness about the speech, whether or not it is a product of anxiety, will lead to more filled pauses. They also suggested that alcohol would do just the opposite, keeping speakers talking without much monitoring of what they are saying. In this sense, we could assume that speakers with a higher level of education have produced more filled gaps in our study since they feel anxious about whether their speech is sophisticated enough and reflects their educational level and social status.

In another study in accordance with the results of our study, Tottie (2011) found that speakers with higher educational background produced more fillers than speakers with lower educational background. She mentioned that this result could be related to the speakers' socio-economic class.

In most of the studies from a psycholinguistic point of view, the main question regarding filled gaps has been whether the filled gaps should be evaluated as real words since the speakers use the filled gaps on purpose or they are the reflections of the problems at planning phase of speech production.

Related to this question, Menyhárt (2003) has evaluated Levelt's (1999) speech production model and suggested that filled gap production occurs as a sign of uncertainty at the conceptualization and grammatical planning phases of speech production. Considering this interpretation, we can suggest that this kind of uncertainty at the planning phase of speech may increase in higher educational level speakers' speech since they experience greater difficulty in selecting the correct word while speaking due to their comprehensive lexicon. Hence, when speakers with a lower educational level speak using a more limited lexicon, it could be concluded that their disfluency production will also be limited. Besides, many researchers suggest that if a word is a concrete and common word, it could be activated more easily in mind and can be produced more correctly (Dell, 1990; Levelt and Jescheniak, 1994; Stemberger and MacWhinney, 1986). In this sense, it is expected that speakers with a higher

educational level will use more abstract and low frequency words and this could lead to more disfluency production.

In line with this interpretation, some researchers emphasize that the grammatical class of the words and syntactical structures used by the speakers may have an impact on the occurrence of speech disfluencies (Au-Yeung et., 1998; Le Dorze & Bédard, 1998). Andrade and Martins (2011: 79) also emphasize that it would be of great value to verify which grammatical classes and syntactical structures are mostly produced depending on the educational achievement since it might explain how disfluencies vary according to educational background. Therefore, there is a need for more studies analyzing the words choices (word class, grammatical class, frequency, being abstract/concrete) of the speakers from different educational levels.

In terms of grammatical planning, most researchers assert that longer utterances lead to more speech disfluency production as a result of the heavier planning demands (Bortfeld et. al, 2001; Branigan et. al, 1999; Oviatt, 1995; Shriberg, 1996). If we assume that speakers with a higher educational level generally prefer to speak using longer and more complex sentences, it is possible to say that participants with higher educational level have produced more filled gaps in our study as a result of this kind of planning demands.

Other than filled gaps, false start production is also more common in higher educational level participants' speech, although this effect is only limited to over 50-year-old female speakers' unprepared speech. In this age group, female professors have produced significantly more false starts than elementary/middle school graduate females. One possible assumption of this result could be that professors have more experience in planned speech situation since they are used to it as a requirement of their jobs, and they can suppress the production of speech disfluencies to some degree in prepared speech situation as a result of this experience. In line with this assumption, Menyhárt (2003) has emphasized the importance of experience in speech production by putting forward that children produce significantly more instances of disfluency than adults/old people as a result of lack of experience, which is partly due to age and partly to the peculiarities of the school system (the fact that schools provide little opportunity to practice speech). However, to draw a direct connection between the speech experience and disfluency production, more research results are needed.

As mentioned before, we observed in our study that filled gap and false start production could increase with higher educational background. However, we also observed that male participants with lower educational background produced some types of disfluencies more than participants with a higher educational background. For instance, 33-50-year-old elementary/middle school graduate males produced more slips of the tongue in prepared speech situation, and more false starts in unprepared speech situation than bachelor's/master's-doctoral degree holder males at the same age group. Similarly, over 50-year-old male speakers who were elementary/middle school graduates produced more hesitations than over 50-year-old male professors. Related to these results, it is possible to assume that participants who are elementary/middle school graduates may not be familiar to prepared speech situations and/or a recorded face to face interview. We could also suggest that some variables such as social status may have led to tension and stress which result in more sensitivity in speech production.

Overall, these results show that non-linguistic sociological factors such as educational background and psychological factors such as anxiety do not have a monotype effect on the production of speech disfluencies except filled gaps. We have observed in our results that different variables (age, gender, speech situation, familiarity, speech experience, social status, etc.) could interact in complicated ways in terms of speech disfluency production. In other words, different variables do not lead to similar results with simple one-way connections related to speech disfluencies.

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