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Self-Repair in Elicited Narrative Production in Speakers of Russian as the First (L1), Second (L2), and Heritage (HL) Language

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Abstract: The current study investigates self-repairs in the speech of three groups of Russian speakers: monolingual controls ($N = 12$) residing in the Russian Federation, for whom Russian is their first dominant language (L1); bilingual Russian–Hebrew speaking participants ($N = 12$), who acquired Russian as their Heritage Language (HL) in contact with the dominant Societal Hebrew in Israel; and bilingual Russian–Chinese speakers ($N = 12$) residing in the Russian Federation at the time of testing, for whom Russian is their second language (L2). Picture-elicited narratives were coded for instances of self-repairs, split into Conceptualizer Repairs (C-repairs)—which imply pragmatic, semantic, or lexical changes—and Formulator Repairs (F-repairs), correcting different types of errors. In addition, self-repair initiators—such as cut-offs, hesitation pauses, and discourse markers—were annotated before each instance of self-repair. The results indicate that L2 speakers, in general, use self-repairs more frequently than L1 and HL speakers. L1 speakers hardly produced F-repairs, while HL and L2 speakers resorted to both C- and F-repairs. L1 speakers mainly used C-repairs for appropriacy, whereas HL and L2 speakers used C-repairs for rephrasing and lexical item change. As for F-repairs, HL speakers tended to change pronunciation and morphology, while L2 speakers implemented more morphological repairs. Lexical initiators of self-repairs were more common in L1 speech; however, in the L2 group we saw much more frequent cut-offs of repaired speech fragments. As such, varying self-repair strategies were employed by different speaker groups, shedding light on the underlying processes of language production. There was also evidence of cross-linguistic transfer of non-lexical self-repair initiators: HL speakers resorted to prolongations as initiators in HL-Russian (a strategy that is common in their dominant language, Hebrew), whereas L1 speakers used vocalized and silent pauses more frequently.

Keywords: self-repair; first language; heritage language; second language; spoken speech; elicited narrative production; Russian

1. Introduction

Disfluencies are common in any spontaneous speech, such as in monologues and dialogues, due to their unprepared nature, a shortage of time, and the absence of the opportunity to carefully think through a strategy (Levitsky 2011). Von Humboldt (1984, p. 378) described the speech act as a spontaneous confrontation, a dramatic conflict between thought and its speech expression: "For the most everyday feeling and the deepest thought, language is insufficient, and people look at this invisible world as a distant land, where only language leads them, never bringing them to the goal. Any speech in the highest sense of the word is a struggle with thought, in which one feels either strength or impotence". Under such conditions of a "time deficit" and/or "struggle with thought", various disfluencies occur in spoken speech; it "seems to be born in agony—slips of tongues, self-interruptions,

self-correction, false-starts, repetitions" (Bogdanova-Beglarian 2013, p. 20). The definition of disfluency, also labeled as speech failure, is accepted in the literature as a modification of speech under the influence of both subjective and objective factors (Rusakova 2013), and it covers "a failure of the mechanism for monitoring the implementation of speech programs". The weakening of such controls is absolutely natural in a situation of spontaneous speech production.

Disfluencies in typical speech production—such as silent pauses, vocalized pauses (e.g., *uh* and *uhm*), prolongations, self-corrections, and repetitions—have been defined in several different ways, beginning in the 1950s, when they were labeled "extralinguistic events" that disrupted the normal flow of speech (Wingate 1987), and moving through the 1990s, when they were defined as "phenomena that interrupt speech flow but do not add propositional content to an utterance" (Fox Tree 1995). Subsequently, disfluencies were referred to as "break[s] in the flow of speech when the speaker stops for a moment in a place or for a length of time not predicted by typical fluent production" (Lickley 2017). The contemporary view of disfluency is more multidimensional, and refers to the listener's perception of fluency: whether the speech that they are listening to has been produced smoothly, with no disruptions in the flow. "Fluency (and disfluency) are features of speech production at several levels that affect perception of the speech in different ways. No single definition can suffice" (Lickley 2015, p. 45).

In the current study, we focused on a particular type of disfluency, i.e., self-repair (also called "self-correction"). We compared the use of self-repair across three groups of speakers: (a) monolinguals residing in the Russian Federation, speaking Russian as their L1; (b) bilingual Russian–Hebrew-speaking participants, with Russian as their Heritage Language (HL), in contact with the dominant Societal Hebrew in Israel; and (c) participants for whom Russian is their Second Language (L2), with Chinese as their dominant first language. The participants were asked to narrate a story based on a wordless picture sequence, to investigate the use of self-repairs across different speakers. The focus on self-initiated self-repairs was not accidental. Self-repair is defined as an error correction, the search for a word, the use of hesitation pauses, lexical, quasi-lexical, or non-lexical pause fillers, immediate lexical changes, false starts, and instantaneous repetitions (Rieger 2003). Self-repair might be initiated by a lexical and/or a non-lexical element and a combination of several elements. It has been suggested that, even if self-repairs are an invariable part of all languages and are systemically relevant to conversational turns, at least in certain sequential environments (Schegloff 1979), they are organized differently in different languages (Fox et al. 2010). In view of the interest in cross-linguistic transfer phenomena, this study also examined interesting trends, among L1 speakers, of disfluency transfer from their L1 to their L2, and vice versa.

1.1. Self-Repair in Spontaneous Speech

Any self-repair in the course of spontaneous speech production is a reaction to the so-called "interruption point" (also labeled as "a moment of interruption", "cut-off")—the place in the monologue where speech failure occurred (e.g., Blackmer and Mitton 1991; Kibrik and Podlesskaya 2007; Levelt 1983). According to Levelt (1983), there are three stages in the self-repair process: (1) the interruption of the flow of speech, when trouble is detected; (2) the presence of hesitation, pausing, but especially the use of editing terms; and (3) the introduction of the self-repair. The reparandum, interregnum, and repair are three distinct components of self-repairs, according to Shriberg (1994). The reparandum represents the part of the utterance that has been 'edited out'; the interregnum contains all disfluency phenomena between reparandum and reparans; and the repair replaces the reparandum.

In the case of a speech error (pronunciation, lexical, grammatical, stylistic, logical, etc.), its *correction* can be implemented. In the case of another hitch that also disrupts the smoothness of speech (cut-off, search for a word or a way to continue speech, an accidentally used non-trivial unit that causes a spontaneous reaction (reflection) of the

speaker, etc.), we refer to this type of correction as self-editing. All types of self-repair occur only when the speaker not only made a speech failure, but noticed it and decided to correct it. Self-repair can follow a speech failure immediately after the erroneous pronunciation of a fragment—online correction—or remotely, after some new part of the text, during which the speaker continues to remember the error and returns to it to correct—offline correction (see Kibrik and Podlesskaya 2007). Preliminary observations have shown that online correction in monologic speech is more common, and that it is easier for an L1 speaker to remember a speech failure. Apparently, "language memory" in a situation of language interference in L2 speakers is significantly shorter than in L1 native speakers (cf. Krashen 1981, 1982).

1.2. Self-Repair Typologies and Self-Repair Initiation Techniques

Self-repair is not the same as correction, because repair is not only limited to cases where an error or a slip has occurred (Laakso and Sorjonen 2010). Furthermore, self-repairs in a spontaneous monologue can be either correct or incorrect (see examples (1–2)):

(1)　*новые рубашки/(ы-н) тепе… <u>теперила</u>/**теперича**/завсегда садятся*
　　　*novye rubaški/(y-n) tepe . . . teperila/**teperiča**/zavsegda sadjatsja*
　　　*new shirts/(y-n) no . . . noweday/**nowadays**/always fit;*

(2)　*новые рубашки (…) <u>теперИчна</u> (э) **теперИча** () теперИча/завсегда садятся*
　　　*novye rubaški (. . .) teperIčna (e) **teperIča** () teperIča/zavsegda sadjatsja*
　　　*new shirts (. . .) noweday eh n**owAdays** () nowAdays/always fit* (Bogdanova-Beglarian and Chunxia 2020, p. 36).

Furthermore, self-repair can be carried out by the speaker in various ways, using a very extensive arsenal of means, i.e., the numerous hesitation phenomena mentioned above. Schegloff (2014) enumerates ten different operations for same-turn, self-initiated self-repair: replacing; inserting; deleting; searching; parenthesizing; aborting; sequence-jumping; recycling; reformatting; and reordering. Repetitions (which are also called recycling) can figure in the self-repair segment, or can serve as a repair operation on their own. According to a study of L2 speakers by Bada (2010), if the language item or items were repeated with no modification or change, this type of repetition was grouped as a 'filled pause', not different in any way from '*ah*', '*er*', '*erm*' (this kind of repetition will be discussed in self-repair initiators), and if the item or items were repeated with some modification, this was considered as an attempt to "self-repair". For example, in the utterance '*Simba Simba doesn't die, he only faints*', the item '*Simba*' is used as a vocalized filler, while in the utterance '*Schooge is . . . Schooge has everything that anyone could wish to have*', the repetition of the item '*Schooge*' is considered part of the self-repair segment.

Based on the Levelt model (e.g., Bange and Kern 1996; Kormos 1999), self-repairs are grouped into two general levels of processing: **Conceptualizer Repairs (*C-repairs*)**, i.e., conceptual pragmatic, semantic, and lexical repairs, where speakers change the informational structure of the message being conveyed, in response to a perceived problem or lack of clarity; and **Formulator Repairs (*F-repairs*)**, production formulator repairs, which occur in response to perceived inaccuracies originating from the morphosyntactic and morphophonological encoding processes (Simard et al. 2011; Zuniga and Simard 2019). The C-repairs are further subdivided into Different, Appropriacy, Lexical, and Determiner repairs, and the F-repairs are subdivided into Pronunciation, Morphology (which includes any derivational or flexional change to a word's form), and Syntax (which includes any change to the order of words in a sentence).

Self-repair might be initiated by a lexical or a non-lexical device. In English, lexical initiation can imply alternatives (e.g., '*or*'), parenthetical explanation and/or specification (e.g., '*I mean*'), apologizing (e.g., '*oops*' and '*sorry*'), and repetition as vocalized fillers (e.g., Bada 2010; Laakso and Sorjonen 2010; Kupina 2020). For Chinese learners learning L2, the lexical initiation might involve '*I mean*', '*well*', '*rather*, or '*that is*' (Ran 2003). Lexical initiators (self-repair markers) belong to the general category of discourse markers. The speaker

utilizes them to signal to the addressee that there is trouble, and that he/she is going to repair it. The previous research also found that Chinese English learners tended to overuse *'maybe'* as self-repair markers (Chen et al. 2005; Wang 2007). Quan and Zheng (2012) showed that L2 learners overused *'maybe'* and underused *'well'* and *'I mean'* as self-repair markers, compared to L1 speakers.

A non-lexical initiation can be a pause, a prolongation, or a vocalized pause such as *'uh'* or *'um'* (Schegloff et al. 1977; Levelt 1983), a cut-off, or a particle (Laakso and Sorjonen 2010; Clift 2016). Some researchers treat laughter as the target, in terms of its particular function in self-repair (e.g., Gao 2020). According to Bogdanova-Beglarian and Chunxia (2020) and Chunxia (2022), self-repair has been found to be preceded by a hesitation pause (20%), a vocalized pause (8%), a paralinguistic expression (cough or sigh) (1%), and prolongation (1%), as well as by the combination of these devices. According to Schegloff (1979), the most common place for repair initiation is immediately after the start of a turn construction unit (post-initiation), or immediately before it is complete (pre-completion), for example, prior to the first or last sound of a word.

In the current study, we investigated self-repair usage in different groups of speakers, in order to better understand the underlying mechanism of production.

1.3. Continuum of Speakers: L1, HL, and L2 Speakers

Different types of speakers can be defined categorically, or placed on a continuum, depending on the number of languages they speak, the age of acquisition of L2, and the level of attainment of the two languages in the case of bilingual speakers. The normal course of language acquisition in monolingual speakers occurs over the first 8 to 10 years of a child's life (according to the *Critical Period Hypothesis*, Birdsong 1999).

A monolingual L1 speaker—also called a "native speaker"—produces grammatical sentences, does not omit or misplace morphemes, recognizes ambiguity and pragmatic implications of words and sentences, and is attuned to his/her socio–linguistic environment (social class, social context, gender, etc.).

HL speakers acquire their HL from birth, just like monolingual L1 speakers, but then experience diminished input in that language, as they become a part of their society and its dominant language (Montrul 2016; Polinsky 2018; Rothman 2009). Eventually, a shift occurs, in which the HL becomes their weaker language, subsumed by the societal language in which they are immersed. Social circumstances constitute the main variables differentiating HL speakers from other naturalistic bilinguals; like monolinguals, HL speakers are exposed naturalistically to the HL; however, this language is a non-hegemonic minority language within a majority-language environment. Thus, since the HL is the family language which is used and heard in restricted settings (quality) and under limited exposure (quantity), there are varying degrees of discourse consequences across different language domains (Montrul 2016; Polinsky 2018; Rothman 2009). The linguistic behavior of HL speakers challenges long-held views, and raises a host of critical issues (Benmamoun et al. 2013). Some studies show that adult HL speakers pattern with L2 learners, child (L1) language learners, or with attritted L1 native speakers (see Polinsky and Scontras 2020); some show that HL speakers behave as L1 monolingual speakers; while others demonstrate differences between HL and L1 speakers, and link the observed differences to formal education differences in the HL (Kupisch and Rothman 2018) and/or cross-linguistic influence from the dominant societal language (e.g., Meir et al. 2017).

In contrast to L1 speakers, who exhibit smooth and complete language acquisition, L2 learners, who begin to learn their L2 in elementary school, high school, or college, are known to show non-L1-like acquisition across different language domains, such as phonetics, phonology, morphology, semantics, syntax, and discourse/pragmatics (Benmamoun et al. 2013). L2 learners rarely become fully balanced in both languages, and maintain their L1 as a dominant language.

1.4. Continuum of Speakers and Self-Repair Research

In L1 speakers, self-repair strategies are highly organized, but they may vary from language to language (Fox et al. 2010). In bilingual speakers, self-repair mechanisms from both languages are activated, and speakers can access strategies from either one language or the other (Hlavac 2011). Most previous studies have compared self-repairs in L1 and L2 speakers (e.g., Belz 2013; Belz et al. 2017; Temple 2000; Declerck and Kormos 2012); fewer studies have compared the use of self-repair in L1 and HL speakers (but see Yılmaz and Özsoy 2020). Some studies have compared self-repairs in L2–L2 and L2–HL interactions in oral tasks in Spanish, and have compared HL–L2 and HL–HL interactions in written tasks in Spanish (Bowles et al. 2014; Torres and Cung 2019).

Quantitatively, previous studies have shown that L2 speakers typically produce more disfluencies compared to L1 speakers, because of a higher cognitive load and more effortful planning (Fehringer and Fry 2007). Similarly, HL speakers were reported to produce more disfluencies, including self-repair, compared to L1 speakers (Yılmaz and Özsoy 2020). Studies comparing L2 and HL have shown that, overall, HL speakers are orally more fluent than L2 speakers, which is reflected in the lower rate of pauses in HL speakers than in L2 speakers. HL speakers are reported to be between native speakers and L2 learners, more like L1 speakers. Studies, overviewed in Simpson et al. (2013), have reported inconsistent results regarding the frequency of self-repairs, the frequency of each type of self-repair, and the use of self-repair communicative strategies among L2 speakers.

Investigation of the link between L2 proficiency and use of self-repair provides conflicting evidence: some studies (Kormos 2000; Van Hest 1996) showed differences between high and low proficiency L2 learners' ability to self-repair and the frequency of self-repairs. Kormos (2000) reported a small, significant negative correlation between self-repair rate and proficiency: as L2 proficiency increased, self-repair frequency decreased. These negative associations were stronger for F-repairs, which supported the suggestion that, as proficiency increases and formulator processes stabilize, speech becomes less error-prone, and the speaker generates fewer disfluencies, such as self-repairs. Conversely, Zuniga and Simard (2019) claimed that L2 self-repair behavior might be more closely linked to stable cognitive and personality traits than to L2 proficiency.

Self-repair research as a part of wider disfluency research deals also with how disfluency strategies transfer from the speaker's L1 into their L2, and vice versa. For example, speakers of English as L2 often transfer disfluencies from their L1 (French, Hebrew, Turkish, and Spanish) into L2-English, and this in turn identifies them as non-L1 speakers by native L1 speakers of this language (Clark and Tree 2002). Furthermore, in the L2-Russian speech of native L1-Chinese speakers, elements of cross-linguistic influence have been documented in the use of Chinese vocalized pauses 'y', 'yn', 'n:' together with the Russian ones, such as 'ə:', 'ə:m', 'a:', 'a:m', 'm:' (Bogdanova-Beglarian and Baeva 2018). Some researchers have highlighted the importance of including disfluencies in L2 learning programs, to achieve more native-like levels in L2, as disfluencies can reveal the non-native status of even advanced and fluent speakers of a language (Eklund 2004). For example, self-repair lexical initiators like 'I mean' and 'you know' are employed differently in English and German, although both languages have these equivalent phrases, so pragmaticism dictates their correct use (Rieger 2000).

1.5. Research Questions of the Current Study

The current study investigated the production of self-repair in three groups of Russian speakers: L1-Russian speakers, HL-Russian/L2-Hebrew speakers, and L2-Russian/L1-Chinese speakers.

Our first research question evaluated whether there were quantitative differences in the ratio of self-repair production across the three groups.

Our second research question investigated whether self-repairs produced by different types of speakers had similar/different linguistic characteristics.

Finally, our third research question tested whether the level of proficiency in HL and L2 speakers was an underlying mechanism accounting for self-repair use.

2. Methodology

2.1. Participants

For this study, 36 elicited monologues were recorded from three groups of speakers: First Language (L1) speakers (*N* = 12); Heritage Language (HL) speakers (*N* = 12); and Second Language (L2) speakers (*N* = 12). All groups were balanced with respect to gender distribution: there were 6 male and 6 female participants in each group. The material for the L1 and L2 speakers came from the corpus of monological speech "Balanced Annotated Text Library" created in St. Petersburg State University (for more details, see: Bogdanova-Beglarian 2013; Bogdanova-Beglarian et al. 2019). Russian monologues of HL speakers were elicited for this study in Israel.

The **First Language (L1) Speakers** of Russian were students at the Saint Petersburg State University Philological Department. The ages ranged from 18 to 21 years old (*M* = 20; *SD* = 1).

The **Heritage Language (HL) Speakers** of Russian resided in Israel, and had been exposed to spoken Russian from birth via naturalistic input. The participants' ages ranged between 18 and 28 (*M* = 24, *SD* = 3; MIN–MAX: 18–28). The age of onset of bilingualism, i.e., the age of onset of Hebrew, was before the age of 5 (*M* = 1, *SD* = 2; MIN–MAX: 0–4). Most of the participants reported both languages (Russian and Hebrew) as their mother tongue and L1. Today, the Russian language is the most frequently spoken HL in Israel. Despite the ubiquitous presence of Russian in Israel, and a strong desire to maintain and transmit heritage Russian to future generations, recent studies have shown a decline in HL-Russian proficiency in Israel among 1.5 (i.e., speakers who moved to a new country before or during early teens) and 2nd generation speakers (i.e., speakers who were born in or immigrated to Israel as young children) (Meir and Polinsky 2021; Niznik 2011; Remennick 2003). Moreover, the Societal Hebrew language affects Heritage Russian in all language domains (pronunciation, lexicon, morphosyntax); a linguistic shift towards Hebrew has been consistently reported in recent studies. All HL participants in the current study were 2nd generation HL speakers; they all reported that they could speak and understand speech in Russian; however, not all of them had well-developed literacy skills. The HL speakers' self-rated proficiency in HL-Russian, on a scale of 0 to 5, was not high (*M* = 3.2, *SD* = 1: MIN–MAX: 0–4). The participants' vocabulary size was also assessed, based on 51 nouns and 51 verbs (totaling 102 items), taken from the "Verb and action: stimuli database" and "Noun and object: stimuli database" (Akinina et al. 2015). While based on the study by Akinina et al. (2015), monolingual speakers showed almost a ceiling performance on these lexical items; lexical skills in the HL speakers in the current study showed a high heterogeneity (*M* = 62, *SD* = 18; MIN–MAX: 28–87).

The **Second Language (L2) speakers** of Russian were Chinese students at Saint Petersburg State University Philological Department. The age of the participants ranged from 23 to 27 years old (*M* = 25, *SD* = 1). The L2 speakers' level of Russian proficiency was 4 or 5 (*M* = 4.6, *SD* = 0.5; MIN–MAX: 4–5) according to the general Russian language proficiency test for students at Saint Petersburg State University, on a scale of 1–6. The students studied Russian as their L2 for 4 to 7 years (*M* = 5.5; *SD* = 1) in China and in Russia: three participants studied Russian only in China, and three participants only in St. Petersburg; others studied Russian both in China and in St. Petersburg. The Russian language in China was learnt most actively in 1960–80, not only in universities but also in secondary schools in almost all regions of the country (Limin' 2011). However, after that it was less popular, and more than 80% of students studying Russian responded that it was their second or third choice at university (Gulimire and Titkova 2018). The Russian language is taught in more than 150 universities in China today, where interest in it is steadily increasing (Limin' 2011).

2.2. Materials, Coding, and Reliability

One of the widely accepted ways to elicit spontaneous speech is a monologue-description which can be presented schematically—see Figure 1 (Bogdanova-Beglarian 2013, p. 367). This is a semiotically understood image of a virtual world invented by the artist. When describing the image, the speaker perceives this virtual world, reflected in the drawing/picture/reproduction, and creates his own virtual world 1 (creates a monologue-description), subconsciously relying on his own life and language experience. As a result, different speakers with their own varying life experiences produce different monologue-descriptions.
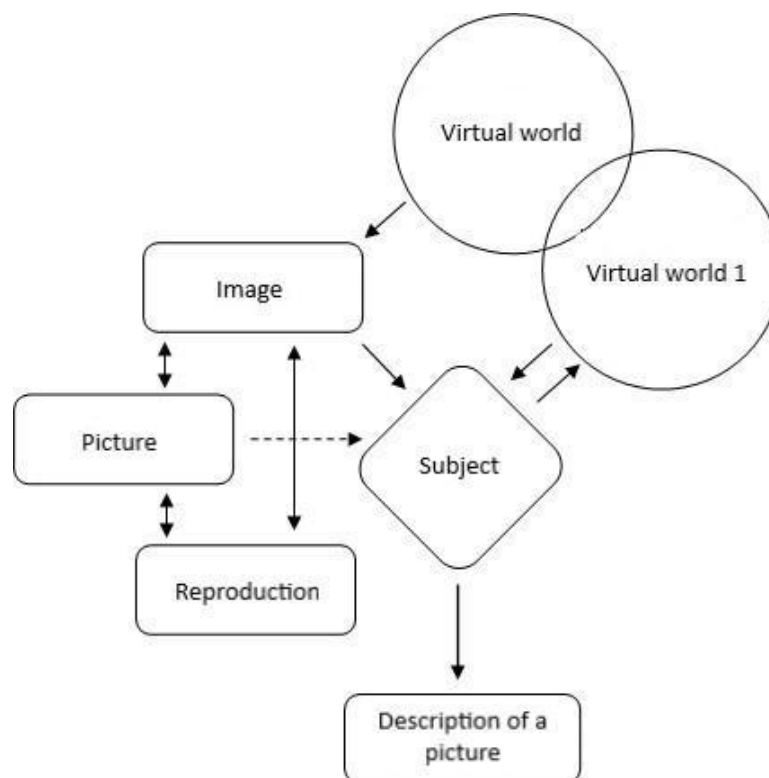
Figure 1. Model of producing a monologue-description.

As stimuli for picture-elicited narratives, wordless comic strips by Herluf Bidstrup "Hair loss treatment" (see: https://herlufbidstrup.com/comics/Hair_loss_treatment accessed on 25 May 2022) were chosen (Hair Loss Treatment 2022). Bidstrup's comics have been previously used with monolingual Russian-speaking neurotypical individuals (Bogdanova-Beglarian and Xie 2021) and patients with aphasia (e.g., Akhutina 2007). The monologue-descriptions are in the middle on the scale of task complexity, among other monologic texts included in the corpus "Balanced Annotated Text Library". Monologic narratives are less spontaneous than stories, as their structure is highly motivated by the picture details themselves, but more spontaneous than text re-telling, because the word usage and phrase composition are less predicted by the set of words and phrases used in stimulus text (Bogdanova-Beglarian 2013, p. 88).

Narratives of L1 and L2 speakers were taken from the corpus "Balanced Annotated Text Library", which includes over 700 monologues from more than 200 speakers. The corpus was divided into two main blocks: the speech of L1-Russian speakers, and the speech of L2-Russian speakers who had been studying Russian as L2. The data were presented in the form of transcripts, with the focus on various types of disfluencies, e.g., pauses, both syntagmatic and hesitation; the latter could be filled both with a non-speech sound (*uh*, *mm*, etc.) and silent pauses, as well as with paralinguistic elements (primarily laughter, sigh, cough), breaks, repetitions, prolongation of sounds, and other signs of

spontaneity. On the rules and symbols of discourse transcription, see Zaides (2019). Such materials can be the object of multidimensional research at all language levels: the actual structure of a monologue (scenario and composition of the text); the strategies that the speaker chooses in the course of producing such a monologue; and the lexical content and syntactic organization of the text and its discursive features—in all the variety of implementations of the functional units of spoken speech.

Narratives for HL speakers were elicited following the same procedure as in the cases of the L1 and L2 speakers. The participants were asked to look at the pictures, and to tell a story based on the pictures. The participants' narratives were audio-recorded for the purposes of further analysis.

Thirty-six monologues used for the current study were transcribed and annotated, including speakers' background data (gender, age, information on their level of language proficiency). Different types of errors (phonetic, lexical, grammatical, syntactic, and stylistic), with self-repairs and without them, were also annotated in the material.

Self-repair instances were split into **Conceptualizer Repairs (C-repairs)**, which implied pragmatic, semantic, or lexical changes, and **Formulator Repairs (F-repairs)**, which corrected different types of errors (Simard et al. 2011). The subcategories of C- and F-repairs are presented in Table 1.

While annotating, the main challenge was to differentiate between two types of C-repairs: Lexical and Appropriacy. It was collaboratively decided to choose the Appropriacy C-repair type in cases of one word (or part-word, by which we could predict its completion) replaced by another, with the narrowing of its meaning as a specification which the speaker found more appropriate in the context; see examples (3–4):

(3)　*однако сзади него/какая-то тёмная кучка (м-м) <u>на подушке</u> **или за подушкой*** (S12, L1, m.)
　　　odnako szadi nego/kakaja-to tjomnaja kučka (m-m) na poduške **ili za poduškoj**
　　　'however behind him/some dark bunch ehm on the pillow **or behind the pillow**'

(4)　*и подошёл () к отделу/где продаются () <u>эликси…</u> (ы) **средства** для ухода за волосами* (S7, L2, w.)
　　　i podošol () k otdelu/gde prodajutsja () eliksi… (y) **sredstva** dlja uhoda za volosami
　　　'and went () to the department/where they sell () **elixi** … (y) hair care products.'

The Lexical C-repair type was chosen in cases of incorrect lexical choice (i.e., lexical error) which was not made because of the context of the description (did this word describe properly what was on the picture?) or any pragmatic purpose (did this word fit in this context?), but rather, probably, because of the speech spontaneity itself, which did not provide enough time for the speaker to choose the proper word thoroughly; see examples (5–6):

(5)　*в то же время/он проснулся//и-и () <u>отметил</u> ч… () а-а () **заметил** что-о/всё-ё/это просто () сон* (S4, L2, w.)
　　　v to že vremja/on prosnulsja//i-i () otmetil č… () a-a () **zametil** čto-o/vsjo-o/eto prosto () son
　　　'at the same time/he woke up//a-and () noted th… () a-a () **noticed** that/everything/is just () a dream'

(6)　*я купил себе при… <u>причёс…</u> (э-м) () **расчёска**/чтобы их расчёсывать* (S12, L2, w.)
　　　ya kupil sebe pri… pričjos… (e-m) () **rasčjoska**/čtoby ih rasčjosyvatʹ
　　　'I bought myself … haircu… ehh () h**airbrush**/to brush them'

Additionally, we also coded some disfluencies that preceded self-repair, e.g., pauses (vocalized and silent), cut-offs, prolongations of sounds, repetitions as vocalized pauses (e.g., Bada 2010), as well as lexical initiators such as *v obɕem* 'in general', *ili* 'or', *vidimo* 'apparently', etc.

Table 1. C- and F-repair subcategories with examples.

C-repairs	Different (abandoning an utterance in favor of a new one)	*он довольный идёт домой//<u>весь/флакончик</u>//**когда ну/придя домой он-н/выливает весь фл…/флакончик себе на голову*** (S2, L1, m.) on dovol'nyj idjot domoj//ves'/flakončik//kogda nu/**pridja domoj on-n/vylivajet ves' fl . . . / flakončik sebe na golovu** 'he satisfied goes home//all//bottle//when well/**on arriving home he-e/pours all bo . . . /bottle on his head'**
	Appropriacy (resolving pragmatic appropriateness)	*ну значит он баночку так любовно взял <u>как реб…</u>/**вообще как младенца** так хоп/и такой идёт домой* (S4, L1, m.) nu značit on banočku tak lubovno vzjal kak reb . . . /**voobče kak mladenca** tak hop/i takoj idjot domoj 'well then he took the jar so lovingly like a chi . . . /**like a baby** so whoop/and like goes home'
	Lexical (changing a single word)	*(а-а) у меня волос <u>ещё</u> … (э-э) **пока** не осталось на голове* (S12, L2, w.) (a-a) u menya volos eщejo . . . (e-e) **poka** ne ostalos' na golove 'ah I still have hair . . . uh **yet** left on my head'
F-repairs	Pronunciation (repair of a pronunciation error)	*он смотрит … смотрит (э-э) он <u>смотрИт</u> **смОтрит*** (S6, HL, w.) on smotrit . . . smotrit (e-e) on smotrit . . . **smotrIt smOtrit** 'he is looking . . . looking uh he is looking . . . **lookIng** looking'
	Morphology (repair of a morphological error)	*волосы продол-жают () <u>растёт</u> () **растить**/и со временем/они стали () большем большем* (S8, L2, m.) volosy prodol-žajut () rastjot () **rastit'**/i so vremenem/oni stali () bol'šem bol'šem 'the hair continues () grow () **to grow**/and over time/it has become () biggerer biggerer'
	Syntax (repair of a syntactic error)	*можно предположить что это <u>самые</u> волосы/**те самые**/которые он остригал* (S12, L1, m.) možno predpoložit' čto eto samyje volosy/**te samyje**/kotoryje on ostrigal 'we can assume that this is same hair/**that same hair**/that he cut'

The annotation of monologues was performed by individual annotators independently: the first and the second annotators encoded the type of self-repair (C-repair and F-repair) in all the texts; the third annotator performed the same types of annotation of all monologues, separately. Afterwards, all annotators discussed the differences which arose in the course of annotation, and most of the issues were resolved in discussion. The average inter-rater reliability over all the monologues, for self-repair in general, was 97%; the average inter-rater reliability over all the narratives, for C-repair and F-repair types,

was 97%. The problems with the following examples remained unresolved—there was a possibility to consider them as different types of C-repairs; see examples (7–8):

(7)　　*он <u>заме…</u> **сразу заметил** что/у не… у него на голове/растили расти-или () (н-н) () краткие () краткие волосы* (S2, L2, m.)

on zame… **srazu zametil** čto/u ne… u nego na golove/rastili rasti-ili () (n-n) () kratkije () kratkije volosy

'he notic… **immediately noticed** that/on hi… on his head/grew gre-ew () (n-n) () short () short hair'

Appropriacy C-repair if the main goal was to add the word *сразу 'srazu'* to refer to the picture details, or Different C-repair in cases of phrase reformulation;

(8)　　*завтра <u>вечером</u> завтра-а (…) **утром**/он встался () встал/и-и (…) (н-н) (…) заметил* (S1, L2, w.)

zavtra večerom zavtra-a (…) **utrom**/on vstalsja () vstal/i-i (…) (n-n) (…) zametil

'tomorrow evening **tomorro-ow** (…) morning/he gots up () got up/a-and (…) (n-n) (…) noticed'

Different C-repair if the speaker abandoned the phrase and started a new one, or Lexical C-repair in cases of word change (adverbial modifier).

3. Results

In this study, the majority of speakers used self-repair: 67% of L1 speakers; 58% of HL speakers; and 100% of L2 speakers. Furthermore, 78% of the speakers made errors in their monologues: 33% of L1 speakers; 100% of HL speakers; and 100% of L2 speakers. For L1 speakers, the errors were mostly lexical and stylistic errors, whereas for HL and L2 learners, the errors included a diverse range of non-L1 formulations, including pronunciation errors, morpho–syntactic, lexical, and stylistic errors. Although error patterns across the HL and L2 groups were interesting, they were beyond the scope of the current paper, which focused on self-repairs.

Firstly, we present the data for the monologues in terms of their length, error, and self-repair ratios per group (see Table 2). The results indicate that there were significant between-group differences in the monologue lengths, with L1 and L2 speakers producing monologues of comparable length, while HL speakers tended to produce significantly less verbose monologues. Because significant between-group differences emerged for the narrative length, we computed error ratios and self-repair ratios, in order to control for the monologue length. The results indicated that there were significant differences for the error ratios, with the L2 group producing a significantly higher ratio of errors, as compared to the HL and L1 groups, and in turn the HL group was found to produce a significantly higher ratio of errors than their L1 peers (see Table 2 for descriptive statistics and group comparisons). The self-repair ratios per group are presented in Figure 2.

Table 2. Narrative information on the participants (*Mean (SD)*, *Min–Max*).

|	L1 Speakers (*N* = 12)	HL Speakers (*N* = 12)	L2 Speakers (*N* = 12)	*F*	*Sig.*	*T2 Tamhane Post-hoc*
Number of Tokens	205 (135) 41–527	82 (46) 15–198	147 (73) 80–315	5.326	=0.010	L1 = L2 > HL
Error-to-Token Ratio	0.005 (0.006) 0.00–0.02	0.05 (0.03) 0.02–0.13	0.16 (0.03) 0.12–0.21	126.13	<0.001	L1 < L2 < HL
Self-repair-to-Token Ratio	0.01 (0.01) 0.00–0.03	0.01(0.02) 0.00–0.05	0.04 (0.02) 0.01–0.06	13.07	<0.001	(L1 = HL) < L2
Self-repair-to-Error Ratio	1.94 (2.40) 0–7	0.37 (0.44) 0–1.33	0.23 (0.11) 0.07–0.42	5.50	=0.009	L1 = HL = L2
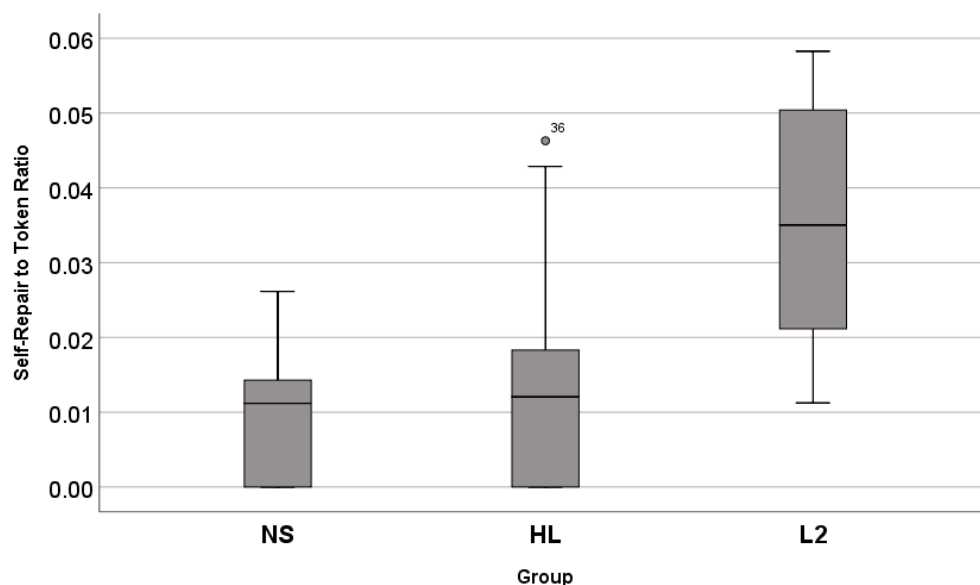
Figure 2. Box plots for Self-repair to Token Ratio results per group.

Subsequently, we compared the distribution of two types of repairs (C-repair and F-repair) (see Figure 3). We used chi-squared tests to evaluate differences in the distributions of the two types of disfluencies. The results confirmed group differences ($\chi^2(2) = 15.53$, $p < 0.001$). To test further the differences across the three groups, we applied pairwise comparisons. The analysis showed that there were significant differences between the L1 and HL groups ($\chi^2(1) = 8.02$, $p = 0.005$), as well as between the L1 and L2 groups ($\chi^2(1) = 15.50$, $p < 0.001$). The final analysis, comparing HL and L2 speakers, showed that HL and L2 speakers did not differ from one other ($\chi^2(1) = 0.50$, $p = 0.48$). Thus, whereas L1 speakers hardly produced F-repairs, HL and L2 speakers produced both C- and F-repairs.
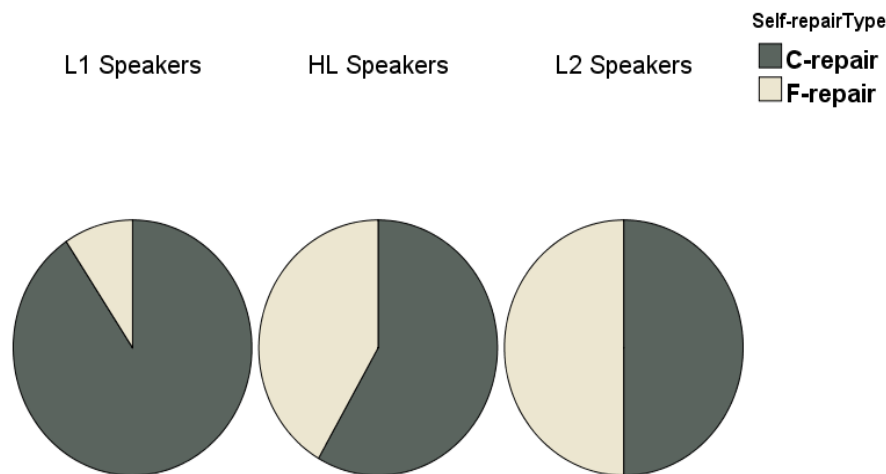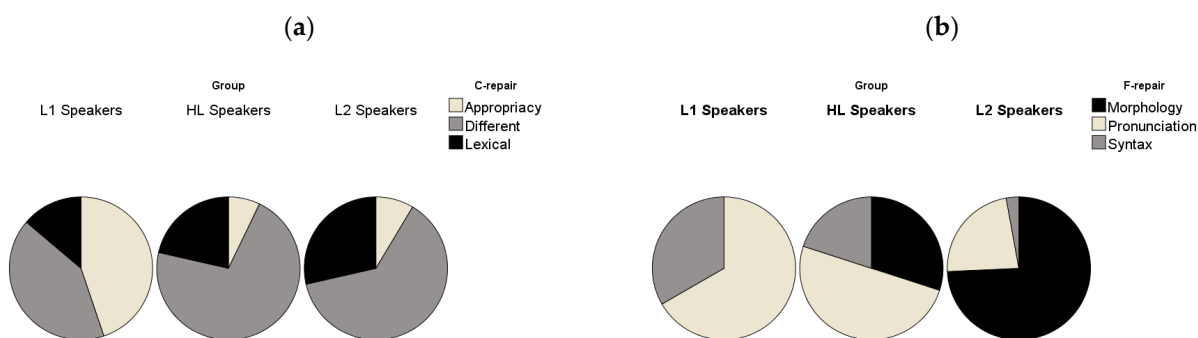

Figure 3. Pie charts representing the distributions of C-repair and F-repair across the three groups.

To further shed light on the use of self-repair across the three groups, we investigated subtypes of self-repairs within the C- and F-repairs (see Figure 4a,b). Starting with the C-repair subtypes, the results indicated that while L1 speakers mainly used self-repair for appropriacy, HL and L2 speakers used self-repair in order to restructure a phrase or to choose a different lexical item. As for F-repair, HL speakers had changes in pronunciation and morphology, while for L2 speakers, the most frequent F-repair was due to morphological change. In the case of L1 speakers, the infrequent F-repairs that were observed were due to a change in pronunciation.

Figure 4. (**a**) Pie charts representing the distributions of C-repair subtypes across the three groups; (**b**) Pie charts representing the distributions of F-repair subtypes across the three groups.

Subsequently, we analyzed the devices used by the three groups for initiating self-repairs (see Figure 5). Kruskal–Wallis tests for non-parametric statistics indicated that there were no group differences for pauses ($H(3) = 4.85$, $p = 0.09$), vocalized pauses ($H(3) = 4.95$, $p = 0.08$), non-verbal elements ($H(3) = 4.68$, $p = 0.10$), prolongations ($H(3) = 5.70$, $p = 0.06$), and repetitions ($H(3) = 4.68$, $p = 0.46$), yet differences were observed for lexical initiators ($H(3) = 41.69$, $p < 0.001$) and cut-offs ($H(3) = 4.68$, $p = 0.10$). L1 speakers usually resorted to lexical elements, while L2 speakers resorted to cut-offs as initiators of self-corrections. Follow-up pairwise comparisons using Mann–Whitney tests showed no differences between the L1 and HL speakers on cut-offs ($U = 360$, $p = 0.61$), yet significant differences emerged, between the groups, on lexical initiators ($U = 236$, $p = 0.002$), with L1 speakers employing lexical initiators significantly more frequently than HL speakers. As for the comparison of L1 and L2 speakers, L2 speakers differed from L1 speakers on both measures (cut-offs: $U = 782$, $p = 0.005$; lexical initiators: $U = 595$, $p < 0.001$), with L1 speakers employing lexical initiators more than L2 speakers, and L2 speakers employing cut-offs more than their L1 peers. Interestingly, there were significant HL and L2 differences in both measures (cut-offs: $U = 534$, $p = 0.002$; lexical initiators: $U = 770$, $p = 0.015$), with HL having more lexical initiators compared to L2 speakers, and the picture was reversed for cut-offs; see examples (9–11):

(9)　　*на первой/к…/**в общем** тут несколько картинок* (S1, L1, w.)

　　　na pervoj/k…/**v obɕem** tut neskol'ko kartinok

　　　'on the first/p…/**in general** here are a few pictures'

(10)　*ночью/Александр/долго не не смог заснуться/от какого-то **мо**… волнения* (S7, L2, w.)

　　　noč'ju/Aleksandr/dolgo ne ne smog zasnut'sja/ot kakogo-to **mo**… volnenija

　　　'at night/Alexander/could not fall asleep for a long time/from some kind of **enx**… anxiety'

(11)　*выглядит как () **лек… то есть я не знаю назвать это лекарство или-и (э-э)** жидкость* (S9, HL, m.)

　　　vygljadit kak () lek… **to est' ja ne znaju nazvat' eto lekarstvo ili-i (e-e) židkost'**

　　　'looks like () med… **that is I don't know what to call this medicine o-or eh liquid**'

We also looked into the number of initiating devices preceding self-repairs, yet the results showed no differences between the three groups ($F(123) = 1.958$, $p = 0.145$). In all the groups, the number of initiators varied between no initiators and as many as four, yet on average in all the three groups of participants, there were around 1.5 initiators per self-repair (L1 speakers: $M = 1.5$, $SD = 0.95$; HL speakers: $M = 1.7$; $SD = 1.00$; L2 speakers: $M = 1.9$, $SD = 1.02$); see example (12):

(12) *(ы-н) он () вс… он (ы-н) () **взял** () (ы) средство собой/и-и () пошёл домой* (S6, L2, w.)—cut-off, repetition, vocalized pause, and hesitation pause

(y-n) on () vs… on (y-n) () **vzyal** () (y) sredstvo soboj/i-i () pošjol domoj

'(y-n) he () ta… he (y-n) () **took** () (y) product with himself/a-and () went home'

Finally, we evaluated whether the use of self-repairs was linked to the level of proficiency in the HL and L2 groups. The results indicated that correlations between self-repair ratios and the level of proficiency reached significance neither in the HL group (self-repair and self-rated proficiency: $r = -0.51$, $p = 0.09$; self-repair and vocabulary: $r = -0.28$, $p = 0.38$) nor in the L2 group ($r = 0.15$, $p = 0.64$).
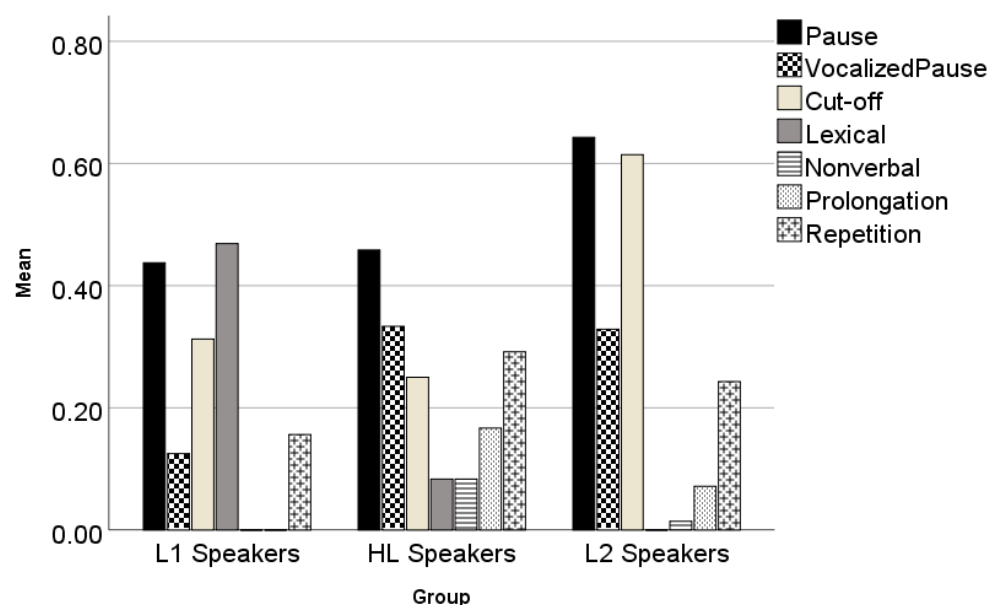

Figure 5. Devices for initiating self-repair across the three groups.

4. Discussion

The current study aimed to compare the use of self-repair across different groups of speakers: L1, HL, and L2. The results showed both quantitative and qualitative differences between the groups. Quantitatively, L2 speakers were found to produce a higher rate of disfluencies compared to HL and L1 speakers. With respect to the qualitative differences, HL and L2 speakers were found to resort mainly to F-repair, while L1 speakers mainly used C-repair. In this subsection, we will discuss group differences in the use of self-repair, and the underlying mechanisms attributed to quantitative and qualitative group differences.

L1 speakers producing monologue-descriptions are, in fact, in familiar and natural conditions speaking their dominant L1. Their speech is slightly influenced by the monologue communicative genre, i.e., the situation of describing a picture, which can cause speech disfluencies and, among them, self-repairs. In L1 speech, mostly C-repairs are observed, which help speakers edit some previous fragments of their speech, correcting word choices (lexical repairs), pragmatics (appropriacy repairs), or phrase/text structure (different repairs). These repairs are in fact more self-correction than repairs of actual errors (Schegloff et al. 1977).

HL speakers usually use their HL for everyday conversation with family members, or to communicate with their friends. When HL speakers are in the situation of producing a monologue-description which involves usage of specialized, less familiar, vocabulary required for narrating a story based on a comic strip, they seem to experience language-production anxiety (MacIntyre and Gregersen 2012). Also, we can assume that the novelty of the speech genre of monologue may also cause an increased rate of self-repairs in HL speech. Therefore, their speech is abundant in both C- and F-repairs, which reflects not only

the willingness to produce an acceptable text, but also the desire to avoid pronunciation, morphological, and syntactic errors and, eventually, when making such errors, attempting to repair them properly.

The self-repair ratio in L2 speech is significantly higher than in L1 and HL speech. Self-repairs arise in L2 speech because of both the specifics of foreign language usage and the difficulties arising in the intention to follow the communicative genre. This can be explained by the stressful conditions of L2 speech production: being language learners, students are frequently in the situation of language -level-and-usage assessment. Therefore, their efforts to produce an excellent monologue lead them to the constant check of what is being said and, moreover, to correct the parts in doubt; see example (13):

(13) *это очень эффектный эликсир для волос/«Радость волос»/(н) () и пользуйтесь __им__ () __ей__ () __ему__ () (ы) __им__ () (ы)*
два раза в неделю (S7, L2, w.)
eto očen' effektnyj eliksir dlja volos/«Radost' volos»/(n) () i pol'zujtes' im () jej () jemu () (y) im () (y) dva raza
v nedelju
'this is a very effective hair elixir/"Hair Joy"/(n) () and use it () her () him () (y) it () (y) twice a week'

The most frequent type of C-repairs in the monologues of L1 speakers turned out to be appropriacy repairs. This was consistent with Ullenius (2015), who also found that the English L1 group was significantly less likely to make F-repairs (referred to as error-repair by the authors), and significantly more likely to make C-repairs (referred to as appropriacy repairs by the authors). HL and L2 speakers tended to use different repairs in their attempts to restructure the text. The lexical repairs of the L1 speakers were motivated by their desire to find the most suitable word, while the HL and L2 speakers produced some stipulations, or corrected the wrong word choice; see examples (14–15):

(14) *после этого он ложится спать//очень-нь/озабоченный//видимо __на у…__/__на следующий день__ он встает и*
обнаруживает что что у него на голове/выросли волосы (S7, L1, w.)
posle etogo on ložitsja spat'//očen'-n'/ozabočennyj//vidimo na u…/na sledujuɕij den' on vstajot i
obnaruživajet čto čto u nego na golove/vyrosli volosy
'after that he goes to bed//very-y/preoccupied//apparently in the m…/the next day he gets up and finds that
that on his head/hair has grown'

(15) *и потом он (э-э) ну (…) не (…) __не намазал__ его/я не знаю//как-то его (…) __положил__ на голову/намазал* (S1, HL,
w.)
i potom on (e-e) nu (…) ne (…) ne namazal jego/ya ne znayu//kak-to jego (…) položil na golovu/namazal
'and then he (uh) well (…) didn't (…) didn't smear it/I don't know//somehow he (…) put it on his
head/smeared it'

F-repairs were used more often by HL and L2 speakers who were not as proficient in their Russian as were the L1 speakers. This was in accordance with Kormos (2006), who reported that advanced L2 learners made fewer lexical repairs (error repairs), while producing more discourse-level repairs (appropriateness repairs). These results may have been related to the amount of cognitive attention involved in speech production at various proficiency levels; lower proficiency entails more cognitively demanding processing, and consequently more errors. Rare pronunciation errors, and their repairs, occur in L1 speech as stipulations, whereas frequent HL and L2 speakers struggle with the word stress or with the consonant cluster under cross-linguistic influence from the dominant language (see 16–17). It should be kept in mind that consonant clusters are highly frequent in the Russian language, yet not so common in Chinese (Zhang and Yin 2009), or in Hebrew (Schwarzwald 2005), see examples (16–17):

(16)   *он похож на бабу Ягу/его* <u>*вор…*</u> ***волосы*** *растут так быстро что он () не знает что с ними делать* (S10, L1,
w.)

on pohož na babu Jagu/jego vor… volosy rastut tak bystro čto on () ne znajet čto s nimi delat'

'he looks like Baba Yaga/his gai… hair grows so fast that he () doesn't know what to do with it'

(17)   *но потом он (…) (ы) увидел что/(ы) волос растёт* <u>*шс… шлис…*</u> *с… **слишком** () быстро* (S9, L2, m.)

no potom on (…) (y) uvidel čto/(y) volos rastjot šs… šlis… s… sliškom () bystro

'but then he (…) (y) saw that/(y) hair grows too qi… qiuck … qu … () quickly'

L2 speakers in particular frequently resort to morphological repairs when searching
for the noun or verb form required by the context; see examples (18–19):

(18)   *домой он-н () мазал () элипсир () (ы-н) () на голо… ()* <u>*на голове*</u> *(…) **на голову*** (S4, L2, w.)

domoj on-n () mazal () elipsir () (y-n) () na golo… () na golove (…) na golovu

'home he-e () smeared () elipsir () (y-n) () at the he… () at the head (…) on the head'

(19)   *он () заснул//и-и () и-и и и-и ему* <u>*приснился*</u> *та… () **приснилось** та… такое чудо* (S7, L2, w.)

on () zasnul//i-i () i-i i i-i jemu prisnilsja ta… () prisnilos' ta… takoje čudo

'he () fell asleep//a-and() a-and and a-and he dreaming of su… () dreamed of su… such a miracle'

The number of self-repair initiators used by L1, HL, and L2 speakers was also found to
differ significantly. To be more specific, group differences were observed for lexical initiators
and cut-offs. The chains of initiators arose in L1, HL, and L2 speech. Our results showed
that L1, HL, and L2 speakers did not differ in frequency of initiators as a whole. Lexical
initiators usually preceded C-repairs, which were not corrections of errors, but rather a form
of self-editing, signaling an attempt to choose the most suitable word, phrase, or syntactic
construction. Thus, higher ratios of C-repairs in L1 speech were interconnected with higher
ratios of lexical initiators. Moreover, most of the lexical initiators were introductory words,
whose usage was one of the characteristics of either the speech of L1 speakers or of HL/L2
proficient speakers. As for cut-offs, our study showed that they were more prevalent in L2
speakers. This was in line with previous studies showing that L2 speakers rely heavily on
self-repairs in their speech. For example, Gráf and Huang (2018) compared self-repairs and
cut-offs in two groups of Taiwanese and Czech learners of English as L2 and L1 English, and
found that both L2 groups overused self-corrections. Interestingly, Taiwanese learners also
frequently used cut-off, which was replicated in the current study, with L2 Chinese–Russian
speaking learners overusing cut-offs as non-lexical initiators.

The results of the current study found no correlations between level of language
proficiency and self-repair usage: this was the case with both groups. In the L2 group, we
ran correlations between self-rated proficiency and self-repair frequency, while in the HL
group we tested correlations between self-repair frequency, HL self-rated proficiency, and
subjective proficiency as measured by a naming task. Previous findings conflict in regard to
the use of self-repair and proficiency. Some findings show that there is a tendency toward a
slight reduction in repair frequency, with an increase in proficiency (Zuniga and Simard
2019). Yet, there are also findings which show that, as proficiency increases, the frequency
of self-repairs remains relatively stable (see Zuniga 2015, and studies cited therein), yet
the targets of the self-repairs shift from lower-level local F-repairs to global C-level repairs.
Our findings support the claim that it is not the self-repair frequency that is related to
proficiency; rather, it is the self-repair type, which undergoes qualitative changes with an
increase in proficiency.

Another aspect that might contribute to the conflicting findings on proficiency and
self-repair frequency is the method of data elicitation. For example, our study relied on a
narrative-elicitation task, yet some previous studies investigated self-repair in role-play
activities and retrospective interviews. It has been suggested that self-repair frequency
increases with task complexity (e.g., Gilabert 2007). Therefore, it is highly plausible to

suggest that some tasks might be more challenging for lower proficiency groups, and thus elicit a stronger increase in self-repair frequency. Future research should further investigate how elicitation methods affect the use of self-repair across speakers with different levels of proficiency (for more details, see Foster and Skehan 1996; Van Hest 1996; Zuniga and Simard 2019).

Some additional observations were made, with regard to initiator use in the light of cross-linguistic transfer of non-lexical initiators. Prolongations as disfluency used for maintaining the floor during hesitative moments in the speech, are very frequent in Hebrew and Chinese. HL participants master Hebrew as their dominant language, despite the fact that Hebrew is actually their L2 language. The use of prolongations as initiators preceding self-repair was almost absent in the L1 group, but present more frequently in the HL group. Although we analyzed only prolongations preceding self-repairs, we observed a tendency for transfer of prolongations from Hebrew to Russian. This gap in the use of prolongations might be also attributed to the high proficiency of L1 speakers, associated with a higher rate of editing lexical initiators, while making the use of prolongations unnecessary in L1 speech; however, as L1 speakers use other non-lexical initiators, such as silent and vocalized pauses, that can serve the same function as prolongations, the notion of transfer from Hebrew may be highly plausible.

5. Conclusions

The current study compared the use of self-repair in three groups of speakers: L1, HL, and L2. The results indicate quantitative and qualitative differences between the three groups. Firstly, the self-repair rate was higher in L2 speakers compared to L1 and HL speakers; secondly, the distribution of self-repair patterns revealed different underlying mechanisms for the use of self-repair. While L1 speakers mainly used Conceptualizer Repairs (C-repairs) in the attempt to restructure the utterance and find the most suitable word, HL and L2 speakers' speech was abundant in Formulator Repairs (F-repairs), i.e., repairs related to pronunciation, morphological, and syntactic errors, signaling their lower levels of proficiency, and uncertainty in the production of linguistic forms encoding the conceptual message. Furthermore, the results indicate that non-lexical self-repair initiators may be transferred from the dominant language into the weaker one. For example, HL speakers were found to resort to prolongations as initiators in HL-Russian (a strategy that is common in Hebrew, their dominant language), whereas L1 speakers used vocalized and silent pauses more frequently.

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