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Morphological case in child Heritage Russian:
Comparing Russian in contact with Hebrew and Norwegian vs. the monolingual baseline

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Abstract. The current study extends seminal work by Maria Polinsky on American Russian to other varieties of Russian acquired in contact with Norwegian and Hebrew. Two groups of child heritage language (HL) speakers of Russian participated in the study: Russian-Norwegian (n=17) and Russian-Hebrew (n=34). Their performance was compared to Russian-speaking monolingual children (n=79), evenly distributed across the four age groups: 3-, 4-, 5-, and 6-year-olds. We also tested a group of monolingual Russian-speaking adult controls. All participants performed the same picture-description task targeting Structural accusative, Inherent dative, and Lexical cases assigned by the prepositions *na* 'on', *v* 'in', and *pod* 'under', differentiating locative and directional semantics. The performance of monolingual Russian-speaking children was homogeneous and target-like with respect to the specified structures from age 3. Child HL-Russian speakers in both groups displayed more heterogeneous profiles. The data indicate that some HL speakers might develop systems that are qualitatively different from monolinguals, while others acquire a target-like case system. Possible reasons for such qualitative differences include substantially diminished input in the HL as well as potential cross-linguistic influence from the SLs. Theoretical implications of these findings are discussed.

Keywords. child bilingualism; heritage language acquisition; Russian; case morphology

1. Introduction. Maria Polinsky's groundbreaking research on heritage language (HL) speakers of Russian dominant in English has profoundly influenced the broader field of HL studies and has also established a robust foundation for exploring HL-Russian in particular (see Polinsky 2006a,b, 2007, 2008, 2018, among many other works). HL speakers are typically the second or third generation of immigrants who acquire their HL from birth until the onset of schooling (approximately ages 4-5) via naturalistic exposure to native input. HL speakers are early bilinguals who acquire their HL either simultaneously or sequentially with a second language (SL). The current study aims to extend insights from American Russian to other varieties of HL-Russian, namely Norwegian and Israeli Russian. Our study delves into the patterns of child HL acquisition with a specific focus on case morphology. The choice of case morphology is deliberate, considering cross-linguistic variations in the expression of morphological case (for detailed discussion, see Polinsky & Preminger 2014). Furthermore, prior research indicates that case morphology is particularly vulnerable in HL grammars (for an overview, see Benmamoun et al. 2013; Polinsky & Scontras 2020a,b).

In this study, we discuss the acquisition of morphological case, which "reflects the relationship between a head and its dependent noun(s), or between different nouns in a clause" (Polinsky

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& Preminger 2014). The Standard Case theory divides case into two types: Structural and Non-structural, each differing in behavior and manner of licensing (Chomsky 1981, 1986). Non-structural cases further subdivide into two distinct types: Lexical and Inherent (Woolford 2006). Structural case is assigned in a particular structural configuration, while Inherent case is associated with specific theta-positions (e.g., Inherent DAT case). Lexical case, on the other hand, is an idiosyncratic case selected and licensed by certain lexical heads, such as particular verbs and prepositions. Previous research on German has shown that Lexical case is more challenging to acquire compared to Structural and Inherent cases (Eisenbeiss et al. 2006). The current study investigates the effect of case typology in monolingual and HL acquisition of Russian.

1.1. The Case systems of Russian, Hebrew and Norwegian. Baseline Russian is a morphologically rich language: all Russian nouns, adjectives, certain numerals, quantifiers, pronouns, and demonstratives agree with the head noun and carry a case inflection (Bailyn 2012; Timberlake 2004). There are six main cases in Russian in singular and plural: nominative NOM, genitive GEN, accusative ACC, dative DAT, instrumental INSTR and prepositional PREP (see Table 1). In Russian, case is marked on an inflection (that also marks gender and number). The case inflection can also have a zero form. Nouns are declined for case according to the declensional class they belong to. Three declension classes have been suggested to be relevant for the first stages of language acquisition (Gagarina & Voeikova 2009) following Zaliznjak's (1977) classification based on the gender and phonological type of the stem. We refer to feminine and masculine nouns ending in -a/ja (e.g., *devočk-a* 'girl'; *pap-a* 'father') as declension class I, masculine and neuter nouns (e.g., *stol* 'table'; *pingvin* 'penguin'; *okno* 'window') as declension class II, and feminine nouns ending in a soft consonant (e.g., *tetrad* 'notebook') as declension class III. Some nouns are not declined (e.g., *pal'to* 'coat'; *metro* 'underground'; *kofe* 'coffee').

	Declension I		Declension II			Declension III
	FEM and MASC nouns in -*a*	MASC animate in non-palatalized	MASC inanimate in non-palatalized	MASC in palatalized consonant	NEUT	FEM in palatalized consonant
	'star'	'rabbit'	'cake'	'goose'	'window'	'mouse'
NOM	zvezd-a	krolik	stol	gus'	okn-o	myʃʼ
GEN	zvezd-y	krolik-a	stol-a	gus'-a	okn-a	myʃʼ-i
DAT	zvezd-e	krolik-u	stol-u	gus'-u	okn-u	myʃʼ-i
ACC	zvezd-u	krolik-a	stol	gus'-a	okn-o	myʃʼ
INST	zvezd-oj	krolik-om	stol-om	gus'-om	okn-om	myʃʼ-ju
PREP /LOC	zvezd-e	krolik-e	stol-e	gus'-e	okn-e	myʃʼ-i

Table 1. The Russian case marking system for singular nouns

Structural case is assigned to a nominal phrase in a particular syntactic position; thus, in Russian, in addition to NOM and ACC structural cases, structural GEN is assigned to nominal phrases under negation and to the complements of nouns. DAT and INSTR are regarded as

Inherent cases. A Lexical case is checked by a particular lexical item, such as a verb or a preposition (see Matushansky 2010; Bailyn 2012).[1]

As demonstrated in Table 1, the Russian case paradigm shows a high degree of syncretism. For example, the ACC and NOM forms are homophonous for inanimate nouns of declension class II and all nouns of declension class III. The case inflection -*u* is used to mark DAT in masculine and neuter nouns as well as ACC case of nouns of declension class I. For some nouns, PREP and LOC forms are distinct (e.g., *o lese*/*v les-u* 'about forest/in forest').

The prepositions involved in this study (*v* 'in', *na* 'on', and *pod* 'under') assign ACC case when they appear in directional contexts and denote Goal of motion. When they appear in locative contexts and denote Location, the prepositions *v* 'in' and *na* 'on' assign PREP case, and the preposition *pod* 'under' assigns INSTR case. The case assignment patterns of the three prepositions are summarized in Table 2 below.

	v 'in'	*na* 'on'	*under* 'pod'
Directional/Goal (where to?): DIR	v maʃin-u in car-ACC	na maʃin-u on car-ACC	pod maʃin-u under car-ACC
Locative/Place (where?): LOC	v maʃin-e in car-PREP	na maʃin-e on car-PREP	pod maʃin-oj under car-INSTR

Table 2. The structure of locative and directional PPs in Russian

In contrast, the SL systems of the bilingual children in our study (i.e., Norwegian and Hebrew) lack a rich repertoire of case inflections, in this respect akin to English, which has been extensively studied in the context of previous research on HL-Russian (on HL-Russian in contact with English, see Turian & Altenberg 1991; Isurin & Ivanova-Sullivan 2008; Fridman et al. 2023). For example, most dialects of Norwegian (including the dialects of Tromsø and Oslo where the participants live) do not employ nominal morphological case markers. Hebrew has only a morphological marker of the accusative case *et*, which is used with definite noun phrases. Neither Norwegian nor Hebrew marks dative with the help of case inflections, or morphologically differentiates between LOC and DIR prepositional constructions.

In Hebrew, morphological case is not marked by an inflection on a noun and is highly restricted. Hebrew marks the ACC[2] case with the dedicated particle *et* in front of definite noun phrases, and there is no case marking in front of indefinite noun phrases. Hebrew differentiates between subject and direct object pronouns, as well as between dative and possessive pronouns (see Rom & Dgani 1985).

Morphological case is not marked on nouns in most Norwegian dialects (Berg 2015). Personal pronouns appear in two distinct forms depending on whether they are in the subject position (nominative case) or object position (accusative case). Norwegian employs a set of locative and directional prepositions to express spatial semantics. Locative prepositions *i* 'in' and *på* 'on' are highly polysemous and can convey a variety of locative and non-locative meanings. In directional contexts, these prepositions can appear together with a directional particle *opp* 'up'

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[1] For an alternative view, see Pesetsky (2013), who differentiates between four syntactic environments that assign case values: GEN, NOM, ACC and OBLIQUE (under this schema DAT, INSTR, PREP or LOC cases are all valued by prepositions).

[2] In this paper, we refrain from discussing the nature of the ACC case in Hebrew. Danon (2002) proposes "that Hebrew, therefore, has no structural accusative. As a consequence of the unavailability of structural accusative, Hebrew reverts to the use of the prepositional element *et*, which is capable of assigning structural Case to definites, which require this kind of Case."

(see Mitrofanova & Westergaard 2018 on the acquisition of these prepositions in Norwegian). Nouns appear in unmarked forms after a preposition.

1.2. CASE ACQUISITION IN MONOLINGUAL AND HL RUSSIAN-SPEAKING CHILDREN. Although the acquisition of case morphology among monolingual Russian-speaking children has been addressed in many studies (e.g., Gvozdev 1961; Babyonyshev 1993; Protassova & Voeikova 2007; Cejtlin 2009; Voeikova 2011), few studies evaluate the contrast in acquisition between Structural and Non-structural cases (but see Babyonyshev 1993; cf. Eisenbeiss et al. 2006 for German). Babyonyshev (1993) showed that monolingual Russian-speaking children have full mastery of Structural NOM and ACC cases from the moment of appearance of the arguments that require them. Babyonyshev (1993) argued that the Structural case assignment mechanism of the adult grammar is already operative in monolingual Russian-speaking 2-year-olds. Similar results are reported for the use of the Inherent DAT case. Regarding the Lexical case assigned by prepositions, errors have been documented in Russian-speaking monolinguals, although they are quite rare (e.g., Babyonyshev 1993): between ages 1;6 and 2;00, the child Petja used preposition *na* 'on' four times, and in three out four cases, the correct case marking was used. In the only erroneous case, the NOM form was produced (e.g., *na batarejk-a 'on battery-NOM').

In the same vein, Janssen & Meir (2019) showed at-ceiling production (above 90%) of Structural ACC in monolingual 4- to 5-year-old Russian-speaking monolinguals. Mitrofanova (2016, 2018) found that Russian-speaking 3-year-olds rarely make errors in noun case forms within locative prepositional phrases, successfully distinguishing between prepositions requiring the prepositional case and instrumental case forms. However, children at age 2 often omit locative prepositions, using bare inflected nouns regardless of the spatial configuration described. Recently, Chrabaszcz et al. (2023) tested Structural ACC and Lexical cases assigned by prepositions in 54 monolingual Russian-speaking children aged 2-5, finding age-related improvements in accuracy and no differences between real and nonce words, suggesting established mechanisms for case assignment.

Some evidence suggests that the HL-Russian case system can develop in a manner similar to that of monolinguals. For instance, a recent study on a simultaneous bilingual child acquiring HL-Russian and SL-Turkish between 2;11 to 4;0 found comparable case morphology acquisition to monolingual children, despite reduced input in HL-Russian (Antonova Ünlü & Li 2018). The study reported an approximately 95% accuracy rate for ACC, DAT, and Lexical cases assigned by prepositions, with error patterns resembling those of monolingual Russian-speaking children. Another study on Russian-Finnish bilinguals (Protassova et al. 2017) reported quantitative differences in case morphology acquisition, but not qualitative differences. Although bilingual children exhibited high rates of case errors, their error patterns were similar to those of monolingual children. The study ranked the difficulty of case form acquisition, noting that INSTR was the most challenging, followed by DAT and GEN, while ACC was the easiest to acquire. Notably, Russian-Finnish bilinguals rarely substituted various case forms with the NOM form. These studies on HL-Russian child speakers indicate mainly quantitative differences, suggesting a similar acquisition path in these children compared to monolinguals.

Conversely, unlike monolingual children who generally exhibit nearly error-free case production in case morphology from an early age, child HL-Russian speakers encounter challenges in their production of case morphology. This difficulty with case morphology production appears more pronounced when their SL has sparse case morphology (e.g., English, Dutch, Swedish) or expresses case differently, such as using particles, as in Hebrew), or marking case on

464

determiners, as in German (see Turian & Altenberg 1991; Gagarina 2011; Ringblom 2014; Schwartz & Minkov 2014; Meir & Armon-Lotem 2015; Janssen 2016; Meir et al. 2017; Protassova et al. 2017; Janssen & Meir 2019; Chrabaszcz et al. 2023). In this discussion, we aim to explore prior findings on case acquisition within the framework of Case Theory, examining Structural, Inherent, and Lexical cases.

It is not clear to what extent the divergent attainment is due to reduced input alone, or is also due to cross-linguistic influence from the SL, which has sparse case morphology and/or marks case differently. For instance, Schwartz & Minkov (2014) demonstrated low accuracy rates for case inflections in HL-Russian speakers in Israel, linking lower case accuracy to Age of Onset (AoO) and the amount of input. NOM case form substitutions were observed in bilinguals, a pattern which does not present in monolingual Russian-speaking children after age 2;6. Similarly, Gagarina & Klassert (2018) reported longitudinal data on HL-Russian SL-German children, revealing ongoing difficulties in case morphology acquisition, particularly when the SL marks case morphologically but in a different manner from Russian. The study emphasized input factors such as HL-Russian use within the nuclear family, the child's chronological age, and SL-German AoO as significant predictors of case inflection production accuracy. Meir & Armon-Lotem (2015) reported low accuracy scores for ACC and DAT production, finding a positive correlation between case production and uninterrupted exposure to HL. Janssen & Meir (2019) compared HL-Russian speakers of SL-Hebrew and SL-Dutch to monolingual Russian-speaking controls, revealing lower accuracy in ACC case production and comprehension of certain sentence structures for HL-Russian speakers.

In summary, research on case acquisition in HL-Russian yields mixed results. While some studies suggest that HL speakers can achieve monolingual-like accuracy, numerous others report divergence in HL case systems. The driving factors behind divergences in HL-Russian grammar, whether input alone or combined with cross-linguistic influence, remain unclear. This study aims to contribute to this ongoing debate by focusing on case morphology, specifically investigating Structural, Inherent, and Lexical cases assigned by prepositions in HL-Russian acquisition compared to monolingual controls.

1.3. RESEARCH QUESTIONS AND HYPOTHESES. The study aimed to compare HL and monolingual patterns of acquisition of case morphology within the Standard Case theory. The first question concerns the order of acquisition of case morphology in monolinguals and HL speakers. We ask whether mastery of Structural (e.g., ACC indicating an object) and Inherent cases (e.g., DAT marking the recipient) would occur prior to the acquisition of Lexical cases differentiating locative and directive, assigned by prepositions ON, IN and UNDER, semantics (see Table 2). Because the latter types of utterances require the integration of both prepositions and case inflections assigned by prepositions, the mastery of such forms could be particularly challenging for children. We additionally address the problem of error types produced by child monolingual and HL-speakers, looking separately at the contribution of case vs. preposition errors on children's performance across conditions. This hypothesis for Russian monolingual and bilingual children is based on previous findings for German-speaking monolingual children (Eisenbeiss et al. 2006). Thus, we expect less errors for Structural and Inherent cases compared to Lexical ones.

The second research question concerns the general trajectory of case acquisition in HL-Russian speakers compared to monolinguals. To address this question, we compare HL-Russian speakers with two typologically different SLs (Hebrew and Norwegian) to Russian speaking monolinguals of different ages. We aim to determine whether differences exist between two HL

groups, taking into account SL disparities and the inherent distinctions within Russian-speaking communities in Israel and Norway. We expected SL-Hebrew-speaking bilinguals to pattern more closely to Russian-speaking controls, given Hebrew's overt marking of direct objects with the ACC case. Additionally, Israel boasts a larger Russian-speaking community compared to Norway. Therefore, SL-Hebrew-speaking children were expected to have greater exposure to HL-Russian compared to their SL-Norwegian peers. Extending Polinsky's research to further HL contexts makes the findings more detailed, generalizable, and reliable.

2. Methodology.

2.1. PARTICIPANTS. A total of 130 participants took part in the study (see Table 3): monolingual Russian-speaking children, monolingual Russian-speaking adults, Russian-Hebrew bilinguals raised in Israel and Russian-Norwegian bilinguals raised in Norway.

Language background	Group	Age range	Mean (SD)	Number (males)
Monolingual	monoRU-3yr	3;0–3;11	3;6 (0;4)	16 (8)
	monoRU-4yr	4;0–4;11	4;5 (0;4)	16 (8)
	monoRU-5yr	5;0–5;11	5;6 (0;3)	19 (8)
	monoRU-6yr	6;0–6;11	6;5 (0;4)	16 (5)
	Adults	21–58	36.2 (13.3)	12 (4)
Bilingual	bi-NO	4;0–10;0	5;8 (1;1)	17 (8)
	bi-HE	4;1–6;6	5;1 (0;6)	34 (13)

Table 3. Participant information

2.1.1. RUSSIAN-SPEAKING MONOLINGUALS. The Russian-speaking monolingual participants were tested in the Moscow metropolitan area. In total, we recruited 75 children from two municipal kindergartens (72 participants) and by word of mouth (3 participants). Eight children were subsequently excluded from analysis: two children due to suspected bilingualism; three children were under 3 years of age; and two children withdrew from the task. The remaining 67 children were aged 3-6 years and formed four age groups (see Table 3). We additionally tested a control group of 12 adult Russian speakers, eliciting their responses to use as a baseline for exploring the developmental trajectories in children. Due to cognitive demands of the task and the inconsistent level of communicative abilities in children aged 2 years (i.e., a large proportion of children are at a single-word stage), it was not possible to test these children as a homogeneous group. We therefore chose not to include children aged 2 years in the study, although some of the case forms, such as NOM–ACC oppositions, already appear in these children's spontaneous speech.

2.1.2. RUSSIAN-HEBREW BILINGUALS. In Israel, 34 bilinguals were recruited for the current study, who were all born and raised in Israel in Russian-only (n=21) or mixed Russian-Hebrew families (n=13). These families resided in cities in the central part of Israel with large Russian-speaking communities. Two participants (raised in mixed Russian-Hebrew families) only responded in Hebrew, which is why we excluded their data from the final dataset. The AoO of the societal language varied between 0 and 42 months (M = 14 months, SD = 16 months). The children were recruited from private educational settings providing six-day bilingual programs for younger children (0-5 years). In such programs, preschool teachers carry out the educational program in Russian and Hebrew. Older children (above the age of 5 years) attended obligatory Hebrew-speaking kindergartens/schools in the morning (8am-1pm) and joined bilingual educational settings after school hours (1pm-5pm). The Russian-Hebrew speaking bilingual children were

466

reported to spend between 20-34 hours per week at a HL-Russian educational setting ($M = 26$ hours/week, $SD = 6$).

2.1.3. RUSSIAN-NORWEGIAN BILINGUALS. We recruited 17 Norwegian-Russian bilingual children growing up in Norway: 11 children come from mixed Russian-Norwegian families, while six children come from families with two Russian-speaking parents. The AoO of the societal language varied between 0 and 12 months ($M = 4$ months, $SD = 5$ months). All children attended a Norwegian-language daycare or school during the week and a supplementary Russian-language school on the weekend (2-5 hours a week). The Russian-Norwegian bilinguals were reported to receive between 2-8 hours per week of HL-Russian educational support ($M = 6$ hours/week, $SD = 1$).

The background differences between the two bilingual groups reflect the nature of Russian-speaking populations in Israel and Norway. Thus, we do not aim to compare the two groups directly to each other; rather, our study aims to compare each HL group separately to monolingual speakers (3yr, 4yr, 5yr, 6yr, and adults).

2.2. TASK. We conducted an elicited production picture description task to elicit sentences involving direct and indirect objects (i.e., Structural ACC and Inherent DAT case forms), as well as locative and directional utterances involving prepositional phrases (nouns in Lexical ACC, INSTR and PREP case forms). Each experiment involved triggering 12 sentences with noun phrases in Structural case forms (6 Structural ACC forms and 6 Inherent DAT) and prompting 18 sentences producing Lexical cases assigned by preposition to their complements. The prepositions were *na* 'on', *v* 'in', and *pod* 'under', which have been reported to be the first prepositions produced by monolingual children across different languages, including Russian (Johnston & Slobin 1979; Mitrofanova 2016, 2018). The experiment elicited 6 utterances with each preposition: 4 locative and 2 directional phrases (see Table 4).

Case	Example				
Structural [ACC] (6 items)	babušk-a grandma-NOM		risujet draws	gor-u mountain-ACC	
Inherent [DAT] (6 items)	lis-a fox-NOM	dajot gives	koshk-e cat-DAT	jabloko apple	
Lexical [LOC] (12 items)	na on	korobk-e (x4) box-LOC	v in	lodk-e (x4) boat-LOC	pod under	mashin-oj (x4) car-INSTR
Lexical [DIR] (6 items)	na on	korobk-u (x2) box-DIR	v in	lodk-u (x2) boat-DIR	pod under	mashin-u (x2) car-DIR

Table 4. Experimental conditions and stimuli

We selected frequent, easily visualizable nouns that are acquired early by monolingual children. According to the norming study by Akinina et al. (2015), the perceived acquisition age of all our target nouns is below 2 years of age (see http://stimdb.ru/), and the frequency is between 7.5 and 402.5 instances per million (Lyashevskaya & Sharov 2009; http://dict.ruslang.ru/freq.php). All target nouns in utterances that elicited Structural ACC and Inherent DAT case forms were feminine nouns of declension class II.[3] This was done to avoid ambiguity between nominative and accusative case forms. To elicit locative and directional

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[3] We follow Shvedova (1980) for the numeration of the declension classes.

phrases with prepositions *v* 'in', *na* 'on', and *pod* 'under', we selected four feminine nouns of declension class II that denote containers (*mashina* 'car', *lodka* 'boat', *korobka* 'box' and *korzina* 'basket'). To avoid cases of consonant cluster reduction in the onset of the phonological word in prepositional phrases with the preposition *v* 'in', half of the target nouns started with a segment (/l/ or /m/) that had higher sonority than the fricative /v/. Finally, to have more diversity in the stimuli, we used four masculine nouns in contexts that elicited locative prepositional phrases only (these contexts elicited forms that can unambiguously be interpreted as instrumental or locative case forms of this declension class).

2.3. PROCEDURE. Data collection was approved and conducted in accordance with the ethical principles of the Higher School of Economics (Russian Federation), Norwegian Social Science Data Service (Norway), and the Institutional Review Board of Bar-Ilan University (Israel). Before we invited a child to take part in the study, we received written informed consent from his/her parent or guardian. On the day of testing, we further obtained verbal assent from the child to "play a word game, which could be stopped at any moment." If the child agreed to play the game, the experimenter opened the laptop and started asking the child about what was happening on the screen.
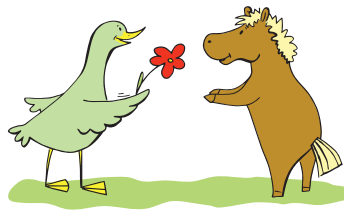

Figure 1: Example of an experimental item. Experimenter: *čto delaet utočka?* 'What is the duck doing?' (Target: *utočka/ona daet cvetoček **loʃadk-e*** 'duck-NOM gives flower-NOM/ACC **horse-DAT**')

3. Results.

3.1. CASE MORPHOLOGY ACCURACY. To address the first research question regarding the order of acquisition of nominal case forms in monolingual and bilingual children, we compared children's abilities to use Structural-ACC, Inherent-DAT and Lexical cases, assigned by prepositions. We conducted a generalized linear mixed model analysis in SPSS 25, with target-like production of case inflection as our response variable, coded as 1 for target and 0 for non-target response. The most parsimonious model included two main effects and their interaction: Group with seven levels (monolingual 3-, 4-, 5- and 6-year-old children and adults; bilingual Hebrew- and Norwegian-speaking children) and Case (Structural-ACC, Inherent-DAT, Lexical-Location and Lexical-Path). We included by-participant and by-item random intercepts to account for child-specific and item-specific variability. The models did not converge when random slopes were included. We then explored the type of case error, such as overuse of NOM/ACC/LOC case (see Figure 2).
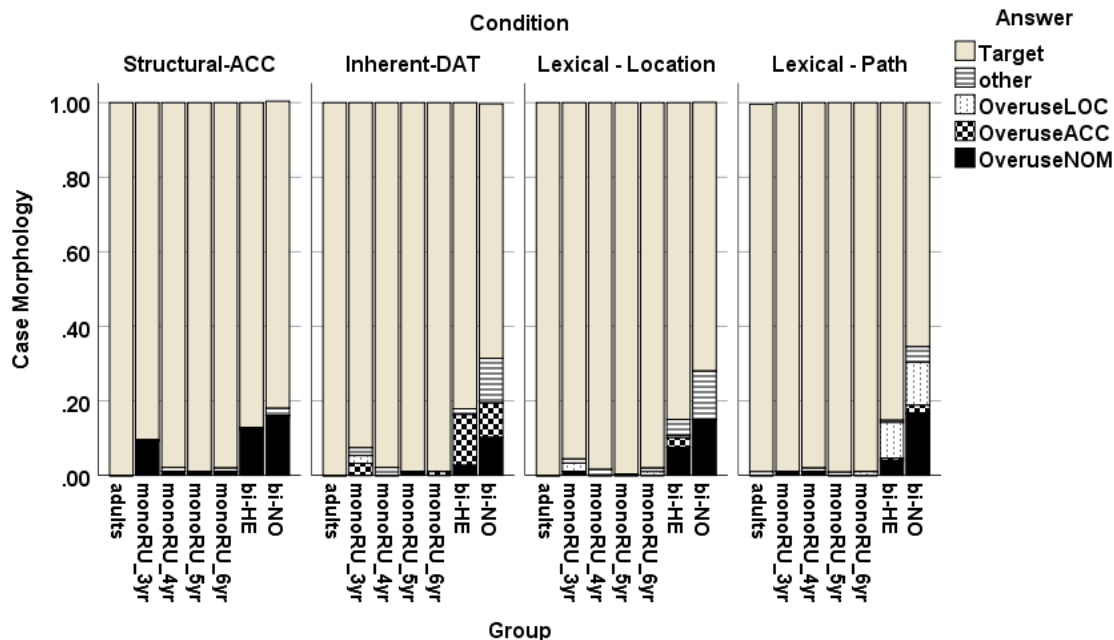
Figure 2: Case accuracy and error types per condition across groups

The results indicated only a significant effect of Group ($F(6,3647) = 9.31$, $p < .001$), while the effects of Group*Case interaction ($F(3,3647) = .87$, $p = .63$) or Case ($F(3,3647) = 0.00$, $p = 1.00$) on the performance were not significant. Pairwise contrasts with adjusted alpha-level using the Bonferroni correction method revealed that among monolinguals only children 3 years of age were significantly less accurate compared to the adult controls. Both bilingual groups performed significantly less accurately across Case conditions than the monolinguals, even when compared to the youngest participants 3 years of age (see Table 5).

GROUPS Pairwise Contrasts	EST	SE	t	df	Adj. Sig.	95% CIs Lower	Upper
monoRU_3yr - bi-NO	.207	.069	3.008	3647	.003	.072	.341
monoRU_3yr - bi-HE	.079	.030	2.615	3647	.009	.020	.137
monoRU_3yr - monoRU_6yr	-.018	.015	-1.180	3647	.238	-.047	.012
monoRU_3yr - monoRU_5yr	-.022	.014	-1.557	3647	.120	-.050	.006
monoRU_3yr - monoRU_4yr	-.014	.015	-.919	3647	.358	-.044	.016
monoRU_3yr - adults	-.028	.014	-2.093	3647	.036	-.055	-.002
adults - bi-NO	.235	.067	3.489	3647	<.001	.103	.367
adults - bi-HE	.107	.027	3.985	3647	.001	.054	.159
adults - monoRU_6yr	.011	.006	1.726	3647	.084	-.001	.023
adults - monoRU_5yr	.006	.004	1.626	3647	.104	-.001	.014
adults - monoRU_4yr	.014	.007	1.904	3647	.057	.000	.029
adults - monoRU_3yr	.028	.014	2.093	3647	.036	.002	.055

Table 5. Pairwise contrasts with the Bonferroni correction method for target case morphology

In order to further address the question of bilingual HL trajectory, we examined the types of case errors across participants. Both bilingual groups overused the default NOM form (as in

Examples (1)–(2) in all four experimental conditions (bi-NO group: overall $M = .14$; Structural-ACC: $M = .16$, Inherent-DAT: $M = .10$; Lexical-Location: $M = .15$ and Lexical-Path: $M = .17$; bi-HE group: $M = .07$; more specifically for Structural-ACC: $M = .12$, Inherent-DAT: $M = .03$; Lexical-Location: $M = .08$ and Lexical-Path: $M = .04$). Interestingly, the use of NOM in the bi-HE group was not comparable to Russian-speaking peers (4–6-year-olds). The overuse of the default NOM case was observed only for the Structural-ACC ($M = .09$), and only in 3-year-old monolingual participants. We return to this point in the Discussion.

As is evident from Figure 2, another typical error made by bilingual children in the Inherent DAT condition was the overuse of ACC by the bi-HE group ($M = .14$) and the bi-NO ($M = .09$). This error pattern appeared very seldom in monolingual groups; it was only observed in monolingual 3-year-olds, yet its distribution was very low ($M = .03$).

The overgeneralization of the Lexical case denoting Location (PREP case for IN and ON, and INSTR case for UNDER) instead of forms indicating Path (ACC for all prepositions) were noted in bilingual groups (bi-HE: $M = .10$; bi-NO: $M = .12$). This error pattern was very rare in the monolingual groups. Lexical cases are discussed in more detail in the next subsections.

(1)   Prompt: chto delaet babuʃka?
      Target Structural ACC: risujet   gor-u
                               draw-3SG mountain-ACC
      Children's responses:
      bi-HE_109(age 5):   *risovajet *gor-a
                               draw-3SG mountain-NOM

(2)   Prompt: čto delaet utka?
                what does duck?
      Target Inherent DAT: dajot   loʃadk-e   tsvetoček
                             give.3SG   horse-DAT flower.NOM/ACC
      Children's responses:
      bi-NO_43 (age 8):   utk-a   dajot   tsvetoček   *loʃadk-a
                            duck-NOM give-3SG   flower.NOM/ACC   horse-NOM

      bi-NO_5 (age 7):   dajot   *loʃadk-u tsvetoček
                            give.3SG   horse-ACC flower.NOM/ACC

To summarize, for case inflectional production only Group was a significant predictor of the performance: monolingual children above 3 years of age showed nearly ceiling effects (ACC: $M = .91$ DAT: $M = .93$ Lexical-Location: $M = .96$; Lexical-Path: $M = .99$); while both bilingual groups were significantly less accurate even when compared with the monolingual 3-year-olds. No significant effect of case typology and no interaction between case typology and Group were found. In the next subsection, we look at Lexical Case forms in more detail.

3.2. LOCATIVE AND DIRECTIONAL PREPOSITIONAL PHRASES. In this subsection, we focus on the two prepositional conditions (Lexical-Location and Lexical-Path). First, we analyzed the accuracy of case inflectional morphology. Similarly to a model for all four conditions (see Model 1 above), a generalized linear mixed model on the accuracy of case production across lexical cases confirmed a significant effect of Group ($F(6,2180) = 8.92$, $p<.001$), no effect of Condition ($F(1,2180) = 0.00$, $p = .99$), and no Group*Condition significant interaction ($F(6,2180) = .77$, $p = .59$). The accuracy of case inflectional production within the Lexical case condition is only

relevant to the child group. As can be seen in Figure 3, monolingual Russian-speaking adults and children showed at-ceiling performance with respect to case accuracy and correctly differentiated between Location and Path conditions, while the two bilingual groups showed a significantly lower performance when compared to monolinguals, as determined by pairwise contrasts with an adjusted alpha-level using the Bonferroni correction method.
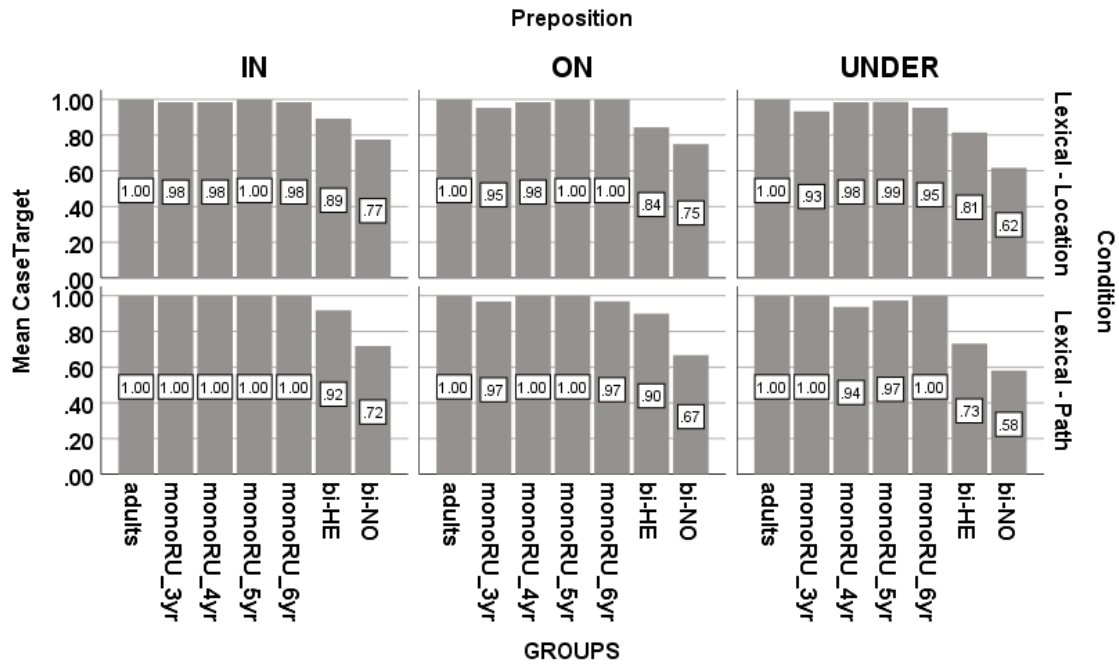

Figure 3: Case accuracy per preposition type and condition across groups

Subsequently, we focused on error patterns and analyzed the omission of prepositions (see Figure 4). We applied a binominal logistic regression modeling with the following variables as fixed factors: Experimental condition (Lexical-Location and Lexical-Path), Preposition (IN, ON, UNDER) and Group (Adults, monoRU-3yr, monoRU-4yr, monoRU-5yr, monoRU-6yr, bi-HE and bi-NO), as well as their interactions. Participants and Items were included as random effects. To investigate error patterns, we analyzed preposition omissions (1- omission of preposition; 0 – no preposition omission, which reflected two types of responses: Target Preposition use and Preposition substitution). The results based on the a binominal logistic regression modeling with Experimental Condition (Lexical-Location and Lexical-Path), Preposition (IN, ON, UNDER) and Group (Adults, monoRU-3yr, monoRU-4yr, monoRU-5yr, monoRU-6yr, bi-HE and bi-NO) as fixed variables and Participant and Items as random variables, indicated a significant effect of Group ($F(4,2174) = 3.15$, $p = .02$), no effect of Condition ($F(1,2174) = .79$, $p = .97$), no effect of Preposition ($F(2,2174) = 1.86$, $p = .16$) and no significant Group*Condition and Group*Preposition interactions. The pairwise contrasts with the Bonferroni correction method revealed that among monolinguals only children 3 years of age were significantly less accurate compared to the adult controls and indicated that the monoRU-3yr were significantly more likely to omit prepositions as compared to the adult controls ($B = 0.19$, $SE = .09$, $t = 2.06$, $p = .04$), as well as to the monoRU-4yr group ($B = 0.17$, $SE = .08$, $t = 2.02$, $p = .04$). The bilingual groups as well as the older monolingual groups (ages 5-6) were not significantly different from the monolingual adult controls on preposition omissions.
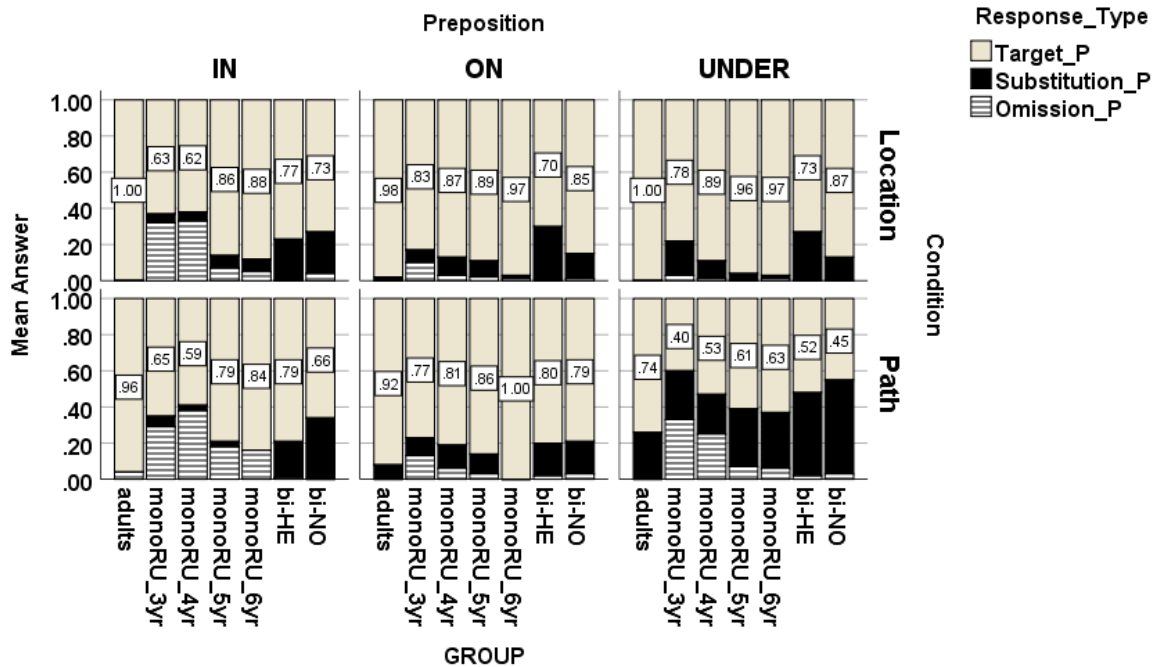
Figure 4: Preposition accuracy and error types per condition and P type across groups

(3)   Prompt: gde   myʃka?
                  where mouse
        Target (Lexical-LOCATION):   na korobk-e
                                      on basket-LOC
        Children's non-target responses:
        a. monoRU_19 (age 3): __ korobk-e
                                __ box-LOC
        b. bi-HE_122 (age 5): na korobk-a
                                on box-NOM
(4)   Prompt: kuda   zabralas' myʃka?
                  where climbed   mouse?
        Target (Lexical-PATH): v   korobk-u
                                in box-DIR
        Children's non-target responses:
        a. monoRU_13 (age 4): __ korobk-u
                                __ box-DIR
        b. bi-NO_44 (age 7):   v   korobk-a
                                in box-NOM

Interestingly, there were instances of preposition *additions* in the responses of bilingual children in the DAT condition. It should be noted that in both SL languages (Hebrew and Norwegian), the recipient is realized with the preposition (Hebrew: *le-* "to"; Norwegian: *til* 'to').

(5)   Prompt: čto   delaet   utka?
              what   doing   duck?
      Target (Dative):   ona   darit   tsvetoček   loʃadk-e.
                         she   gives-as-a-present   flower.NOM/ACC   horse-DAT
      Children's non-target responses
      a. bi-NO_53 (age 7):   davaet*   tort   dlja   loʃadk-e
                               gives.3SG   cake.NOM/ACC   for   horse-DAT
      b. bi-NO_51 (age 8):   ona   dajot   tsvetoček   k   loshad'
                               she   gives.3SG   flower.NOM/ACC   to   horse.NOM
      c. Bi-HE_603 (age 6):   dajot   tsvety   dlja   kon'
                               gives.3SG   flowers.NOM/ACC   for   horse.NOM
      d. Bi-HE_130 (age 5):   dajot   podarok   na   sobačk-u
                               gives.3SG   present.NOM/ACC   on   dog-ACC

   To sum up the subsection on Lexical cases, the results demonstrate that while monolingual 3- and 4-year-olds are likely to omit prepositions, older monolinguals as well as bilinguals do not omit prepositions. However, in the absence of the overt preposition, all monolingual groups (including the youngest children) typically do not resort to the use of the default NOM form, but use a noun in the Lexical case form correctly differentiating between LOC and DIR forms even in the absence of the case-assigning preposition (see (3a) and (4a)). The pattern is different for the two bilingual groups (biNO and bi-HE). The HL children in both groups are not likely to omit prepositions, yet they are more likely to err on case inflections (they overuse NOM across two types of utterances, or they use LOC and INSTR instead of ACC in utterances denoting Path, see (3b) and (4b,c)).

3.3. INDIVIDUAL VARIABILITY AND FACTORS INFLUENCING IT. There was wide variability in the accuracy of case inflections in the two bilingual groups (bi-HE and bi-NO), while only very few children showed non-target-like performance in the monolingual group. In this subsection, we address the heterogeneity of HL-speakers and factors affecting it.

   First, we evaluated the percentage of children who show at-ceiling (above 85%) case accuracy. The majority of children in the monolingual group exhibit mastery of case morphology, whereas in bilingual groups the percentage was substantially lower (see Table 6).

	Structural ACC	Inherent DAT	Lexical Location	Lexical Path
CHILD Mono-RU (3-, 4-, 5-, 6-year-olds together)	84%	90%	99%	93%
Bi-HE	47%	53%	66%	47%
Bi-NO	71%	53%	35%	18%

   Table 6. Target-like performance per child groups per condition (i.e., Accuracy 85-100%)

In the bi-HE group, around half of the children showed above 85% mastery of case inflections, while in the bi-NO group this percentage was even lower. Subsequently, we investigated the percentage of children who exhibit very low performance on case morphology (below 25% accuracy). As can be seen in Table 7, no monolingual children fit this profile. In contrast, in the two bilingual groups, there were several children who hardly used case inflections and opted for the default NOM forms. Finally, around half of the children in the bilingual groups scored between 25% and 85% accuracy. Overall, our results revealed great heterogeneity in accuracy with

respect to case morphology in the bilingual groups, and homogeneity (early mastery of case) in the monolingual group.

	Structural ACC	Inherent DAT	Lexical Location	Lexical Path
CHILD Mono-RU (3-, 4-, 5, 6-year-olds together)	0%	0%	0%	0%
Bi-HE	0%	9%	6%	3%
Bi-NO	18%	24%	18%)	10%

Table 7. Nontarget performance per child group per condition (i.e., Case Accuracy Rate 0-25%)

Finally, we evaluated the effect of input factors on the two bilingual groups in case acquisition using Spearman's correlational analyses. The results indicated that chronological age, AoO of bilingualism and number of schooling hours in HL significantly affect case acquisition (see Table 8). As children get older, they progress in their HL, and they make fewer case errors. Furthermore, children with longer period of uninterrupted HL acquisition (i.e., children with later AoOs of the SL) and children who receive more support outside of home (i.e., schooling in HL) were more likely to score higher on the case production task. Previous research shows that exposure variables form a complex, intertwined, and interrelated network, collectively affecting the language abilities of bilingual children (see Fridman et al. 2024).

	Age	AoO	Family type	Schooling in HL
Case Error	-.092[*]	-.231[**]	.006	-.117[**]
Age	1	.397[**]	.397[**]	.611[**]
AoO	.397[**]	1	-.231[**]	.443[**]
Family Type	.397[**]	-.231[**]	1	.063[*]
Schooling in HL	.611[**]	.443[**]	.063[*]	1

Table 8. Spearman's correlational analysis between case error rate and input factors

4. Discussion. In this study, we investigated the production of case morphology by monolingual and bilingual children who acquire Russian as their HL in tandem with two different SLs (Norwegian and Hebrew). The acquisition of case morphology was addressed within Case Theory by comparing Structural ACC (e.g., *risujet gor-u* '(she) draws a mountain-ACC'), Inherent DAT (*dajot loʃadk-e tort* '(she) gives the horse-DAT a cake') and Lexical cases assigned by prepositions ON, IN and UNDER, differentiating locative and directive semantics (e.g., location: *v korzin-e* 'in basket-LOC'; direction: *v korzin-u* 'in(to) basket-ACC'). We aimed to contribute to the ongoing debate with respect to the trajectory of HL development. We explored whether bilingual children acquiring HL-Russian in combination with two different SLs show quantitative and qualitative differences compared to younger Russian-speaking monolinguals. We contrasted the performance of two groups of bilingual children – Hebrew-Russian and Norwegian-Russian speakers – with monolingual typically developing preschool children on an elicited production task, comprising several inflection forms. The study did not aim to compare the HL groups due to inherent differences between the Russian-speaking communities in Israel and those of Norway; rather, we aimed to compare each HL group to monolingual children of different ages.

4.1. CASE TYPOLOGY IN ACQUISITION. The analysis did not reveal a significant effect of case typology on the accuracy of case production in any of the groups; i.e., there were no differences between Structural ACC, Inherent DAT and Lexical Cases assigned by the prepositions. Overall,

our results showed that monolingual Russian-speaking children reach at-ceiling performance on all tested case forms as early as age 3, indicating that the acquisition of case in Russian happens very early.

In regard to Russian, only a handful of previous studies have looked at case accuracy production from the point of view of case typology, reporting that the first cases to appear are Structural cases (NOM and ACC) (Gvozdev 1961; Babyonyshev 1993; Cejtlin 2009; Gagarina & Voieikova 2009). At the same time, in Russian (similarly to Polish, see Dąbrowska 2006; Krajewski et al. 2011), monolingual children master case very rapidly, exhibiting at-ceiling accuracy on Structural ACC, Inherent DAT and Lexical cases assigned by prepositions denoting Location and Path already by the age of 3. The findings for Russian (as well as Polish) stand in contrast to the findings for German, which evince a more pronounced effect of case typology in acquisition. For German, Lexical case has been shown to be more challenging in acquisition compared to Structural case and Inherent case (Eisenbeiss et al. 2006). We call for future studies that assess the contribution of case typology in acquisition in other languages. Future studies should also address the acquisition of Lexical cases assigned by verbs as compared to the ones assigned by prepositions (as in the current study).

4.2. HL DEVELOPMENT TRAJECTORY. The second aim of our study was to determine the general trajectory of case acquisition in HL-Russian speakers compared to monolingual controls. In other words, we aimed to determine whether HL child speakers are qualitatively different from monolingual controls.

At the group level, both groups of HL speakers (bi-NO and bi-HE) exhibited significantly lower accuracy in case inflection production compared to monolingual children. This finding is consistent with previous studies, which have highlighted case morphology production as a vulnerable domain in HL acquisition (see Polinsky 2006a,b, 2007, 2008, 2018, among others). Previous studies have shown that bilinguals as a group tend to perform significantly less accurately than 4- to 5-year-olds (Janssen & Meir 2019). Our current study further demonstrates that even when compared to 3-year-old monolingual controls, a gap in accuracy exists.

Examining individual profiles, we observed that some HL children may attain baseline performance in their HL, with accuracy exceeding 85%. However, we have also noted not only quantitative but also qualitative divergence in some HL speakers. Common error patterns among HL-Russian children included the overuse of NOM forms instead of Structural ACC, Inherent DAT, and Lexical cases, particularly after LOC or DIR prepositions. Both bilingual groups demonstrated a tendency to substitute the Structural ACC with the NOM form (Russian-Norwegian: $M = .15$; Russian-Hebrew: $M = .12$). This tendency to use unmarked forms in place of marked case forms is characteristic of HLs, including HL-Russian, as evidenced in previous studies (Polinsky 2006a, 2018; Montrul 2016; Meir et al. 2017; Janssen & Meir 2019), as well as recent research on adult Russian-HL speakers (Meir et al. 2021; Fridman et al. 2023).

For monolinguals, overuse of NOM forms was observed primarily in Structural ACC contexts for the youngest group (3-year-olds: $M = .09$), where overall accuracy was nearly perfect ($M = .91$). NOM form errors were nearly absent in monolingual responses in other conditions (Inherent DAT: $M = 0$; Lexical-Location $M = .01$; Lexical-Path: $M = .01$). Another quite frequent pattern of errors observed in the responses of both bilingual groups was the overuse of ACC instead of Inherent DAT, yet this overgeneralization is virtually non-existent in monolinguals. This is a mistake that has been registered before in HL-Russian speakers growing up with

a different majority language and has been analyzed as a reflex of a simplified case system (a more frequent and less marked oblique case form replacing a more marked and infrequent form).

Interestingly, while ACC was relatively often used by child HL-Russian speakers to replace Inherent DAT, it was almost never used in LOC contexts, suggesting that child HL speakers distinguish between distinct oblique case contexts with different semantics. The most common overgeneralization patterns in the locative and directional contexts were (i) the overuse of NOM case after prepositions in LOC contexts (Russian-Hebrew: $M = .07$ and $M = .04$; Russian-Norwegian: $M = .15$ and $M = .16$ for Lexical-Location and Lexical-Path respectively), (ii) the overuse of NOM instead of ACC and DAT (Russian-Hebrew: $M = .12$ and $M = .02$; Russian-Norwegian: $M = .16$ and $M = .10$ respectively) and (iii) the overuse of LOC case instead of directive after prepositions in directional contexts (Russian-Hebrew: $M = .09$; Russian-Norwegian: $M = .12$). These types of errors were not observed in monolingual Russian-speaking children, even in the younger 3-year-olds. While the overuse of NOM forms after prepositions has been attested in previous studies (Polinsky 2006a,b), and can be regarded as another instantiation of the use of an unmarked form replacing the oblique case form, the overuse of LOC case in directional contexts is a novel pattern, which to the best of our knowledge has not been observed in previous studies, but was quite robust and systematic in HL-Russian learners. This pattern may reflect HL speakers' intuitions that Location is a part of the directional prepositional phrases semantically and structurally (cf. Svenonius 2010; Pantcheva 2011), yet it should be further investigated.

To sum up, based on the quantitative and qualitative differences between monolinguals and HL-Russian speakers of different SLs, we can conclude that some HL speakers are not simply "slower" than monolingual children; rather, they show divergent attainment. We also aimed to determine the mechanisms driving HL divergence. We hypothesized that if HL development is linked to direct/indirect cross-linguistic influence from the SL, we might register an advantage in the bi-HE group for the Structural ACC case, since Hebrew (but not Norwegian) overtly marks ACC case with a specialized particle *et*. This prediction was not borne out. We would like to be cautious about claims relating to the effect of cross-linguistic influence from the SL. It should be noted that the mapping and bundling of Structural ACC differs in Russian and Hebrew. In Russian, ACC case is marked by inflections, while in Hebrew, ACC case is sensitive to definiteness and is realized as the particle *et*. Some HL speakers are likely to develop grammars which diverge from monolingual baseline grammars under cross-linguistic influence from the SL (as neither Hebrew nor Norwegian utilize case inflection) and/or due to reduced input in the HL. The latter hypothesis is supported by significant correlations between case accuracy and input measure (chronological age; AoO of bilingualism, an index of uninterrupted HL acquisition; and amount of schooling in the HL). Children with longer periods of uninterrupted acquisition to HL (i.e., later AoOs of the SL) and children who received HL educational support were more likely to develop monolingual-like grammars. Input factors have been implicated in monolingual and (even more so) in bilingual language acquisition (see, e.g., Armon-Lotem & Meir 2019 for a review). On the basis of our study design, we cannot tease apart the effects of cross-linguistic influence and diminished input effects. However, it is also plausible that these two effects are not mutually exclusive and that they both play a role (see, e.g., Fridman et al. 2023 for further discussion).

5. Conclusions. The current study affirmed that monolingual Russian-speaking children demonstrate proficiency in case morphology as early as age 3. However, bilingual children acquiring Russian as their heritage language exhibit notably lower accuracy compared to monolingual

children, even when compared to those as young as 3 years old. Our analysis did not reveal any significant effects of case typology on the developmental trajectory: the performance of all groups was comparable across conditions. To be more specific, monolingual groups demonstrated nearly at-ceiling performance on Structural ACC, Inherent DAT, and Lexical cases assigned by prepositions. In contrast, both bilingual groups exhibited significantly poorer performance across all case forms. Importantly, our results indicated that bilingual children regardless of the SL are heterogeneous in their performance on case morphology. Some child HL speakers show evidence of divergent, non-target-like representations, yet some develop monolingual-like grammars in the domain of case. HL speakers were found to be more likely to diverge from the baseline in line with previous research on adult HL-Russian in contact with English (see Polinsky 2006a,b, 2007, 2008, 2018, among many other works). HL speakers not only scored lower than monolingual controls (even when compared to the youngest children aged 3), but HL speakers also presented with a different error profile compared to monolinguals. HL speakers were found to be more likely to use default NOM forms instead of other case forms. Our results revealed great individual variability and heterogeneity in HL development. The success of case acquisition in HL children was found to be related to input factors: chronological age, length of uninterrupted HL acquisition (i.e., AoO), and schooling in HL. Children with a later AoO of bilingualism, those with two Russian-speaking parents, and those who received more schooling in HL-Russian were more likely to develop a monolingual-like baseline grammar. Given our relatively small sample size and the complexity of our design, there is a possibility that our models may be underpowered. Therefore, replicating our research with larger sample sizes would be valuable. Furthermore, future research should investigate the effect of case typology on acquisition and maintenance in HL Russian-speaking children speaking other SLs with rich case morphology (e.g., German, Greek, Hungarian, and Finnish).

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