Teenage kicks: exploring shared syntax through bidirectional crosslinguistic priming

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Evidence from Polish-English bilingual adolescents and adults

Ludovica Serratrice[1,2] Marta Wesierska[3,4]
Vanessa Cieplinska[1,5] and Katherine Messenger[4,6]
[1] University of Reading | [2] UiT The Arctic University of Norway |
[3] University of Huddersfield | [4] University of Warwick | [5] University College London | [6] Lancaster University

A developmental account of how bilinguals organise syntactic knowledge is crucial to understanding their mental representations. While adult studies suggest that syntactic representations can be shared across languages, evidence from child and adolescent heritage speakers remains limited and mixed. We conducted two syntactic priming experiments with adolescent heritage speakers of Polish in the UK ($N=35$, mean age = 15;3) to test whether they would produce (1) relative clauses (RCs) instead of adjectival phrases for attributive relationships, and (2) possessor-second structures for possessive relationships with referential possessors, following cross-linguistic priming. A third experiment tested first-generation Polish-speaking adult immigrants in the UK ($N=32$) on the same tasks. Adolescents were resistant to priming for RCs, whereas adults showed bidirectional priming. Both groups were primed to produce possessor-second structures only in Polish, where this is the canonical word order. Results indicate that increased proficiency and language experience facilitate priming for less frequent, complex structures like RCs, supporting shared syntax only in adults. For highly frequent constructions like possessives, where Polish and English differ in word order, priming occurred only when consistent with the language-specific preference. This underscores the role of frequency, canonicity, and complexity in shaping bilingual syntactic representations across development.

Keywords: syntactic priming, heritage speakers, crosslinguistic influence, adolescents, Polish

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1. Introduction

One of the central topics in bilingualism research concerns the organisation of knowledge of two languages within one cognitive system. Evidence from research on the mental lexicon lends support to the notion of a shared conceptual store where word meaning is shared across languages (e.g., Dijkstra et al., 2019; Dijkstra & van Heuven, 2002; Shook & Marian, 2013). When it comes to the organisation of syntactic structures, a growing body of evidence using the crosslinguistic syntactic priming paradigm (e.g., Hartsuiker et al., 2004) suggests that adult bilingual speakers can acquire syntactic representations that are shared across languages, at least where their two languages have overlapping syntax (e.g., Bernolet & Hartsuiker, 2018; van Gompel & Arai, 2018). By contrast, there is comparatively little evidence about whether, and when, such shared representations emerge in young bilinguals (Gàmez et al., 2022; Serratrice, 2022 for reviews). A handful of studies provide evidence that children may, like adults, develop shared representations of syntax under some circumstances. In some cases, crosslinguistic priming occurs from one language to the other but not in the opposite direction (e.g., Vasilyeva et al., 2010), and in other cases it does not emerge at all, even if there is fully overlapping syntax (e.g., Wesierska et al., 2025). This developmental evidence comes from populations that differ from adult bilinguals in ways other than age. Research with adults is typically conducted with speakers who are acquiring a second language (L2) at a later stage having already fully acquired their first language (L1). Conversely, research with children has so far been conducted with early, simultaneous bilingual speakers who are acquiring their two languages through their home and school environments and without (much) pedagogical instruction in the case of the non-societal language — what we will refer to henceforth as their heritage language (Kupisch & Rothman, 2018). The learning experiences and environments differ considerably for late and early bilinguals which may help to explain why the pattern of results with child bilinguals does not always mirror that of adults.

Adolescent bilinguals that sit chronologically between younger children and adults have yet received little attention (Favier et al., 2019; Kutasi et al., 2018). Adolescent bilinguals are of interest developmentally since, unlike adult L2 learners, they may have acquired two languages simultaneously in a more naturalistic environment. In contrast to younger child bilingual speakers, some may have reached a greater degree of proficiency in each language, if a concerted effort has been made to keep developing both language and literacy skills in the heritage language alongside those in the societal language. In the current study we explore whether bilingual adolescents show evidence of having acquired shared syntax for a set of structures that are not yet shared in early bilinguals (Wesierska et al.,

2025). Finding significant effects of priming would show a progression towards shared syntactic structures over the course of development in heritage speakers. This would mirror general findings from older bilinguals/L2 learners. A lack of priming would be more consistent with a developmental trajectory in which the two languages of bilingual speakers follow an independent and parallel course. To further explore the developmental trajectory, we also investigate these effects in a group of first-generation Polish immigrants who come from the same Polish community in the UK as the adolescents in this study.

1.1 Shared representations of syntax in bilingual speakers

Starting from the well-attested linguistic phenomenon that processing a syntactic structure facilitates, i.e., primes, the subsequent processing of the same structure (e.g., Bock, 1986; Pickering & Branigan, 1998; see Mahowald et al., 2016, for a meta-analysis of syntactic priming in production), Loebell and Bock (2003) extended syntactic priming crosslinguistically. If processing a syntactic structure in Language A primes the production of the same syntactic structure in Language B, then the syntactic representation must be shared across languages. Our understanding of a shared syntax account is that bilinguals represent some syntactic structures at an abstract level common to both languages. These are amodal, language-nonspecific representations. The strongest logical implication of a shared syntax account is that the magnitude of priming should be the same within and between languages, and that priming should be bidirectional. In the absence of bidirectional priming, we cannot conclude that representations are fully shared, but that they are merely connected in an asymmetrical fashion where priming directionality is subject to a number of constraints, for example, priming is more likely from the more proficient to the less proficient language, and for structures that are already preferred in the target language. Work on the crosslinguistic priming of ungrammatical structures lends support to the hypothesis of structures that are not fully shared (e.g., Baroncini & Torregrossa, 2025; van Dijk & Unsworth, 2023).

According to Hartsuiker and Bernolet's (2017) account, learning generates a representational network that balances two core principles: specificity and economy. L2 acquisition likely begins with lexical learning without strong syntactic links. As exposure increases, L2 syntactic representations emerge and combinatorial nodes form, leading to item-specific priming effects. Over time, abstract structures emerge, enabling both item-specific and abstract priming, eventually resulting in shared structures that are subject to crosslinguistic priming.

Bilingual adults can represent syntactic structures that are equivalent across languages as one shared representation (see van Gompel and Arai, 2018, for an

overview). Whether overlapping word order is necessary for the development of shared syntax is less clear as some studies have found priming in the absence of word order overlap (e.g., Desmet & Declercq, 2006; Hartsuiker et al., 2016; Song & Lai, 2022) and others have not (e.g., Bernolet et al., 2007; Jacob et al., 2017; Kidd et al., 2015). Some have also argued for connected rather than fully shared syntactic structures on the basis of the magnitude of within- vs. between-language priming (e.g., van Gompel & Arai, 2018; Ahn & Ferreira, 2024), and crosslinguistic priming has been identified as the underlying mechanism of crosslinguistic influence (Serratrice, 2016) and a driver of language change (e.g., Baroncini et al., 2025).

1.2 Developmental evidence for shared syntax

Child bilinguals do not have a fully-fledged L1 in place before acquiring an L2; 'L1' and 'L2' are typically acquired simultaneously or within a few years of each other, thus findings of research with adults may not straightforwardly replicate within child bilingual populations (see Gàmez et al., 2022 for an overview). Shared representations may take longer to emerge when the speaker has not yet acquired a representation in one language to support acquisition or sharing of a representation in the other language. This process may be even more extended for low-frequency structures, as exposure to rarer structures will be even more infrequent for a child exposed to two languages.

Of the two studies that have tested priming of passive structures in Spanish–English bilingual children, one found bidirectional priming of English and Spanish passives in a group of balanced bilinguals (Gàmez & Vasilyeva, 2020), but the other only found priming from English to Spanish in a group of English-dominant bilinguals (Vasilyeva et al., 2010).

Another study with child bilinguals compared crosslinguistic and within-language priming: Wolleb et al. (2018) tested English–Norwegian bilingual children's production of dative sentences in Norwegian, the societal language. Children produced more DO datives in Norwegian after DO primes, irrespective of prime language. These results are consistent with the shared syntax hypothesis, but crucially, they did not test priming into the non-societal language, so it is unclear whether the same effects would occur bidirectionally. Similarly, Unsworth (2023) examined between- and within-language priming for English–Dutch bilinguals. The children described pictures of possessive relations in Dutch after hearing English and Dutch primes of pre- and post-nominal possessive structures. They were primed to produce more of the dispreferred prenominal possessive in Dutch after hearing English and Dutch prenominal primes than after hearing

postnominal primes. As in Wolleb et al. (2018), priming was only tested in one direction.

A study which tested crosslinguistic priming bidirectionally and also within languages did not find evidence of shared syntax in Polish–English bilingual 5-to-11-year-olds (Wesierska et al., 2025). Hearing a postnominal relative clause attributive structure in one language (e.g., *The house that is yellow*) did not elicit postnominal relative clause attributive descriptions in their other language, despite the structures being fully overlapping between the two languages and therefore — in principle — good candidates for shared syntactic representations. This lack of effect was observed in both directions, from English to Polish and from Polish to English. A separate group of Polish–English bilingual children matched in age and language proficiency did show within-language priming for the same structures in both Polish and English. Together, these results suggest that these children have likely acquired the relevant within-language representations, but they are not yet shared across languages.

In contrast, in a second experiment in Wesierska et al. (2025), the same Polish–English bilinguals were primed to repeat the word order of possessive structures (e.g., possessum–possessor order (*the glasses of the king*) rather than possessor–possessum order (*the king's glasses*) across languages and bidirectionally. In this case, crosslinguistic priming transcended syntactic equivalence: children were primed even though the language-specific form had a different syntactic structure. This evidence may reflect priming of the linear order of the possessor–possessum thematic roles rather than syntactic priming (e.g., Chang et al., 2003; Ziegler & Snedeker, 2018).

Previous research with child populations has clearly shown mixed results in the extent to which crosslinguistic syntactic priming effects occur, and whether these effects are consistent with the idea that young simultaneous bilingual speakers acquire shared syntactic representations. These results are from studies mostly testing children aged between 4 and 8 years (one study included children up to 11 years as well), and so the results may only reflect the relatively earlier stages of bilingual language development. For some bilinguals, and for some structures, fully shared representations may take longer to be acquired. What happens at later stages of language development is even less well documented — to our knowledge only two previous studies have examined crosslinguistic syntactic priming in adolescent participants. Both studies did so with a view to examining whether syntax may be shared when the two languages are different, for example in word or constituent order, and whether proficiency plays a role in crosslinguistic priming.

Kutasi et al. (2018) tested Scottish Gaelic–English bilinguals aged 15–18 years. They examined whether hearing Gaelic passive-like constructions would prime passive structures in English. The teens produced more English passives after

Gaelic passive constructions with a '*go*' auxiliary, relative to syntactically unrelated baseline trials. Gaelic passive constructions with a '*be*' auxiliary did not prime more passive responses in English. Teens with higher self-ratings of Gaelic language skills produced more English passives irrespective of prime condition. These findings indicate crosslinguistic priming can occur in speakers younger than adults even when languages differ in word order (the verb of Gaelic *go*-passives occurs in sentence final position whilst the auxiliary occurs in sentence initial position) and auxiliary verb (*go* versus *be* or *get* as used in English).

Favier et al. (2019) tested Irish Gaelic–English bilinguals aged 16–17 years who attended Irish-medium education; most were sequential bilinguals who had acquired Irish in school but from a young age (before 5 years). Favier et al. examined whether Irish passives and datives would prime the same structures in English. Irish passives overlap closely with English passives except that the auxiliary is sentence-initial (before the subject) in Irish. Datives are structurally more dissimilar: Irish has only one dative form which has the syntactic/thematic role order of English prepositional object datives (e.g., subject/agent — verb — direct object/theme — indirect object/recipient) but does not contain a preposition; instead, the indirect object article is marked for dative case. Favier et al. found crosslinguistic priming for datives but not passives (both effects were replicated when priming was tested within English, albeit on a slightly different population). Moreover, priming interacted with proficiency such that teens with higher Irish proficiency were more likely to show priming for datives, in line with the developmental account of shared syntax (e.g., Bernolet et al., 2013; Hartsuiker & Bernolet, 2017).

Both studies reveal mixed patterns of crosslinguistic priming in adolescent bilinguals, and whilst bilingual teenagers may acquire shared representations through simultaneous or early sequential bilingual language experience, this evidence suggests that it is not the inevitable outcome of bilingual experience. One potential explanation is that these bilinguals were English-dominant rather than balanced bilinguals such that they had not reached a stage of fully shared syntactic representations. Neither study tested whether crosslinguistic priming was bidirectional, where it occurred: both studies tested priming from the heritage language (Scottish Gaelic, Irish Gaelic) to the societal language (English). Evidence of bidirectional priming is critical to show that structures are shared and not simply connected.

In summary, the literature on shared syntactic representations in bilingual children and adolescents has several limitations. Firstly, not all studies investigated priming bidirectionally. Secondly, studies with teenagers so far have reported mixed findings but with structures that are not fully equivalent across languages, having either word order differences, or differences in the presence of

function words. This leaves open questions of whether priming occurs when the structures are fully equivalent, and whether crosslinguistic priming is purely syntactic or at a structural level that includes thematic role ordering. Addressing these questions will make a critical novel contribution to our understanding of how two languages are represented in one cognitive system developmentally.

1.3 The present study

In this study we tested bidirectional syntactic priming for English and Polish of two different noun phrase structures: attributive constructions (involving prenominal or postnominal modification; Experiment 1) and possessive constructions (describing possessor–possessum relations; Experiment 2). In Experiment 3, we tested a group of Polish–English speaking adults from the same community on the same structures.

In English and Polish, the attributive relationship between a noun and an adjective can be expressed with equivalent constituent structures: a prenominal adjectival phrase ((1.a)/(b)) and a postnominal relative clause (RC) structure, in which the noun precedes the relative clause with the adjective modifying the noun ((2.a)/(b)). In both languages, the prenominal construction is canonical and used more frequently.

(1) a. A red$_{[ADJ]}$ ball$_{[NOUN]}$
b. Czerwona$_{[ADJ]}$ piłka$_{[NOUN]}$ ('a red ball')

(2) a. A ball$_{[NOUN]}$ that$_{[REL]}$ is red$_{[ADJ]}$
b. Piłka$_{[NOUN]}$ która$_{[REL]}$ jest czerwona$_{[ADJ]}$ ('a ball that's red')

Possessive relationships, in contrast, are expressed differently: English has an *s*-genitive structure, in which the possessor noun precedes the possessum noun and is marked with *'s* (3.a), and a prepositional structure, in which the possessum noun is mentioned first and the possessor is expressed in a prepositional phrase headed by *of* (4.a). In Polish, the head noun, the possessor, is inflected with genitive case and can occur either before (3.b) or after (4.b) the possessum noun. In English, the possessor-first genitive is more frequently used with animate, highly referential, definite possessors (see Rosenbach, 2014), whereas in Polish the possessor-second word order is more common in these contexts (i.e., (4.b)) (Cetnarowska, 2014; Migdalski, 2003) but the possessor–possessum order is possible provided that the possessor is referential and that it is an argument (3.b).

(3) a. the king's glasses
b. król-a okulary
king-GEN.SG glass-NOM.PL
'(the) king's glasses'

(4) a. the glasses of the king
b. okulary król-a
glass-NOM.PL king-GEN.SG
'glasses of (the) king'

For Experiment 1, we predicted that, unlike the younger bilinguals in Wesierska et al. (2025), the adolescent bilinguals should have reached a sufficient level of proficiency in their two languages to be primed crosslinguistically and bidirectionally, similarly to the adults in Experiment 3. For Experiment 2 and Experiment 3, we assumed that priming would also be crosslinguistic and bidirectional for a less complex structure that was successfully primed in younger Polish–English bilinguals.

2. Experiment 1 — attributive constructions

2.1 Method

2.1.1 *Participants*

Thirty-five adolescents aged between 13 and 19 years (M_{age} = 15;3 years; 22 female, 13 male) took part. Participants were recruited through mainstream secondary schools and complementary schools in the UK (as well as by social media and word of mouth) and had lived in the UK for at least five years. We administered the child version of the Q-BEx language background questionnaire (De Cat et al., 2023), but the completion rate was very low (N = 11) and we could not use this information further. We succeeded in collecting some basic information on language use as follows: except for one participant, all spoke Polish at home with their parents; seven spoke English at home with one or both parents (participants reported speaking both Polish and English with parents or had one non-Polish parent); fourteen spoke English at home with siblings.

We specifically targeted adolescents studying for British secondary education qualifications in Polish (i.e., the General Certificate of Secondary Education (GCSE), which is typically assessed at 16 years, and the Advanced Level (A-Level), which is typically assessed at 18 years). These young people were targeted to ensure that we recruited bilinguals who were proficient in both languages. This

project was reviewed and given approval by the University of Warwick Research Ethics Committee.

2.1.2 *Design*

Experiment 1 involved a 2 (Prime Structure: prenominal adjective vs. postnominal RC construction, within-participants and within-items) x 2 (Priming Direction: English-to-Polish vs Polish-to-English, within-participants) design.

2.1.3 *Materials*

The materials consisted of picture cards and associated prime descriptions which were used in a Snap game syntactic priming task (Branigan et al., 2005). The same items were used in the Polish-to-English and English-to-Polish versions of the task. ClipArt images were displayed in PowerPoint slideshows (see Figure 1).

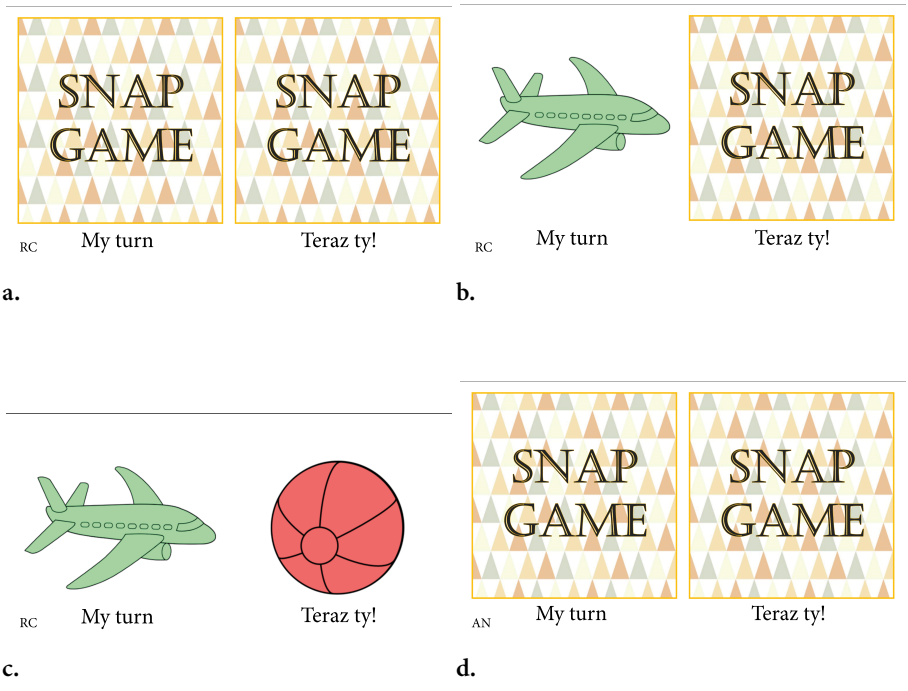


Figure 1 Example Experiment 1 prime (b) and target (c) items as displayed in the Snap task (a, d)

The stimuli did not include translation equivalents or cognates; 12 inanimate object target nouns and 12 different inanimate object prime nouns were combined with each of four different colours (*red/czerwony, green/zielony, blue/niebieski*

and *yellow/żółty*) to create 48 prime and 48 target images. We paired semantically unrelated prime and target images in different colours to create 48 experimental items, ensuring there was no lexical overlap within prime-target pairs. Each prime picture was associated with both an English and Polish prenominal adjectival and postnominal RC prime phrase (see Examples (1) and (2) above).

We created two experimental lists of the items with each target occurring once per list in one of the two prime conditions; across lists, items occurred in each prime condition. Within lists, an even number of items (24) occurred in each prime condition. Each participant received an individually randomised order of items in which items alternated between prime conditions. We added eight Snap items (in which the same image appeared for the prime and target) using eight new nouns, paired with the same four colours. Snap items were inserted at random intervals into each participant list. We created an additional four practice items, two per prime condition, to introduce the game to participants; a full list of items is provided at the following OSF project https://osf.io/x2rd8/?view_only=68db7e665bc44ad19dd489e2b5d08b43.

Each priming task was preceded by a baseline measure to establish the participants' preferred grammatical constructions. We presented six images of coloured objects and asked participants to describe them freely.

We measured language proficiency using the Vocabulary subtests of the Wechsler Intelligence Scale for Children (WISC) — Fourth UK Edition (English; Wechsler, 2003; 36 items, maximum raw score 68) and the WISC — Fifth edition, Polish adaptation (Stańczak et al., 2014; 29 items, maximum raw score 54). Participants were asked to provide definitions of words of increasing difficulty. We also administered the LITMUS Sentence Repetition Task in English (30 items; Marinis & Armon-Lotem, 2015) and the Polish version, Test Powtarzania Zdań (22 items; Przygocka et al., 2021), which measure verbatim repetition of sentences of increasing length and complexity.[1]

2.1.4 *Procedure*

The study consisted of two sessions, one with English as the target language and one with Polish (order counterbalanced between participants); the vocabulary task and the sentence repetition task were administered in the target language of the session. Testing sessions were carried out and recorded via Microsoft Teams

1. Although other scoring methods are possible for the sentence repetition task (e.g., repetition of the target structure without literal repetition, or production of a grammatical sentence that is unrelated to the target), we used literal repetition as we wanted as stringent a measure of participants' language proficiency as possible.

approximately one week apart (M_{lag}=10 days, range: 3–28 days) by the second and third authors who are fluent English–Polish bilinguals.

Participants were told that the study was devised to explore early bilingualism and as such they would be completing tasks designed for younger children. First, participants completed the baseline task, naming each picture. The experimenter and participant took turns to describe the pictures, with the experimenter always describing first according to the scripted primes; the experimenter's picture was first revealed on the left of the slide, then the participants' picture was revealed on the right while the experimenter's picture remained on screen (see Figure 1). Participants were encouraged to say 'Snap' as soon as they noticed a matching pair of pictures to maintain the guise of the card game. The language measures were completed after the priming tasks. The sessions lasted between 20 and 30 minutes. After the second session, participants were sent a link to the Q-BEx questionnaire and were given a £ 10 voucher.

2.1.5 *Coding*

We used a strict coding scheme to categorise participants' responses on the baseline and priming tasks.[2] Responses in which an adjective preceded a noun were coded as prenominal AN. Responses in which the noun was named first followed by a relative clause headed by *that*, *which* or *what* in English and *która/który/które* in Polish and including an adjective were coded as postnominal RC.

2.2 Results and analysis

The average raw vocabulary score on the English WISC was 34.14 (SD=5.80, range 25–50) and on the Polish WISC it was 18.91 (SD=5.50, range 10–33). On the Litmus SRT, the average score in English was 26.51 (SD=2.33) and in Polish, it was 19.80 (SD=1.91). Pearson correlations on raw scores showed a significant correlation between Polish vocabulary and Polish sentence repetition scores (r=.45, p=.007), and between Polish and English sentence repetition scores (r=.34, p=.045) only. Given the correlation between sentence repetition scores across languages, which suggests a role for verbal working memory in this task, we used participants' vocabulary scores as a measure of language proficiency, as these were

2. We also used a lenient coding scheme for Polish, which allowed for errors in inflectional morphology and included uninflected noun–adjective phrases in Polish (e.g., "*piłka czerwona*", literally "ball red"), where the word order matched that of the relative clause structure (the ball that is red), in the postnominal RC category; there was no lenient coding for English as the participants did not make any errors. The results did not change across strict and lenient scorings; therefore, we report the more conservative strict-coded results only.

not correlated across languages. For the analyses, we converted these scores to *Z* scores. In the picture description tasks, participants had a strong preference for prenominal attributive descriptions in both languages. Overall, participants produced 419 descriptions in the baseline task, of which 96% were AN responses, 0% RC responses, and 4% were 'other' responses. These data indicate numerically that participants had a clear preference for AN responses; our analyses examined participants' structural choices once they were primed.[3] Participants produced 3360 trials in the priming task, in which they provided 98% AN responses, 1% RC responses and 1% 'other' responses (see Figure 2). Only three individuals produced RC responses (1 each) in English and only one individual produced them in Polish.

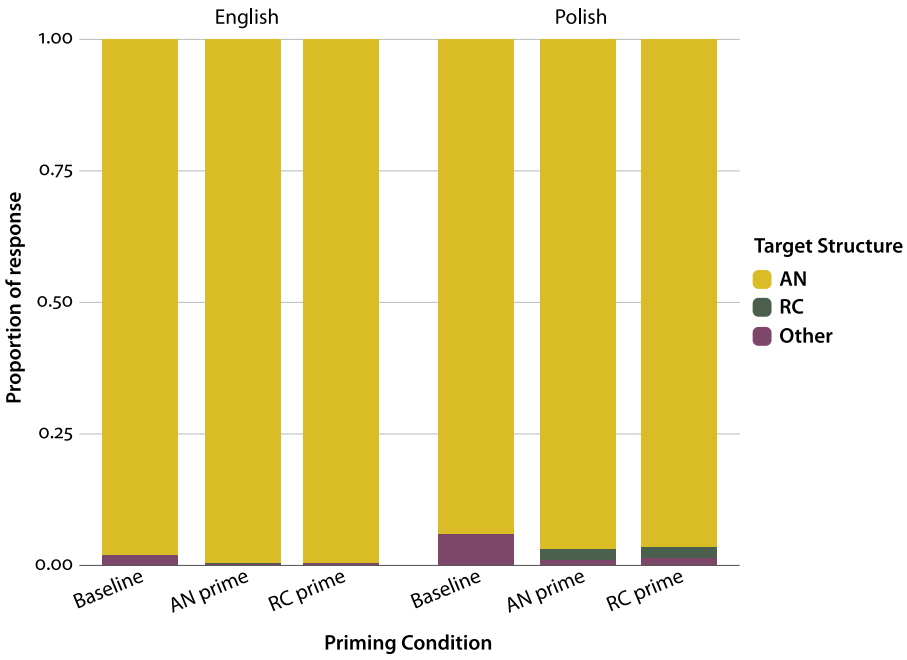


Figure 2. Proportion of strict-coded attributive responses by target language in the baseline and experimental conditions for Experiment 1

We used the lme4 package (Bates et al., 2015) in R Studio (version 4.1.2; R Core Team, 2021) to run logistic mixed-effects models; AN responses were coded 0, RC responses were coded 1. We included the fixed effects of Prime Struc-

3. We did not include the baseline data in our statistical analyses as the number of items in this task was much smaller (6) than in the priming task (48).

ture (sum-coded using contrast coding: AN prime = −0.5, RC prime = 0.5) and Priming Direction (sum-coded using contrast coding: Polish-to-English = −0.5, English-to-Polish = 0.5) and the interaction between the two. We started with maximal models (Barr et al., 2013) with a full random effects structure including by-participant random slopes for Prime Structure and Priming Direction as within-subjects factors and by-item slopes for Prime Structure as a within-items factor (see Table 1). Where maximal models did not converge, the random effects structure was simplified by removing higher-order terms that explained the least variance until the model converged (Barr et al., 2013). We then added participants' age and vocabulary scores separately and tested whether these variables improved the model fit. We used the *emmeans* package (Lenth, 2025) to conduct simple effects analyses[4] of priming effects within each priming direction.

Table 1. Converging model* of the strict-coded attributive responses

Predictor	Coefficient	SE	Wald *Z*	*p* value
Intercept	−12.16	2.90	−4.19	<.001
Prime Structure	−0.41	0.79	−0.52	.600
Priming Direction	−7.20	5.53	−1.30	.193
Prime Structure x Priming Direction	0.66	1.54	0.43	.666

* *Strictdata = glmer(Strict_score~PrimeCon*TargetLang + (1+TargetLang|SubNo) + (1|ItemNo), control=glmerControl(optimizer = c("bobyqa")), adjdata, family=binomial)*

There were no significant predictors in the model; neither age nor expressive vocabulary significantly improved the model fit. Simple effects analyses confirmed there was no priming for English-to-Polish or Polish-to-English (Zs < 1, ps > 0.5).

2.3 Discussion

Our adolescent participants had a strong preference for prenominal adjective–noun phrases irrespective of language or prime condition. Bilingual teenagers do not always exhibit crosslinguistic priming (Kutasi et al., 2018; Favier et al., 2019), but in these other instances, the syntax was not fully equivalent between languages, and our hypothesis was that syntactic overlap would increase the likelihood of crosslinguistic priming. These adolescents were no different from younger Polish–English bilinguals who equally showed no crosslinguistic

4. We thank an anonymous reviewer for the suggestion to look at priming effects within each level of Priming Direction.

priming for these structures (Wesierska et al., 2025). These younger bilinguals were, however, primed to repeat the word order of possessive phrases; in Experiment 2, we tested whether we could replicate these effects in this group of adolescent bilinguals.

3. Experiment 2 — possessive constructions

3.1 Method

3.1.1 *Participants*

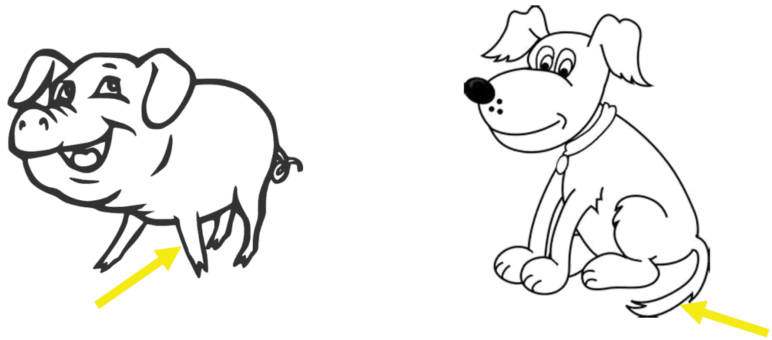
The participants who completed Experiment 1 also completed Experiment 2 within the same testing sessions.

3.1.2 *Design*

Experiment 2 involved a 2 (Prime structure: possessor-first vs possessor-second; within-participants and within-items factor) x 2 (Priming Direction: English-to-Polish vs Polish-to-English; within-participants factor) design.

3.1.3 *Materials*

Half of the stimuli involved 'part-of' inalienable possession, depicting an animal with a body part highlighted by a yellow arrow, and half involved object-possession, depicting a human with an inanimate object (see Figure 3). All the possessors were highly referential and thus allowed for both word orders in Polish and English. Twelve animate characters were used as target possessor nouns and twelve different animate characters as prime possessor nouns. As possessum nouns, we used eight part-of features (*tail/ogon, eye/oko, paw/łapa, ear/ucho, foot/stopa, leg/noga, tooth/ząb, tongue/język*) and eight object nouns (*shoe/but, glove/rękawiczka, glasses/okulary, bicycle/rower, watch/zegarek, cake/ciasto, coat/płaszcz, book/książka*). We did not include any translation equivalents or cognates and there was no lexical overlap across prime and target. Prime and target images were paired within possession type (part-of or object-possession) to create 48 experimental items; each item had a possessor-first (POSS1) and a possessor-second (POSS2) prime description in English and in Polish (see examples 3 and 4). Item lists, practice items and snap items were created as described for Experiment 1. For the baseline task, participants were shown pairs of items: three object-possession (e.g., *grandpa's car/dziadka samochód* versus *girl's tricycle/dziewczynki rowerek*) and three part-of possession examples (e.g., *frog's leg/żaby noga* versus *duck's eye/kaczki oko*) and asked to choose one and describe their choice.

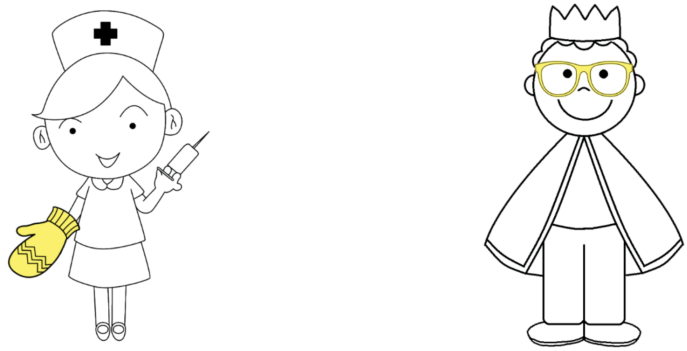


Moja kolej

poss1

Your turn!

a.



Moja kolej

poss1

Your turn!

b.

Figure 3. Example Experiment 2 prime and target items showing (a) part-of and (b) object possession

3.1.4 *Procedure*

The procedure was as described in Experiment 1. We counterbalanced between participants whether they completed the attributives or the possessives priming task first, as well as which language they first completed the tasks in.

3.1.5 *Coding*

We again used a strict coding scheme to categorise participants' responses on the baseline and priming tasks.[5] This included responses in which the possessor preceded the possessum as possessor-first (POSS1); these required the possessive '*s* in English and genitive marking in Polish on the possessor noun. Responses in which the possessum preceded the possessor were coded as possessor-second (POSS2); these required the possessive preposition *of* in English and the genitive case marking on the possessor noun in Polish.

3.2 Results and analysis

Overall, participants produced 420 descriptions in the baseline task, of which 56% were POSS1, 27% were POSS2 and 17% were 'other'. They completed 3360 trials on the priming task, in which they produced 61% POSS1 responses, 38% POSS2 responses and 1% 'other' responses. Figure 4 shows that possessor-second responses were indeed dispreferred in English but more strongly preferred in Polish; eleven individuals produced possessor-second responses in English, whereas only one did *not* produce any in Polish. Participants produced a slightly greater proportion of possessor-second responses in English after priming than in the baseline trials, but no evidence that they produced more possessor-second responses after POSS2 primes than after POSS1 primes. In Polish, there was an increase in possessor-second responses from baseline to priming tasks and a small numerical increase in the frequency of possessor-second responses after POSS2 primes than after POSS1 primes.

We used the same method of analysis as in Experiment 1; POSS1 responses were coded 0, POSS2 responses were coded 1. We fitted a model with the fixed effects of Prime Structure (sum-coded using contrast coding: POSS1 prime = −0.5, POSS2 prime = 0.5) and Priming Direction (sum-coded using contrast coding: Polish-to-English = −0.5, English-to-Polish = 0.5) and the interaction between them (see Table 2). There was a main effect of Priming Direction, as participants produced more POSS2 responses during the English-to-Polish priming task than in the Polish-to-English priming task (see Figure 4), mirroring the baseline trials, however there was no main effect of Prime Structure or interaction with Priming

5. There was no lenient coding in English as the participants did not make any errors; in Polish we included utterances that were missing inflectional morphology in a lenient coding (this added only four more responses across all participants, which did not change the results of the analyses and so these data are not reported). We did not include the baseline data in our statistical analyses as the number of items in this task was much smaller (6) than in the priming task (48).

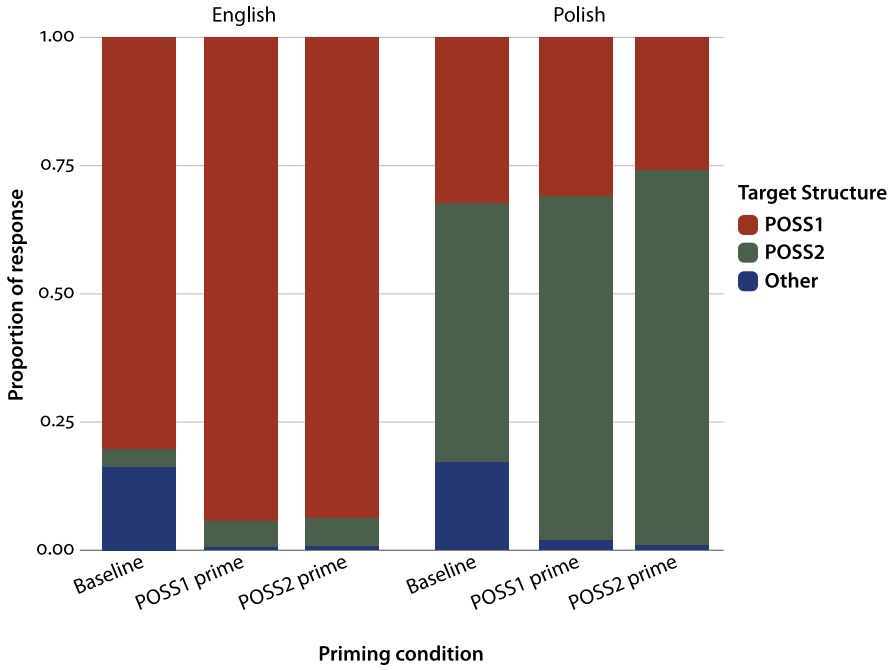


Figure 4. Proportion of strict-coded possessive responses by target language in the baseline and in the experimental conditions for Experiment 2

Direction, suggesting that, overall, participants did not produce significantly more POSS2 after POSS2 primes than after POSS1 primes. Neither age nor vocabulary score improved the model fit. However, simple effects analyses showed a significant effect of Prime Structure within English-to-Polish priming (Estimate −0.5548, $SE = 0.238$, $Z = -2.327$, $p = .02$), but there was no priming for Polish-to-English ($Z < 1$, $p > .9$).

Table 2. Converging model* of the strict-coded possessive responses

Predictor	Coefficient	*SE*	Wald *Z*	*p* value
Intercept	−2.67	0.80	−3.35	<.001
Prime Structure	0.30	0.29	1.04	.300
Priming Direction	9.08	1.38	6.57	<.001
Prime Structure x Priming Direction	0.52	0.55	0.93	.350

* **Strictdata = glmer(Strict_score~PrimeCon*TargetLang + (1+PrimeCon+TargetLang|SubNo) + (1|ItemNo), control=glmerControl(optimizer = c("bobyqa")), possdata, family=binomial)*

3.3 Discussion

Adolescents tended to use the possessive structure that is preferred in the target language: in English, they produced more possessor-first responses, irrespective of prime structure; in Polish, they produced more possessor-second responses, and more so after a possessor-second prime in English. In contrast with the results of younger Polish–English bilinguals (Wesierska et al., 2025), teenagers showed priming in one direction only and this priming effect was not strong enough to result in a significant interaction.

To explore developmental explanations for these findings in adolescent participants, we conducted a third experiment with a group of Polish–English first-generation immigrants to the UK.[6]

4. Experiment 3 — adult participants

4.1 Method

4.1.1 *Participants*

Thirty-two UK-based speakers of Polish aged between 24 and 54 years (M_{age} = 39.8 years; 29 females, 3 males) took part. Participants were recruited through social media, as parents whose children took part in previous studies, and by word of mouth. They answered a subset of questions from the Language Experience and Proficiency Questionnaire (LEAP-Q, Marian et al., 2007) to provide some basic information on their language experience and use. All but one adult, who was born in the UK, were first-generation immigrants born in Poland and had lived in the UK for 1–19 years; the youngest age of immigration to the UK was 18 years and the oldest was 48 years. Two adults considered English to be their first language and all reported learning Polish from birth, whereas the age of learning English varied from birth to 27 years (M = 13.6 years). In terms of Polish use, only three indicated a break in using Polish or using the language less since moving to the UK. Thirty of the adults reported using English most of the time, with the other two using it sometimes.

6. We thank two anonymous reviewers for this suggestion.

4.1.2 *Design, materials and procedure*

Experiment 3 used the same design, materials and procedure as Experiments 1 and 2. Participants completed all the tasks for one language (attributives priming task, possessives priming task and respective baseline tasks, as well as the WISC vocabulary test)[7] in one remote MS Teams call with the same researchers as in Experiment 1 and 2; they completed all the tasks for the other language in a second session with the same experimenter approximately one week later (M_{lag} = 10.79 days; range: 6–31 days). We counterbalanced between participants whether they completed the attributives or the possessives priming task first, as well as which language they first completed the tasks in. Participants' responses were coded as per the coding schemes previously described.

4.2 Results and analysis

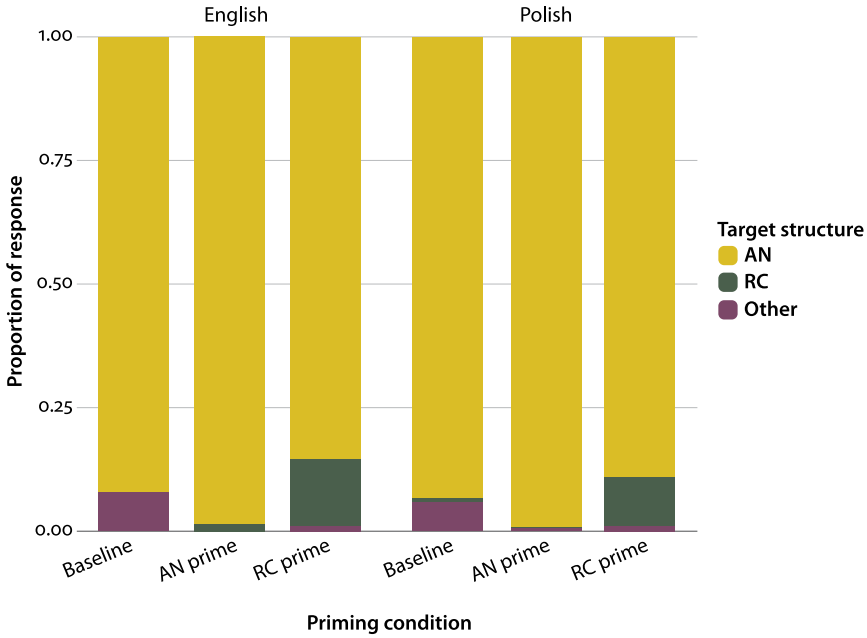
4.2.1 *Vocabulary test*

The average raw vocabulary score on the English WISC was 45.03 (SD = 9.53), maximum score 68) and on the Polish WISC it was 44.38 (SD = 5.59, maximum score 54). For the analyses, we converted these scores to Z scores.

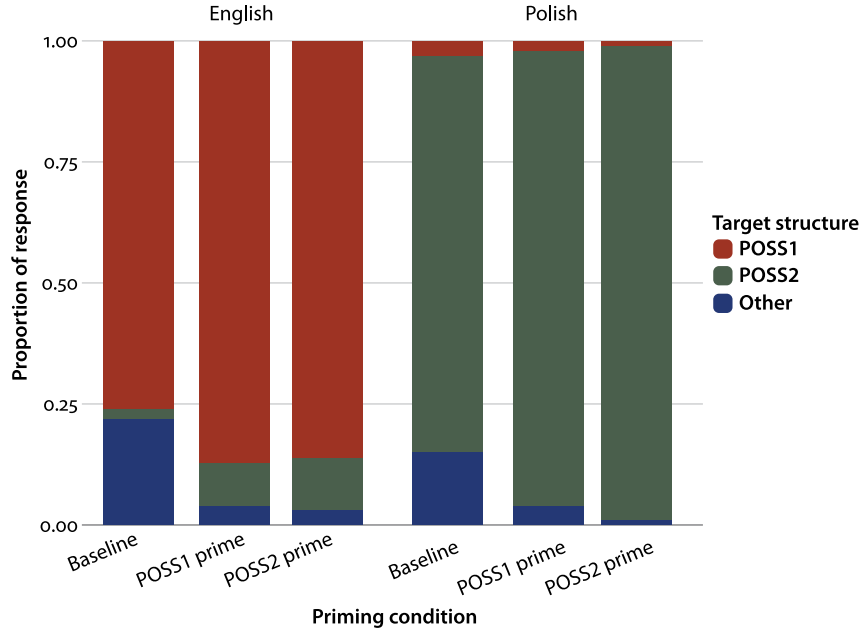
4.2.2 *Attributive priming task*

Figure 5a presents the proportion of prenominal AN and postnominal RC attributive responses, and 'other' responses that participants produced in the experiment. They produced 396 baseline descriptions, of which 92.5% were AN responses, 0.5% (N = 2) were RC responses and 7% were 'other' responses. They completed 3072 trials in the priming tasks and produced 93% AN responses, 6% RC responses and 1% 'other' responses. Six adults produced RC responses in the priming task in Polish and ten individuals produced RC responses in the priming task in English.

7. Note that since we used only the WISC vocabulary scores in the analysis of the teens' data, we collected only WISC vocabulary scores from adults; the adults did not complete a sentence repetition task.



a.



b.

Figure 5 Proportion of (a) attributive responses and (b) possessive responses by target language in the baseline and experimental conditions for Experiment 3

The analytical protocol was the same as Experiment 1 and 2. Table 3 presents the output of the converging models.

Table 3. Converging models of the strict-coded attributive responses

Predictor	Coefficient	*SE*	Wald *Z*	*p* value
Model of fixed effects*				
Intercept	−11.50	1.74	−6.59	<.001
Prime Structure	4.25	0.43	9.78	<.001
Priming Direction	− 1.49	0.41	−3.65	<.001
Prime Structure x Priming Direction	1.06	0.81	1.31	.191
Model with vocabulary scores (significant interactions only)*				
Intercept	−12.43	1.83	−6.80	<.001
Prime Structure	5.04	0.72	6.99	<.001
Priming Direction	−1.94	0.68	−2.83	.005
English WISC Z score	−1.21	1.30	−0.93	.352
Polish WISC Z score	2.37	1.49	1.59	.111
Prime Structure x English WISC Z score	2.58	0.73	3.57	<.001
Prime Structure x Polish WISC Z score	−5.19	1.60	−3.25	.001

* *Strict_score = glmer(Strict_score~PrimeCon*TargetLang + (1|SubNo), control=glmerControl(optimizer=c("bobyqa")), adjdata, family=binomial)*

** *Strict_score_EV = glmer(Strict_score~PrimeCon*TargetLang*z_EVscore + PrimeCon* TargetLang*z_PVscore + (1|SubNo), control=glmerControl(optimizer=c("bobyqa")), adjdata, family=binomial)*

There was a main effect of Prime Structure: adults produced 11% more postnominal RC attributive responses following RC primes than following prenominal AN primes. There was also a main effect of Priming Direction: adults produced more postnominal RC attributive responses in the Polish-to-English priming task than in the English-to-Polish priming task. There was no interaction between the two predictors. Simple effects analysis showed that there was a significant effect of Prime Structure within each level of Priming Direction (Polish-to-English: Estimate −3.71, $SE = 0.381$, $Z = -9.738$, $p < .001$; English-to-Polish: Estimate −4.78, $SE = 0.750$, $Z = -6.370$, $p < .001$). Adding adults' English and Polish vocabulary scores improved the model fit (χ^2 ($df = 8$) = 28.58, $p < .001$) but did not change which predictors were significant. Neither English nor Polish vocabulary score was a significant predictor of the frequency of RC responses; however, there were significant interactions with Prime Structure: priming of RC responses was positively related to English vocabulary and negatively related to Polish vocabulary scores.

4.2.3 *Possessives priming task*

Figure 5b presents the proportion of possessor-first and possessor-second possessive responses that participants produced in the experiment; similarly to the adolescents, they had a strong preference for possessor-first descriptions in English and possessor-second descriptions in Polish. They produced 396 baseline descriptions, of which 39% were POSS1 responses, 42% were POSS2 responses and 18% were 'other' responses. They completed 3072 trials in the priming tasks and produced 44% POSS1 responses, 53% POSS2 responses and 3% 'other' responses. All adults produced possessor-second descriptions in Polish and 14 produced them in English.

The converging model of the strict-coded results is shown in Table 4. There was a significant main effect of Prime Structure, as adults produced more possessor-second responses after possessor-second than possessor-first primes, and of Priming Direction as adults were more likely to produce possessor-second responses in the English-to-Polish task than in the Polish-to-English task (see Figure 5b). Adding adults' vocabulary scores did not improve the fit of the model. Simple effects analyses showed that the significant effect of Prime Structure was carried by English-to-Polish priming (Estimate −1.147, $SE = 0.561$, $Z = -2.045$, $p = .041$); there was no priming for Polish-to-English ($Z < 1.5$, $p > .2$).

Table 4. Converging models of the strict-coded possessor-first responses

Predictor	Coefficient	*SE*	Wald *Z*	*p* value
Model of fixed effects*				
Intercept	2.85	1.41	2.02	.040
Prime Structure	0.70	0.30	2.35	.019
Priming Direction	15.68	2.58	6.08	<.001
Prime Structure x Priming Direction	0.89	0.60	1.49	.137

* *Strict_score = glmer(Strict_score~PrimeCon*TargetLang + (1+TargetLang|SubNo) + (1|ItemNo), control=glmerControl(optimizer=c("bobyqa")), possdata, family=binomial)*

4.2.4 *Comparison of teen and adult participants*

Finally, we combined the teen and adult datasets. We added Experiment Group as a between-participants' fixed effect (Teen group = 0; Adult group = 1) and the interactions between Experiment Group, Prime Structure and Priming Direction. The converging models are shown in Table 5. For attributive responses, there was a main effect of Prime Structure, suggesting that more RC responses were produced after RC primes than AN primes and a main effect of Experiment Group since adults produced more RC responses than teens. Moreover, there was a

significant interaction between the two, reflecting priming of RC responses for adults but not teens (11% versus 0% priming). There was also a main effect of Priming Direction as more RC responses were produced in the Polish-to-English task than the English-to-Polish overall, however this is qualified by a significant interaction with Experiment Group since, whilst adults produced more RC responses in English ($N=122$) than in Polish ($N=79$), teens produced more in Polish ($N=34$) than in English ($N=3$).

Table 5. Best-fitting models comparing teens' and adults' strict-coded responses

Predictor	Coefficient	*SE*	Wald *Z*	*p* value
Model of attributive responses*				
Intercept	−13.79	1.77	−7.80	<.001
Prime Structure	1.89	0.40	4.70	<.001
Priming Direction	0.98	0.40	2.44	.014
Experiment Group	5.05	0.68	7.39	<.001
Prime Structure * Priming Direction	0.91	0.79	1.14	.253
Prime Structure * Experiment Group	4.53	0.81	5.61	<.001
Priming Direction * Experiment Group	−4.90	0.81	−6.08	<.001
Prime Structure * Priming Direction * Experiment Group	0.34	1.59	0.22	.828
Model of possessive responses*				
Intercept	−0.45	0.44	−1.02	.31
Prime Structure	0.35	0.21	1.68	.093
Priming Direction	8.89	0.67	13.33	<.001
Experiment Group	3.02	0.21	14.44	<.001
Prime Structure * Priming Direction	1.21	0.44	2.76	.006
Prime Structure * Experiment Group	0.65	0.36	1.80	.072
Priming Direction * Experiment Group	4.18	0.42	10.01	<.001
Prime Structure * Priming Direction * Experiment Group	0.80	0.72	1.12	.264

* *Strict_scoreANRCcomp = glmer(Strict_score~PrimeCon*TargetLang*Expt_code + (1|SubNo), control=glmerControl(optimizer=c("bobyqa")), adjdata, family=binomial)*

** *Strict_scorePOSScomp = glmer(Strict_score~PrimeCon*TargetLang*Expt_code + (1+PrimeCon+TargetLang|SubNo) + (1|ItemNo), control=glmerControl(optimizer=c("bobyqa")), possdata, family=binomial)*

For possessive responses, there was a main effect of Priming Direction as participants produced a greater proportion of possessor-second responses in the English-to-Polish task, and there was also a main effect of Experiment Group since adults produced more possessor-second responses than teens. Moreover, there was a significant interaction between Priming Direction and Experiment Group as adults showed a greater (86%) difference in the frequency of possessor-second responses in Polish (96% responses) and English (10% responses) than teens (65% difference between Polish (70% responses) and English (5% responses)). Lastly, though there was no main effect of Prime Structure, there was a significant interaction between Prime Structure and Priming Direction: when combined, the data show a greater increase (4%) in Polish possessor-second responses after possessor-second primes than in English possessor-second responses (1%). Simple effects analyses confirmed that the effect of Prime Structure was not significant in English (Estimate 0.253, $SE = 0.247$, $Z = 1.023$, $p = .31$) but was significant in Polish (Estimate −0.957, $SE = 0.351$, $Z = -2.729$, $p = .006$).[8]

4.3 Discussion

Unlike adolescents (Experiment 1), adults showed bidirectional crosslinguistic priming for postnominal relative clauses. Similarly to adolescents (Experiment 2), adults only showed weak English-to-Polish priming for possessives. Adults produced more RCs overall than teens and more in English than Polish whereas teens produced more in Polish than English. Adults also produced more possessor-second responses, and more in Polish, than teens.

5. General discussion

In a series of structural priming experiments, we investigated whether adolescent Polish heritage speakers and first-generation adult Polish speakers in the UK had acquired shared syntactic representations for structures that were fully syntactically equivalent (attributive structures) or not fully syntactically equivalent (pos-

8. For possessives, we conducted a further analysis including Polish and English WISC to the combined groups model (which had Prime Structure, Priming Direction and Experiment Group as predictors). This did provide evidence to support the idea that the effects are driven by proficiency. In this model, Experiment Group was no longer a significant predictor but both Polish and English vocabulary scores were significant predictors of POSS2 responses. However, *g* comparisons suggested that the model with Experiment Group was a better fitting model (Model with Experiment group AIC 2645.8, Model with vocabulary scores AIC 2836.2, $\chi 2$ (df = 3) = 196.38, $p < .001$).

sessive structures) in their two languages. In both experiments, adolescents were largely resistant to priming and used the preferred structure in the target language rather than reusing the structure of the experimenter's prime description; there was only significant crosslinguistic priming from English-to-Polish for possessives. In contrast, adults showed significant bidirectional crosslinguistic priming for relative clauses, and — similarly to the adolescent — were primed to produce possessor-second possessive constructions only from English to Polish. The results from the adolescent and adult speakers of Polish in the UK in this study complement findings from previous research with a younger group of child Polish heritage speakers in the UK using the same methodology (Wesierska et al., 2025).

The difference in priming effects between two alternations needs to be reconciled in the light of different developmental trajectories, with the caveat that the evidence comes from cross-sectional rather than longitudinal studies. We argue that the nature of the syntactic alternation has consequences for the likelihood of priming, and we appeal to the notion of resistance to priming as a function of the relative frequency and markedness of the alternation options (e.g., Hou, 2023; Shin & Christianson, 2009). In the attributive alternation in both English and Polish, an adjectival phrase is the simpler and default way of modifying a name with a colour adjective, and in both languages the RC option is syntactically more complex and pragmatically constrained. Priming of RCs has been previously shown for English-speaking adults (Cleland & Pickering, 2003), and we expected that Polish–English bilingual speakers with the necessary level of proficiency in each language would be primed to use RCs, and primed bidirectionally if the structure is shared across languages. In the case of the alternation between prenominal and postnominal possessive constructions, the two languages differ in the extent to which the possessor-first (English) or the possessor-second (Polish) is the canonical option for definite, animate, referential possessors. We originally expected that adolescent and adult bilinguals, similarly to their younger counterpart, would be primed to produce possessor-second structures, but this was the case only in Polish. With growing experience with the way in which each language encodes this possessive relationship, it is likely that more proficient bilingual speakers would become more resistant to the priming of marked options of thematic role ordering in each of their languages.

5.1 Syntactic alternations with equivalent structures: Attributives

Whilst care should be taken not to overinterpret null results, our findings appear to represent a lack of effect for the adolescent group and not a lack of power. In Experiment 1, only three adolescents produced just one RC in English each; 32 participants did not produce any. In Polish, one adolescent produced several RC

responses, which is likely evidence that this single participant experienced priming, but the remaining 34 participants produced none, suggesting this effect was not typical of this population. In this case, the lack of priming is not a case of a weak effect failing to reach significance – there was little evidence of priming within this adolescent bilingual population. The adults, on the other hand, were primed, but only six adults produced RC responses in Polish and ten produced them in English.

In the case of this alternation, where there are syntactically equivalent structures in both languages and one is more syntactically complex than the other, the pattern of results from childhood, through adolescence, to adulthood aligns with the predictions made by a developmental account like Hartsuiker and Bernolet's (2017) model in which increased exposure and greater proficiency should lead to single-language abstract representations that can eventually become shared across languages and primed crosslinguistically and bidirectionally. The original proposal was made for adult L2 learners who already have a mature and well-established competence in their L1 and who need to learn how meaning maps to syntactic structures in their new language. This happens through a gradual process of abstraction that goes from initially lexically-specific structures, to structure-wide abstractions, to the sharing of combinatorial nodes between languages for shared syntactic structures. In the case of children and adolescents where there is no clear chronological separation between their two languages in terms of age of onset, we cannot make assumptions about a fully established L1 before their learning of an L2, as these two processes take place in parallel (Gàmez et al., 2022). For a structure like RC, we found no evidence that adolescent heritage speakers have reached the stage where this structure has a degree of abstraction and of crosslinguistic equivalence that justifies a shared representation. Because there was no lexical or even cognate overlap between prime and target, the teens, like their younger counterparts, did not have the option to fall back on an explicit memory mechanism that could have facilitated priming. Conversely, for the adults, the presentation of a syntactically complex RC in the prime did lead them to use the same syntactic structure in the other language, and in both directions thus confirming that abstract representations can be shared crosslinguistically. The fact that only the adults were primed with this alternation, but neither the adolescents in this study nor the younger children in Wesierska et al. (2025) were, suggests that it is with greater language experience and proficiency that syntactic structures can become shared. The adults' vocabulary scores were comparable in their two languages and higher than the adolescents', particularly for Polish, which is unsurprising since all but one were first-generation immigrants to the UK who were born in Poland.

Including a group of adult speakers of Polish allowed us to contextualise the lack of priming in the adolescent group. Our initial prediction was that, with more language experience and increasing proficiency, adolescents would be likely to be primed where younger children were not. The results showed instead that an additional few years for these heritage speakers were not enough to reach the level at which there is an option for syntactic structures to be shared crosslinguistically. It is not until later into adulthood that a sufficient proficiency threshold has been reached and that crosslinguistic priming is available, at least to some of the adult speakers that we tested, who were, however, first-generation immigrants rather than heritage speakers. Whether RCs become shared syntactic structures in adult heritage speakers remains to be seen.

5.2 Syntactic alternations without equivalent structures: Possessives

The results for unidirectional priming for the possessive alternation not only with adolescents but also with adults require further explanation. These findings are consistent with explanations whereby representations may be connected but not fully shared (e.g., Kantola & van Gompel, 2011).

What is already obvious from Figure 4 and Figure 5b is that both the adolescents and adults produced target responses that mirror the preference of a possessor-first in English and a possessor-second in Polish, and that this distinction is even clearer for the adults than the adolescents. In the latter group the preference for possessor-second in Polish is somewhat less marked and it likely reflects the effects of reduced input in the heritage language and cross-linguistic influence from English, where possessor-first is the canonical thematic role ordering with referential possessors. The language-specific thematic role orders of possessor-*first* in English and of possessor-second in Polish have become entrenched as the most frequently experienced forms for animate, definite, referential possessors like the ones we used in our experiments. In a study investigating priming of the *ba*-construction in adult native speakers of Mandarin and two groups of L2 learners of Mandarin, one with a similar construction in their L1 and one without, Hou (2023) reports that only the L2 speakers who did not have an equivalent construction in their L1 were likely to be primed to use *ba*-construction in alternation with an SVO construction. The L1 speakers and the other group of L2 speakers were not primed. Hou's argument is that L1 knowledge and L2 mediated knowledge of the pragmatics of the *ba*-construction made these speakers resistant to priming. The notion that the likelihood of priming can be affected by item-level features is not new: Gries (2005), for example, showed how some verbs can be more or less resistant to priming depending on the frequency of the association with a particular construction that overrides the structure in the

prime. The adolescents' and the adults' resistance to bidirectional crosslinguistic priming in the use of possessive constructions is consistent with their growing experience with language-specific syntactic structures in each of their languages. Priming emerged in the direction of English-to-Polish since it was reinforcing an entrenched preference for this thematic role order. We did not find any evidence of a surprisal effect whereby a less preferred construction (i.e., possessor-first in Polish and possessor-second in English) led to priming.

A proficiency-based account of the semantics of possessive constructions also explains the fact that the findings with the adolescents and the adults in the current study do not mirror those observed for younger bilinguals, (Wesierska et al., 2025). Younger children have less robust and less entrenched syntactic and semantic representations in either language because of their relatively limited language experience. They are thus more likely to be primed than more proficient and more experienced adolescents and adults because their expectation of which form-meaning mapping to use in which language may still be relatively open, and they may therefore be more receptive to priming.

5.3 Limitations

One first limitation of the present study is the absence of a set of within-language experiments. At least in the case of RCs for the adults, a comparable magnitude of priming in the same set of speakers for both between- and within-language priming would have made an even stronger claim for the presence of shared syntax.

Secondly, while these studies address issues of developmental differences in bilinguals' representations of syntactic structures, changes over time can only be indirectly inferred from the cross-sectional design.

Thirdly, while both sets of speakers are bilinguals living in a country where Polish is the minority language and English the majority language, and where they regularly use both, the adolescents — with one exception — are heritage speakers and the adults are first-generation immigrants. For this reason, the adults in our study do not represent the next step in the developmental trajectory of the adolescents in this study. However, they come from the same Polish diaspora as the adolescents inasmuch as they belong to the generation of their parents. As such, the study gives a synchronic if not a diachronic picture of mental representations and shared syntax in this population of bilinguals. While longitudinal studies of syntactic priming that span generations are likely to be unrealistic, we believe that a family-centred approach that looks at intergenerational differences and similarities between younger heritage speakers and first-generation immigrant parents is an ecologically valid approach that should be pursued and would have much to

add to our understanding of evolving structural representations as a function of environmental differences.

6. Conclusion

We explored the developmental trajectory of shared syntax by testing crosslinguistic and bidirectional priming in adolescent heritage speakers of Polish and first-generation immigrant adult speakers of Polish in the UK. Across two structures, which differed in the extent to which English and Polish have overlapping syntax, we found limited evidence of crosslinguistic unidirectional priming in teens for possessives, but we did find evidence of unidirectional priming of possessives and bidirectional priming in the adults for the attributive alternation. We interpreted the lack of priming differently as a function of the two different types of alternation and as a function of increased proficiency and experience with the canonical marking of form-meaning in each language.

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Data availability

All materials, trial level data, and analysis code are available at https://osf.io/x2rd8/?view_only=68db7e665bc44ad19dd489e2b5d08b43

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CRediT author statement

Ludovica Serratrice: Conceptualization; Funding acquisition; Methodology; Project administration; Resources; Supervision; Writing – original draft; Writing – review & editing; **Marta Wesierska:** Data curation; Formal analysis; Investigation; Resources; Validation; Visualization; Writing – original draft; Writing – review & editing; **Vanessa Cieplinska:** Data curation;

Investigation; Validation; **Katherine Messenger:** Conceptualization; Data curation; Funding acquisition; Methodology; Project administration; Supervision; Writing — original draft; Writing — review & editing.

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Address for correspondence

Ludovica Serratrice
School of Psychology and Clinical Language Sciences
University of Reading
Harry Pitt Building
Reading RG6 7RB
UK
l.serratrice@reading.ac.uk
https://orcid.org/0000-0001-5141-6186

Co-author information

Marta Wesierska
Department of Social and Psychological Sciences
University of Huddersfield
m.k.wesierska@hud.ac.uk
https://orcid.org/0000-0003-4047-9629

Vanessa Cieplinska
Division of Psychiatry
University College London
vanessa.cieplinska.23@ucl.ac.uk

Katherine Messenger
Department of Psychology
Lancaster University
k.messenger@lancaster.ac.uk
https://orcid.org/0000-0002-9378-235X

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