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The diminishing role of inalienability in the Hebrew possessive dative

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Abstract: Hebrew has two constructions that are used to convey possessive relations: ordinary possession (OP) and possessive dative (PD). PD is most often used when the possessor is perceived as *affected* by the action or state described in the sentence. This study investigates the possibility that this tendency is gradually diminishing – in other words, that unaffected possessors in PD are in the process of becoming more acceptable. This hypothesis was evaluated in a blog corpus study, which focused on a central correlate of possessor affectedness: whether or not the possessed object was a body part (inalienability). In line with the hypothesis, inalienability had a weaker effect on the choice of construction in younger than in older bloggers. The overall proportion of PD constructions was similar across age groups. This suggests that the change is best viewed as semantic bleaching of PD rather than as a process in which PD is gaining ground at the expense of OP.

Keywords: Hebrew, possessive dative, possession, language change, affectedness

1 Introduction¹

Possessive constructions can be classified into two types: internal and external (Heine 1997; Payne and Barshi 1999). In internal possession constructions, the possessor and the possessed object (*possessum*) form a single noun phrase (e.g., *John's knee*). In external possession constructions, by contrast, the possessor and possessum are two separate noun phrases, with no obvious hierarchical relationship between them. English possessor ascension is an example of an external possession construction, though one whose productivity is fairly limited (Kemmerer 2003; Levin 1993):²

1 This paper uses the following abbreviations: ACC=accusative, OP=ordinary possession, PD=possessive dative.

2 All of the examples in this paper that are not marked as unacceptable were found in Web searches (marked *attested*) or are drawn from published work. The URLs for all of the attested examples are given in the Appendix.

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- (1) I hit him on the knee lightly. (attested)

Example 1 can be roughly paraphrased with the internal possession sentence *I hit his knee lightly*.

External possession is expressed in Hebrew using the *possessive dative* (PD). In this construction, a dative-marked noun phrase that functions syntactically as an argument of the verb is interpreted as the possessor of another entity in the sentence, often the direct object of the verb:

- (2) *hu shavar l-i et ha-yad.* (attested)
 he broke to-me ACC the-arm
 ‘He broke my arm.’

The Hebrew PD has attracted a large amount of attention in the literature (Berman 1982; Boneh and Bar-Asher 2014; Borer and Grodzinsky 1986; Bosse et al. 2012; Gafter 2014; Halevy 2013; Landau 1999; Lee-Schoenfeld 2006; Linzen 2014; Pylkkänen 2008), in part due to the status of the construction as an unaccusativity diagnostic (Borer and Grodzinsky 1986; Friedmann 2007; Reinhart and Siloni 2004; though see Gafter 2014; Linzen 2014).

Along with the PD construction, Hebrew has an internal possession construction, which will be referred to in this paper as *ordinary possession* (OP). In an OP construction, the possessor and the possessum form a single noun phrase:

- (3) *hu shavar et ha-yad shel-i.* (attested)
 he broke ACC the-arm of-me
 ‘He broke my arm.’

As illustrated by the identical English glosses of (2) and (3), PD and OP can often be used to describe the same state of affairs, though their truth conditions may differ subtly in some cases (Lamiroy and Delbecque 1998; Leclère 1976). It is therefore natural to ask what leads speakers to choose one of the constructions over the other when referring to a state of affairs that involves a possessive relation. Several authors have argued that PD constructions imply that the possessor was *affected* by the event described in the sentence, while OP does not carry a similar implication (Berman 1982; Landau 1999; Linzen 2014). In other words, PD is used when the event is perceived to have “happened” to the possessor, even when strictly speaking it only “happened” to the possessum (Wierzbicka 1988). Indeed, affectedness plays a central role in many dative constructions in Hebrew and elsewhere (Ariel et al. 2015; Berman 1982), making

the dative an ideal vehicle for simultaneously expressing possession and possessor affectedness.

It has been argued that the affectedness condition on Hebrew PD is unusually weak compared to similar constructions in other languages (Linzen 2014). This typologically unusual permissiveness raises the possibility that unaffected PD possessors are gradually becoming more acceptable with time. The goal of this paper is to determine if this is indeed the case, and if it is, to characterize the trajectory of the change. Since affectedness is difficult to quantify, this study will focus on a property of the possessive relation that is associated with possessor affectedness: the inalienability of the possessum, that is, whether or not the possessum is a body part. This paper reports on a corpus study that showed that younger Hebrew speakers use non-body-part possessums in PD more often than do older ones. This suggests that the association between PD and possessum inalienability is diminishing, and that the role of affectedness in PD more generally may be weakening.

The rest of the paper is structured as follows. Section 2 reviews existing evidence for affectedness in the alternation between PD and OP and introduces the inalienability of the possessum as a correlate of possessor affectedness. Section 3 presents the hypothesis that the alternation between PD and OP is undergoing change and discusses two potential trajectories that such a change might take. Section 4 describes the Hebrew Blog Corpus and the methodology used to obtain the sample of possessive constructions analyzed in this paper. Section 5 presents the results of a statistical analysis that confirms that inalienability has a weaker effect in younger than in older speakers. Section 6 discusses the implications of the results and the limitations of the study and Section 7 concludes.

2 Affectedness and inalienability

The empirical evidence for the role of affectedness in PD can be divided into two categories: grammaticality judgments and statistical tendencies. The contrast between (4a) and (4b) is an example of grammaticality-based evidence. It illustrates that PD is often infelicitous with stative verbs, which are less likely to be seen as affecting the possessor (Linzen 2014; Shibatani 1994):³

3 An anonymous reviewer argues that (4b) can be grammatical if the person being referred to is affected by the fact that the hairdresser liked her hair. While I do not disagree with this statement, I find it hard to imagine a situation in which that would be the case.

- (4) (a) *ha-sapar shel-i itsev l-a et ha-se'ar.* (attested)
 the-hairdresser of-me styled to-her ACC the-hair
 'My hairdresser cut her hair.'
- (b) **ha-sapar shel-i ahav l-a et ha-se'ar.*
 the-hairdresser of-me liked to-her ACC the-hair
 'My hairdresser liked her hair.'

Though some authors have explained these contrasts by positing restrictions on the types of verbs that can be used with PD (Borer and Grodzinsky 1986; Landau 1999), there is evidence that the identity of the verb is not the only factor that affects the distribution of PD. For example, *ra'a* 'saw' is incompatible with PD in most cases, but is compatible with the construction in invasion-of-privacy contexts (Pylkkänen 2008; Linzen 2014):

- (5) (a) *kol ha-kahal ra'a l-a et ha-taxtonim.* (attested)
 all the-audience saw to-her ACC the-underwear
 'The entire audience could see her underwear.' (only acceptable when the possessor is wearing the underwear during the seeing event)
- (b) ??*kol ha-kahal ra'a l-a et ha-gitara.*
 all the-audience saw to-her ACC the-guitar
 'The entire audience could see her guitar.'

It is plausible to assume that possessors are perceived as more affected when it is their intimate clothing item or body part that is seen by a stranger than when the seeing event involves a different type of possessum.

A second source of evidence for the role of affectedness in the variation between PD and OP is statistical in nature. Linzen (2014) proposes a set of quantifiable correlates of affectedness, drawing on the typology of the construction in the European linguistic area (Haspelmath 1999; König and Haspelmath 1998). Perhaps the most robust statistical diagnostic for affectedness is the inalienability of the possessum.⁴ Possessors are perceived as more strongly affected by something that happened to their knee or hand than by something that happened to their house. Many European languages require PD possessums to be body parts. This is the case in French, for example (König and Haspelmath 1998):

⁴ This paper uses the term "inalienable possession" to refer exclusively to body parts, and not to kinship terms such as *mother*. Kinship terms do pattern with body parts in the PD constructions of some languages (Fried 1999), but that is not the case in Hebrew.

- (6) (a) *Je lui ai cassé le bras.*
 I to.him have broken the arm
 'I broke his arm.'
 (b) **Je lui ai cassé la fenêtre.*
 I to.him have broken the window
 'I broke his window.'

While Hebrew does not require PD possessums to be body parts, inalienability plays a statistical role in the choice of possessive construction in that language as well. A corpus study found that when the possessum was not a body part, the proportion of PD constructions out of all possessive constructions (OP and PD combined) was 18%; when the possessum was a body part, the proportion of PD increased to 45% (Linzen 2014). One is clearly affected by something that happened to a part of one's body; given this natural relationship between inalienability and affectedness, this large statistical difference supports the role of affectedness in speakers' choice between the constructions (Haspelmath 1999; König and Haspelmath 1998).

Another property that is associated with the perception of possessor affectedness is the animacy of the possessor: speakers are more likely to perceive animate possessors than inanimate ones as affected by an event. And indeed, most European languages encode the animacy distinction grammatically, disallowing inanimate possessors in PD altogether; for example, in German (Neumann 1996):

- (7) *Der Stein fällt dem Mann auf den Kopf.*
 the stone falls the:DAT man on the head
 'The stone falls on the man's head.'
 (8) **Der Stein fällt dem Auto aufs Dach.*
 the stone falls the: DAT car on.the roof
 'The stone falls on the roof of the car.'

As shown in (9), Hebrew does not categorically ban inanimate possessors:

- (9) *ze kmo le-haxlif la-mexonit et ha-manoa. (attested)*
 it like to-replace to.the-car ACC the-engine
 'It is like replacing the car's engine.'

Nevertheless, inanimate possessors are considerably less common in PD than in OP; in fact, in a sample of 1,124 PD constructions examined by Linzen

(2014), not a single one had an inanimate possessor (compared to 25% in a sample of OP constructions). Under the assumption that speakers are more likely to perceive an animate possessor as affected by an event, this pattern again supports the role of possessor affectedness in Hebrew speakers' choice between the two constructions.⁵

3 A change in progress?

The previous section showed that possessor affectedness plays a role in the distribution of Hebrew PD, and that this role is weaker than in analogous constructions in European languages: while some languages restrict PD to events in which the possessor is animate or the possessum is inalienable, those restrictions are merely statistical trends in Hebrew. Indeed, in some attested cases, such as the stative (10), it is unclear whether the possessor is even marginally affected by the state of affairs described in the sentence.⁶

- (10) *ha-sear magia l-a ad sof ha-gav.* (attested)
 the-hair arrives to-her until end the-back
 'Her hair goes down to the bottom of her back.'

The relative permissiveness of Hebrew PD is consistent with two diachronic scenarios. First, it is possible that the difference between Hebrew PD and similar constructions in other languages has existed in stable form since earlier stages of the language. Second, this typological difference may reflect a change in progress: Hebrew PD may be gradually drifting away from the typologically common prototype centered around possessor affectedness, in a process that could eventually lead to the transformation of PD into a general-purpose possessive construction. It has been argued more generally that Hebrew changes particularly rapidly compared to other languages, perhaps due to the unique sociohistorical context in which it came into existence (Ravid 1995); PD could be a case of this general tendency.

It is difficult to determine objectively whether the possessor is perceived as affected in any given sentence. This paper focuses instead on possessum

⁵ See Gafter (2014) for an alternative account of animacy restrictions on PD based on prominence relations (Aissen 2003).

⁶ Note that there is no contradiction between the absence of possessor affectedness in (10) and the fact that the possessum in (10) is inalienable; the relationship between possessum inalienability and affectedness is statistical rather than absolute (Linzen 2014).

inalienability, one of the objective properties that are correlated with possessor affectedness (Section 2; see also Haspelmath 1999). It will be shown that inalienability is becoming less and less relevant for the variation between PD and OP. While this finding does not constitute conclusive evidence that other facets of affectedness are also becoming less relevant in PD, it is suggestive of such a broader process.

If PD is indeed becoming gradually more acceptable with non-body-part possessums, this process may follow one of two trajectories. First, it could be that the share of PD constructions out of all possessive constructions is gradually increasing, regardless of the inalienability of the possessum or any other semantic factors. In earlier stages of the language, sentences with affected possessors may have been more favorable to PD for functional or discourse reasons, perhaps since dative arguments carry a general implication of affectedness (Ariel et al. 2015; Landau 1999). As this construction became more frequent overall, speakers started using it in those low-affectedness contexts that were originally less favorable to PD. This is the pattern of change predicted by the Constant Rate Hypothesis (Kroch 1989), according to which the rate of syntactic change is independent of semantic context (see also Pintzuk 1995; Santorini 1993).

A second potential trajectory of change is one where the proportion of PD out of all possessive constructions remains stable, but the *association* between PD and affected possessors weakens gradually. The logical endpoint of this process is a situation in which the choice between PD and OP is divorced from the semantic context and becomes purely formal or stylistic. This type of change will be referred to as *semantic bleaching*, by analogy with the process through which lexical items lose their semantic meaning as they become grammaticalized (Heine et al. 1991; Hopper and Traugott 2003). At a much earlier point in the history of Hebrew, this may have been the fate of “governed datives,” or dative arguments selected by the verb in which the dative preposition does not have any semantic contribution that is independent of the verb (Ariel et al. 2015):

- (11) *ve-az hu hirbits gam l-a-ben shel-i. (attested)*
 and-then he hit also to-the-son of-me
 ‘And then he hit my son too.’

Depending on the syntactic analysis, the linguistic unit that is losing its meaning in the context of PD may be the construction itself (Ariel et al. 2015; Fried 1999) or a related element, such as an applicative functional head that introduces the dative possessor (Pylkkänen 2008).

The rest of this paper tests the predictions of these two hypotheses in an apparent-time (synchronic) corpus. In apparent-time corpora, all of the

utterances are collected around the same time period, but from speakers of different age groups. In principle, the gold standard for demonstrating linguistic change is real-time (historical) corpora, where change can be demonstrated directly by comparing utterances from an earlier and a later period. In practice, however, apparent-time corpora typically yield similar results to real-time corpora (Labov 1963; Bailey et al. 1991). The assumption underlying the apparent-time construct is that an individual’s speech patterns are largely stable throughout their lives. Older speaker’s speech therefore reflects earlier stages of the language; conversely, innovative usage in younger speakers’ speech is likely to become the predominant usage as those speakers age. For example, in his classic study of vowel onset centralization in Martha’s Vineyard, Labov (1963) found that younger speakers were more likely to centralize their vowels than older ones; this paralleled the historical (real-time) records, which indicated that vowel centralization was a recent innovation. The present paper will follow previous work in interpreting apparent-time patterns as reflecting language change (see Section 6.3 for additional discussion).

The predictions of each of the two hypotheses for an apparent-time corpus are illustrated in Figure 1. For clarity of presentation, the simulated probabilities

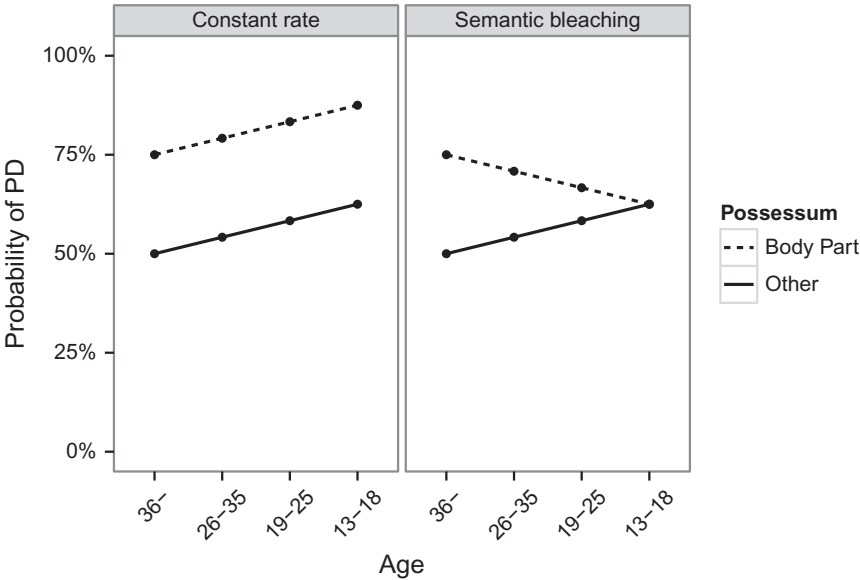


Figure 1: Two types of change processes that can cause PD constructions with alienable possessums to become more acceptable with time. Younger speakers represent later stages of the change process, based on the apparent-time assumption (Bailey et al. 1991).

in Figure 1, as well as the empirical relative frequencies in Figure 3 below, were not transformed using the logistic function, even though that function has been argued to better approximate the rate of syntactic change (Altmann et al. 1983; Kroch 1989). The logistic transform has a very minor effect in the middle of the probability range (that is, far from 0 and 1), and therefore would make little difference in the present case. The formal statistical analysis in Section 5.2 does employ logistic regression.

4 Methods

4.1 The corpus

The data set analyzed in this paper was drawn from the Israblog Corpus (Linzen 2010). This corpus, which consists almost entirely of Hebrew texts, was extracted in September 2008 from www.israblog.co.il, a now defunct blog hosting site. The corpus contains 165 million words in total, drawn from blogs written by 2,370 bloggers between 2005 and 2008. Many of the bloggers (1,851 in total) reported their age and gender; the present study only considers blogs whose authors provided this information. One complication presented by the corpus is that the distribution of ages and genders is highly skewed, as shown in Figure 2: females

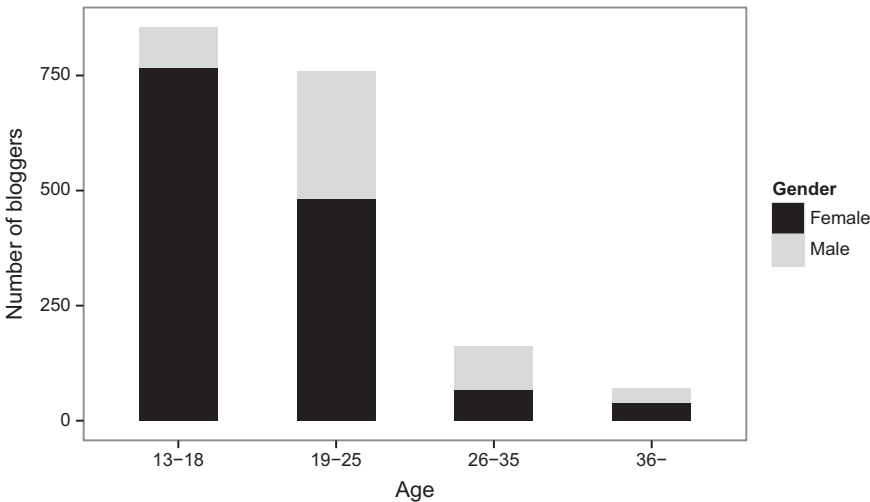


Figure 2: Distribution of age and gender in the Hebrew Blog Corpus.

between the ages of 13 and 18 make up the majority of the users. This paper reports analyses of both the full corpus and balanced subsets of the corpus. While significantly smaller, the balanced subsets allow us to rule out the possibility that a given effect is an artifact of the imbalance in age and gender.

Two properties of Hebrew present a challenge for the corpus searches necessary for extracting the data. First, certain functional elements, such as the definite article *ha* and the dative preposition *le*, are written as orthographic prefixes. As is the case for most Hebrew vowels, the vowel in the preposition is not represented in Hebrew orthography. As a consequence, any orthographic word that starts with one of the consonants *h* or *l* could be mistaken for a functional element followed by a noun. Second, Hebrew has a complex verbal morphology, and each verb has dozens of forms. It is therefore not trivial to search for all forms of a specific verb. To address both of these issues, the corpus was morphologically analyzed using the BGUTagger analyzer (Adler and Elhadad 2006), which also segments complex orthographic words such as *ha-kelev* ‘the-dog’ into their individual elements. All searches were performed on the analyzed version of the corpus.

4.2 Age groups

Bloggers were split into four age categories: 13 to 18; 19 to 25; 26 to 35; and 36 and above (number of authors: 855, 759, 161 and 71, respectively; see Figure 2). The first group corresponds to high-school age teenagers. As pointed out by Ravid (1995), this group comprises the new generation of speakers, those who “represent current use of Modern Hebrew at its most turbulent and unbuttoned” (p. 30; see also Romaine 1984). Indeed, teenagers are particularly concerned about in-group membership and about expressing it through speech patterns (Romaine 1984); as noted by Ravid (1995), “though teenagers may be aware of conventions of ‘good’ or ‘correct’ usage, they are also the ones who typically initiate new slang terms and who deliberately violate those formalities” (p. 15). The next group comprises speakers who are doing their military service or have recently completed it. Military language is as a source of innovative language use (Ravid 1995); one example is the use of originally mass nouns as count nouns, e.g., *neshakim* as the plural of *neshek*, originally ‘weaponry’. Military service in Israel is obligatory and extends for two to three years at a minimum; the first few years after the military service can be seen as a period of transition to young adulthood, much of which is typically spent traveling around the world or holding temporary jobs. Finally, the division between younger (26–35) and older (36–) adults roughly follows Ravid (1995), though in that study the cutoff

age was 40. It was not possible to make finer age distinctions among bloggers older than 35 due to the small number of bloggers in that age bracket.

4.3 Identifying possessive constructions

Only a minority of dative constructions in Hebrew express a possessive relation. The Hebrew dative has multiple other senses, some of them shared with the English dative (Berman 1982). Two examples are transfer datives, as in (12), and benefactive datives, as in (13):

- (12) *natati le-baal-i et ha-kesef li-kniyat ha-tabaat.* (attested)
 I.gave to-husband-my ACC the-money for-buying.of the-ring
 ‘I gave my husband the money to buy the ring.’ (not: ‘I gave my husband’s money.’)
- (13) *afiti la-yelad-im shel-i laxmani-ot le-beit ha-sefer.* (attested)
 I.baked to.the-kid-PL of-me roll-PL for-school
 ‘I baked my kids some rolls for school.’ (not: ‘I baked my kids’ rolls.’)

In order to make sure that only possessive uses of the dative were included in the data set, a list of 204 verbs was compiled based on an examination of all of the verbs that occurred in the first 50,000 dative sentences in the corpus. A verb was only included if the author judged that its occurrences in the dative construction were likely to be interpreted as including a possessive relation (see Section 6.5 for theoretical discussion). This method was employed to enable the automatic collection of a large data set of PD sentences; this would not be feasible by manual annotation of all dative sentences in the corpus, since PD sentences account for a small minority of all dative sentences (approximately 2%; Dattner 2015).

The sample of verbs was as exhaustive as possible: verbs were not excluded based on their frequency or syntactic class (e.g., transitive or intransitive). The relevant verbs appeared in the corpus followed either by the accusative marker *et*, as in example (14), or by a governed preposition, such as *al* in (15); both examples are taken from the corpus:

- (14) *kim’at [shavarti lo et ha-af].*
 almost [I.broke to-him ACC the-nose]
 ‘I almost broke his nose.’

- (15) *lo mamash hitslaxti [le-histakel lo al ha-panim].*
no really I.was.able [to-look to.him on the-face]
'I wasn't really able to look at his face.'

The possessum was never the subject of the verb; this sampling criterion therefore sidesteps the debate as to whether or not PD is compatible with unergative subjects (Borer and Grodzinsky 1986; Gafter 2014; Linzen 2014). A majority of the verbs (150) were accompanied by the accusative marker *et*. Most of the 54 remaining verbs were associated with prepositions that introduced a complement, e.g., *hizik le-* 'damage (lit. damage to)'. Only around six of the verbs were associated with possessums that could be argued to be adjuncts, e.g., *tsamax al* 'grew on' (as in *grew on my arm*). A selection of verbs is given in Table 1; the full set of verbs can be found in the Supplementary Materials. As may be predicted from their meaning, some verbs are more likely than others to occur with body-part possessums (e.g., body-part complements are much more common following *shavar* 'break' than following *parats* 'break into').

Table 1: A sample of the verbs used in corpus searches.

Verb	Preposition	Gloss	Tokens	%PD	%Body part
<i>tipes</i>	<i>al</i>	'climb'	69	70	46
<i>hirgia</i>	<i>et</i>	'calm'	134	21	22
<i>parats</i>	<i>l</i>	'break into'	431	81	2
<i>badak</i>	<i>et</i>	'check'	684	38	16
<i>naga</i>	<i>b</i>	'touch'	985	77	54
<i>shavar</i>	<i>et</i>	'break'	1,638	77	62
<i>horid</i>	<i>et</i>	'lower'	1,911	72	11

To make the searches technically feasible and reduce the number of extraneous factors that would need to be controlled for in the analysis, the searches were restricted to a subset of possible possessors and possessums. First, only definite possessums were considered. This was done both for ease of identification (the accusative marker *et* is only used before definite noun phrases) and because the dative construction is more likely to be interpreted as possessive if the possessum is definite.⁷ Second, only those sentences were considered in which both the possessum and the possessor were each a single word. This was done because

⁷ For a similar observation about Greek, see Smyth (1920); for a possible connection between definiteness and affectedness in Hebrew, see Dattner (2015). I thank the reviewers for these references.

the corpus was not parsed, which made it difficult to identify instances of the constructions that had noun phrases of arbitrary length. Finally, searches were limited to sentences in which the possessor was a pronoun, for a similar reason.⁸

In sum, a sample of PD constructions was identified using the following frame (where *PREP* was either a governed preposition or the accusative marker *et*):

- (16) VERB *l*+PRON *PREP* *ha*-NOUN
 VERB *to*+PRON *PREP* *the*-NOUN

The analogous OP constructions were identified using the following frame:

- (17) VERB *PREP* *ha*-NOUN *shel*+PRON
 VERB *PREP* *the*-NOUN *of*+PRON

The set of PD sentences may in principle include sentences such as (18), in which PD and OP are used redundantly:

- (18) *tanin axal l-i et ha-gerev shel-i. (attested)*
 alligator ate to-me ACC the-sock of-me
 ‘An alligator ate my sock.’

Such sentences, while theoretically interesting, are very rare and are unlikely to change the results of the quantitative analysis.

A total of 29,394 PD and 21,392 OP sentences were obtained in this way. Each construction was automatically annotated for possessum inalienability, based on a list of 61 words that refer to body parts. The list was manually created by the author based on an examination of the search results and is available as part of the Supplementary Materials. Some examples of words that were included in the list are *ozen* ‘ear’, *kaved* ‘liver’ and *katef* ‘shoulder.’ The search was performed on lemmatized forms, to ensure that plural forms were also included. Approximately 25% of the constructions had a body-part possessum, and the rest had other possessums. This proportion was very similar across age groups, with a trend toward a higher proportion of body-part possessums in younger bloggers (25.3% for the 13–18 age group; 24.6% for 19–25; 23.3% for 26–35; 22% for 36 and older).

Given the way that the verbs were selected, it is reasonable to assume that they are more likely to appear with PD than is the average Hebrew verb.

⁸ While necessary for the automatic collection of a large sample for statistical analysis, all of these decisions may limit the generalizability of the results to the language as a whole and should be examined in future research. In particular, we discuss some of the implications of restricting the sample to pronominal possessors in Section 6.5.

This study therefore cannot provide a valid estimate of the total proportion of PD constructions out of all possessive constructions, independent of the verb. However, the base rate is not pertinent to the goal of this study, which is to test whether younger and older speakers differ in how possessum inalienability affects their choice of possessive construction. There is no reason to assume that the results of this study would not extend to verbs that are less strongly associated with PD, though of course this is an empirical question that could be addressed in future research.

5 Results

5.1 Descriptive statistics

The proportion of PD constructions used with body-part and non-body-part possessums within each demographic group is shown in Figure 3. The pattern is consistent with the semantic bleaching hypothesis: overall, younger bloggers use PD at a similar rate to older bloggers, but show a weaker association

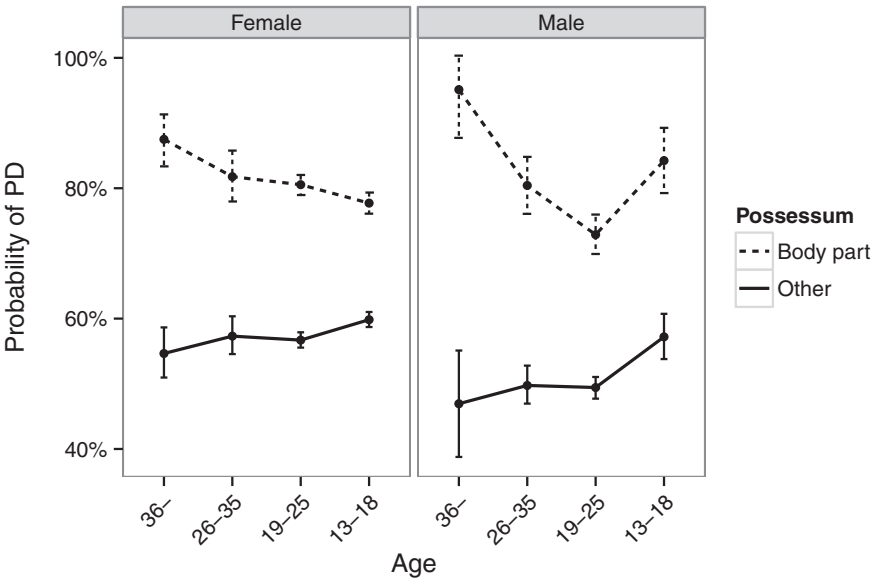


Figure 3: Probability of using PD (rather than OP) given that the possessum is a body part (dashed line) or not a body part (solid line). Error bars indicate bootstrapped 95% confidence intervals; they are typically smaller in the demographic groups that are more highly represented in the corpus, reflecting lower uncertainty about the estimates of the means.

between body-part possessums and PD than the older bloggers. Female bloggers show a consistent trend: inalienability plays less of role in the choice of possessive construction in younger women than in older ones. Male bloggers show a similar pattern, except for an unexpected increase in the probability of PD for body parts between the 19–25 age group and the 13–18 age group. Men of all age groups are slightly less likely than women of the same age group to use PD. In general, the data from male bloggers is noisier because this group is under-represented in the corpus (see Figure 2).

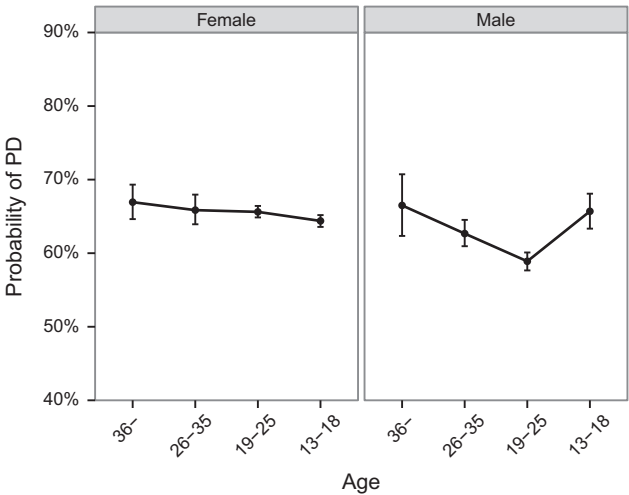


Figure 4: Average probability of using PD (rather than OP) to express possession, given that the verb was one of the 204 verbs investigated in this study. Error bars indicate bootstrapped 95% confidence intervals. Non-body-part possessums outnumber body-part possessums by about 3 to 1 (see 4.3); this imbalance is addressed by calculating the proportion of PD constructions within each possessum type, then taking the average of the two proportions as the overall proportion.

Figure 4 shows the overall rates of PD usage, controlling for the inalienability of the possessum. The figure shows that the overall share of PD among possessive constructions is not increasing; if anything, it is slightly decreasing in women and is not showing a clear trend in men.

5.2 Mixed-effects model analysis

To assess the statistical significance of the differences between the demographic groups, a logistic mixed-effects model was fitted to the data set using the *lme4*

package (Bates et al. 2012) in R. For the purpose of statistical analysis, the two younger age groups (teenagers and extended military-age) were collapsed together, and so were the two older age groups (younger adults and older adults); in other words, the age binning was simplified to 25 and below vs. 26 and above.⁹ The response variable was the construction used in the sentence, PD or OP. Positive regression coefficients correspond to a higher probability of using PD. The predictors were the blogger's gender and age category, as well as a categorical variable indicating whether or not the possessum was a body part. The predictors were centered such that the mean value of each predictor was 0. All of the interactions among the predictors were included.

The large number of data points and predictors precluded fitting a maximal random effect structure. Random intercepts were included for both bloggers and verbs. Following the advice of Barr et al. (2013) for corpus studies, random slopes were only included for predictors involved in statistical inferences of interest. Preliminary analyses showed that the only predictors likely to be significant were possessum inalienability, blogger gender and the interaction between inalienability and blogger age; only those random slopes were included. In addition, the main effect of inalienability was extremely large and unlikely to depend on the specific sample of bloggers, so this random slope was excluded as well. In sum, by-verb random slopes were included for inalienability, gender and the age-by-inalienability interaction.¹⁰

To assess whether the estimated regression coefficients were significantly different from 0, *p* values were calculated in two ways: first using the Wald statistic (i.e., assuming that the regression coefficient divided by its standard error is normally distributed), and then using the likelihood ratio test (comparing the full model to a model with the same random effect structure as the full model but without the relevant fixed effect), which may be more accurate in some cases (Agresti 2002). As may be expected for a data set as large as the present one, the two sets of *p* values were almost identical.

The fitted model is presented in Table 2. Age category did not have a significant effect on the choice of possessive construction: older and younger speakers did not significantly differ in their tendency to use PD. Male users

⁹ This was done because multiple levels of a factor complicate the interpretation of the regression coefficients, and in particular of the interactions. The goal of the statistical analysis was to establish that the interaction between age and possessor inalienability is a significant predictor of the choice of construction rather than to validate the detailed pattern visualized in Figure 3.

¹⁰ As a final simplification, a diagonal covariance matrix was used. In R formula notation: `type ~ age * inalienability * gender + (1 | blogger) + (1 | verb) + (0 + inalienability | verb) + (0 + gender | verb) + (0 + inalienability:age | verb)`.

Table 2: A logistic mixed-effects regression model fitted to the full data set. A positive regression coefficient indicates that PD is more likely to be used when the predictor has a positive value (older speakers for age, male for gender, body parts for inalienability).

Predictor	$\hat{\beta}$	SE ($\hat{\beta}$)	<i>z</i>	Wald <i>p</i>	LRT <i>p</i>
age	0.08	0.05	0.59	0.11	0.12
gender is male *	−0.24	0.05	−4.66	<0.001	<0.001
body part *	0.83	0.1	8.48	<0.001	<0.001
age : body part *	0.51	0.1	4.84	<0.001	<0.001
age : gender	0.13	0.1	1.3	0.19	0.2
body part : gender	0.04	0.07	0.56	0.58	0.2
age : body part : gender	−0.2	0.16	−1.22	0.22	0.23

LRT: Likelihood ratio test; statistically significant predictors are marked with a star.

were less likely to use PD than were female users, but this effect did not interact with the inalienability of the possessum. The inalienability of the possessum had a very significant effect: a body-part possessum increased the likelihood that speakers would choose PD. Crucially, the effect of inalienability was modulated by age: inalienability had a weaker effect in younger speakers than in older ones.

5.3 Verifying the robustness of the results

To verify that the significance of the regression coefficients is robust to the particular sample of verbs, the distribution of the regression coefficients was approximated using bootstrapping: subsets of the verbs were sampled (with replacement) and the regression model was refitted to the subset of the data corresponding to each sample (Davison and Hinkley 1997; Canty and Ripley 2012). Bootstrapping was performed at the cluster level only: individual observations within each verb were not resampled. To make it computationally feasible to fit a mixed-effects model in each of the 1,000 resampling iterations, the random effect structure was simplified by discarding all of the verb random slopes and the verb random intercept. Table 3 shows the results of the bootstrapping analysis (95% confidence intervals were calculated using the adjusted bootstrap percentile method). The results are qualitatively similar to the original model. In particular, the interaction between age and inalienability remains very robust.

A second potential concern about the robustness of the results arises from the lack of balance between the number of users in each of the combinations of age and gender (see Figure 2). To address this concern, the category with the smallest number of users (females 26 and older) was identified, and the same number of users (112) were sampled from each of the three other categories. This

Table 3: Bootstrapped confidence intervals for logistic mixed-effects regression coefficients (only verbs were resampled). A predictor has a significant effect whenever its confidence interval does not include 0 (marked with a star next to the predictor’s name). The column $\hat{\beta}$ indicates the median estimate (50th percentile).

Predictor	2.5%	$\hat{\beta}$	97.5%
age	−0.08	0.01	0.09
gender is male *	−0.32	−0.25	−0.18
body part *	0.81	1.1	1.39
age : body part *	0.32	0.47	0.65
age : gender *	0.03	0.11	0.22
body part : gender	0	0.12	0.25
age : body part : gender	−0.47	−0.22	0.02

Table 4: Regression coefficients resulting from refitting the model to samples balanced for number of users in each combination of gender and age; see the caption of Table 3 for details.

Predictor	2.5%	$\hat{\beta}$	97.5%
age	−0.01	0.09	0.19
gender is male *	−0.27	−0.19	−0.11
body part *	1.01	1.1	1.19
age : body part *	0.29	0.47	0.68
age : gender	−0.03	0.16	0.35
body part : gender	−0.09	0.06	0.22
age : body part : gender	−0.54	−0.19	0.19

process was repeated 1,000 times to ascertain that the results did not depend on the particular sample. A simplified random effect structure was used again, with random intercepts for bloggers and verbs and a random slope for the age by inalienability interaction. As shown in Table 4, the results of this analysis were qualitatively similar to the original analysis.

Finally, recall that PD and OP possessors were allowed to be pronouns of any person. Hebrew third person pronouns can have either animate or inanimate antecedents; for example, *hu* can mean either ‘he’ or ‘it:m’. When the possessor is inanimate, Hebrew speakers are much more likely to use OP than PD (see Section 2). If a large proportion of third person OP possessors were inanimate, and one of the age groups had a particularly high rate of third person pronouns, the proportion of PD sentences in that age group may appear to be lower than it would be if the analysis were restricted to animate possessors. Since inanimate possessors do not typically occur with body-part possessums,

this would likely not skew the estimates of the effect of inalienability by much. Nevertheless, to make sure that the results were not due to a confound related to the person of the possessor, the linear mixed-effects model from Section 5.2 was fitted to the subset of the data in which the possessor was a first person pronoun, and therefore invariably human. This subset of the data included 17,741 sentences (58% of the original set of sentences). The results of the analysis were again similar to the model from Section 5.2: PD was more likely to be used with body-part possessums ($\hat{\beta} = 0.9$, $p < 0.001$) and less likely to be used by men ($\hat{\beta} = -0.3$, $p < 0.001$). Inalienability and age interacted such that the effect of inalienability was larger for older bloggers ($\hat{\beta} = 0.37$, $p = 0.001$). None of the other effects were significant. This analysis confirms that the declining effect of inalienability is not due to a confound related to possessor animacy.

6 Discussion

6.1 The change in Hebrew PD

This paper presented the hypothesis that non-body-part possessums are gradually becoming more common in Hebrew PD. The results of a corpus study corroborated the change-in-progress hypothesis: younger speakers were more likely than older speakers to use PD with non-body-part possessums. Two patterns of change were outlined that could give rise to this tendency: the constant-rate pattern and the semantic bleaching pattern (see Figure 1). The trajectory of the change did not fit the pattern predicted by the Constant Rate Hypothesis (Kroch 1989), according to which linguistic change should proceed at the same rate independently of the semantic context: the overall rate of PD use, at least with the verbs examined in this study, remains largely stable. Body-part and non-body-part contexts showed *opposite* patterns of historical change, as predicted by the semantic bleaching hypothesis (Heine et al. 1991): PD is becoming more common in body-part contexts, but less common in non-body-part contexts (see Figure 3).

Put another way, it is not the case that an older construction (OP) is being replaced by an innovation (PD); rather, the association between PD and inalienability is becoming weaker, making it a less attractive choice for sentences with body-part possessums and a more acceptable choice for sentences with non-body-part possessums. It is illuminative in this context to compare the situation in Hebrew to the variation between OP and PD in Czech. Fried (1999) reports that possessive relations with body-part possessums can *only* be expressed using the

PD, as in (19a); OP constructions with body-part possessums such as (19b) imply that the body part is not attached to the possessor's body:

- (19) (a) *Šlapal jī na nohy.*
 step:PP:SG:MASC 3SG:FEM:DAT on foot:ACC:PL:FEM
 ‘He stepped on her feet.’
 (b) # *Šlapal na její nohy.*
 step:PP:SG:MASC on her:ACC foot:ACC:PL:FEM
 ‘He stepped on some feet of hers.’

None of the demographic groups in the present study showed such an absolute association between PD and body-part possessums: the probability of using PD with non-body-part possessums was consistently much greater than 0. While Hebrew does seem to show a stochastic version of the difference between (19a) and (19b), this difference is gradually eroding: the construction is undergoing a semantic bleaching process whereby some of its semantic content is being lost (Heine et al. 1991; Hopper and Traugott 2003).

There is some debate as to the historical origins of Hebrew PD. Some scholars have suggested that the construction was borrowed from a European language (Halevy 2013; Zeldes 2013), most likely from Yiddish, a language that had a dramatic influence on the syntax of Modern Hebrew (Wexler 1990; Zuckermann 2006a, 2006b). Others have pointed out that datives were used to encode possessive relations in early Semitic languages (Bar-Asher 2008); an anonymous reviewer suggests that the following biblical quote is an example of the PD construction (the translation is from the King James Bible):

- (20) *ve-avadta lo et ha-adama ata u-vane.xa*
 and-you.worked to.him ACC the-land you and-sons.your
 va-avade.xa. (II Samuel 9, 10)
 and-slaves.your
 ‘Thou therefore, and thy sons, and thy servants, shall till the land for him.’

Regardless of its origins, it is fairly clear that the construction has existed in Hebrew for at least several decades; its usage was denounced by prescriptivist grammarians as early as the 1970s (Berman 1982). Since the present study has compared two generations of contemporary Hebrew speakers, its findings are orthogonal to the question of the construction's origins: the crucial points are that the construction is part of the language for both older and younger contemporary speakers, and that the two groups differ in the association between inalienability and the use of the construction.

The hypothesis put forward in the present study does not presuppose that there was a stage in the history of Hebrew in which inalienable possessums in PD were disallowed altogether. In other words, the association between inalienability and Hebrew PD may well have been statistical during the entire lifetime of the construction. Sentence (20) above serves as evidence that alienable possessums (*the land*) were allowed in PD as early as Biblical Hebrew, if indeed the modern PD has its roots in that stage of the language. Even if PD is a modern borrowing from Yiddish, however, it is quite likely that the construction entered the language without a categorical inalienability condition, given that alienable possessums in PD are acceptable in many European languages (König and Haspelmath 1998; Lee-Schoenfeld 2006).

6.2 PD and written corpora

The proliferation in Hebrew of dative constructions borrowed from European languages, in particular PD, was frowned upon by some critics as late as the 1970s (Berman 1982). If this position is indeed influential and PD is considered substandard, a written corpus may not be inappropriate for studying the phenomenon.¹¹ However, there is no indication that the purists' distaste for dative constructions has ever made any significant impact on actual language use, or that speakers are even aware that it was once considered substandard. PD is used fairly often on the pages of the prestigious daily newspaper Haaretz, for example:

- (21) *b-a-sof ishru l-o et ha-doktorat.*
 in-the-end they.approved to-him ACC the-Ph.D.
 'In the end his Ph.D. thesis was approved.' (The title of an article about Albert Einstein from 2005.)
- (22) *ha-yaxid she-nir levin laxats l-o et ha-yad.*
 the-only that-Nir Levin shake to-him ACC the-hand
 'The only person whose hand Nir Levin shook.' (Nir Levin is a football coach; the article is from 2002.)

Moreover, the website that the texts analyzed in the corpus study were drawn from was not perceived as a platform for "serious" blogging. As such,

¹¹ Since PD is a fairly rare phenomenon and existing spoken Hebrew corpora are very small, this would mean that no corpus would be appropriate for studying the construction.

the corpus does not contain any academic or professional content, and none of the texts are likely to be professionally edited. Most of the blogs are diaristic in style and are written in a colloquial, personal register. Empirically, the large number of PD examples found in the corpus indicates that the authors did not hesitate to use it in writing. One might hypothesize that older speakers may be more likely to use more conservative standard language, and would therefore refrain from using PD. As Figure 4 shows, however, this is not the case; if anything, older speakers used PD slightly more often than younger speakers.

6.3 The use of an apparent-time corpus

This study used an apparent-time corpus to argue that the PD construction is undergoing diachronic change. Any time an apparent-time corpus is used, it is important to keep in mind the logical possibility of age grading: a historically stable change that occurs over the lifetime of individuals, regardless of when they were born (Bailey 2002; Chambers 1995; Labov 1994). In the case of the Hebrew PD, for instance, it is in principle possible that younger speakers have always used PD with body-part possessums at a stable rate of, say, 60%, while older speakers have always used it at a stable rate of 80%. If this is the case, a replication of the present study in 2040 will yield exactly the same picture as the present study. This contrasts with the change-in-progress interpretation of the results adopted in this paper, which would predict an even weaker effect of inalienability on the choice of construction among young people in 2040 than in the youngest age group in the present study.

In practice, age grading is the exception rather than the norm: most of the comparisons between apparent-time and real-time studies reported in the literature have found robust convergence between the two types of studies, supporting the interpretation of apparent-time results as reflecting language change rather than change over the course of an individual's lifetime (Bailey 2002; Boberg 2004). There have been some reports of age grading, however (Chambers 1995). Somewhat disturbingly in the context of the current study, age grading appears to be more prevalent among adolescents (Bailey 2002), an age group which is amply represented in the population of bloggers analyzed in this paper. Intuitively, age grading should be more likely when the variable in question is essential to generational identity; this hardly seems to be the case for the variable in question in this study, which has not been noticed before in the literature, let alone in the community. Nevertheless, only a real-time study using a historical corpus could determine

conclusively whether the pattern found in the current study reflects age grading or a change in progress.

6.4 The effect of gender

An unexpected finding of this study was that men were less likely than women to use PD. This was the case regardless of whether the possessum was a body part or not. There is little existing data on the effect of gender on syntactic variation. In the domain of phonetic variation, Labov (1990) outlines two principles that have been shown to hold in many studies of gender effects in language variation and change. According to Principle I, “[i]n stable sociolinguistic stratification, men use a higher frequency of nonstandard forms than women” (p. 205). Principle II states that “[i]n the majority of linguistic changes, women use a higher frequency of the incoming forms than men” (p. 206). Principle II refers to “change from below,” that is, internal change that does not involve the importation of linguistic elements from other systems; the change described in this paper clearly falls into this category.

Neither of Labov’s principles appears to hold in the present case. Principle II would be consistent with the results of the present study (men being less likely than women to use PD) if the change followed the constant rate pattern, whereby PD was gaining ground over OP globally, regardless of the inalienability of the possessum. Yet as this paper has shown, the overall proportion of PD remains stable across younger and older speakers; it is the association between PD and possessum inalienability that is changing. In statistical terms, Principle II predicts an interaction between gender and inalienability; yet the finding of this paper was a main effect of gender, which did not track the pattern of change.

Principle I appears to be even less applicable to the data: as mentioned in Section 6.2, there is no clear evidence that PD is considered substandard. Even if it was, however, Principle I would predict that men should show a higher frequency of PD than women, which is the opposite of the pattern reported in this paper. In sum, it is not clear how the gender difference found in the present study relates to the existing literature on gender differences in phonetic change.

6.5 Delineating the boundaries between Hebrew dative constructions

The correct classification of Hebrew dative constructions is a matter of active debate (Ariel et al. 2015; Boneh and Bar-Asher 2014; Bosse et al. 2012; Dattner

2015; Halevy 2013). Some researchers have argued that PDs are “the same phenomenon” as benefactive datives such as *bake him a cake* (Lambert 2010; Pylkkänen 2008). Others have proposed to split datives with possessive meanings into PDs proper and “datives of interest” (Halevy 2013), though the criteria for this distinction and its practical consequences are unclear. Boneh and Bar-Asher (2014) treat PDs as a subclass of “affected datives,” and argue that the possessive relation is not part of the meaning conveyed by the construction but arises as an online implicature.

The current study has remained agnostic on the question of the correct typology of dative constructions in Hebrew, adopting the pragmatic definition of Linzen (2014): any dative construction likely to be interpreted as denoting a state of affairs that includes a possession relation between a dative argument and another noun phrase is considered to be a PD. This definition is orthogonal to the question of whether those constructions are instances of the “Possessive Dative Construction,” or whether such a construction even exists as a mental entity separate from other dative constructions such as the dative of interest or the affected dative. It is likewise orthogonal to the question of whether the possessive interpretation arises as part of the meaning of the construction (Pylkkänen 2008) or is “implied” by it (Landau 1999). The crucial point for the purpose of this paper is that speakers wishing to refer to a state of affairs that involves a possessive relation have two options at their disposal, a dative or an ordinary possessive construction.

One dative construction that merits special discussion is the “ethical” dative. In this construction, the dative-marked entity is “an onlooker perceived as being intensely affected by, or as having a strong emotional stake in, the state of affairs described in the sentence” (Halevy 2013). This entity need not stand in a possessive relation to any other noun phrase in the sentence. For example (Berman 1982: 38):

- (23) *rak she-hi lo taxle li shuv axshav.*
 just that-she not will-sicken to.me again now
 ‘Just so she doesn’t go and get sick on me again now.’ (Berman’s literal gloss; the intended meaning is roughly ‘I really hope she doesn’t get sick again now’.)

The existence of ethical datives raises the concern that some sentences that appear to be PDs may not in fact be interpreted as referring to a state of affairs that includes a possessive relation between the dative marked argument and another entity. In (24), for example, both the possessive and the ethical meaning are in principle grammatical (see also Boneh and Bar-Asher 2014):

- (24) *mishehu shavar l-i et ha-xalon ha-axori. (attested)*
 someone broke to-me ACC the-window the-back
 a. ‘Someone broke my back window.’
 b. ‘Someone broke the back window (possibly their own) on me.’ (that is, implying that the speaker was affected by them breaking their own window.)

Some authors have suggested that ethical datives masquerading as PDs can be avoided by excluding pronominal possessors (Borer and Grodzinsky 1986; Landau 1999). This recommendation is based on the assumption that ethical datives can only be pronominal (for further discussion of the criteria for distinguishing these constructions from each other, see Dattner 2015; Boneh and Bar-Asher 2014). Linzen (2014) contests the usefulness of pronominality as a tool for distinguishing the ethical from the PD. He further argues that the risk of misidentification is minimal in practice: the interpretation of sentences such as (24) is overwhelmingly possessive.¹² Under these circumstances, speakers are likely to avoid using a sentence such as (24) unless they expect the listener to infer that the dative noun phrase refers to a possessor. It is therefore safe to assume that the vast majority of dative sentences in the sample analyzed in this paper did in fact convey a possessive relation. In future work, it may be useful to conduct a formal experiment to collect native speaker judgments on a wide variety of sentences that can express a possessive relation, in order to explore how often those sentences are in fact interpreted as non-possessive ethical datives.

6.6 Inalienability and affectedness

The corpus analysis presented in this paper demonstrates that the association between PD and inalienable possession is becoming weaker with time. The weakening role of inalienability suggests, though does not prove, that affectedness more generally is playing a weaker role in the distribution of this construction than in the past. If the declining role of inalienability indeed reflects a decline in the role of affectedness, speakers who tend to use PD in alienable possession scenarios are expected to be more likely to use this constructions in

¹² To confirm this intuition, I asked six native Hebrew speakers whether the window in (24) belongs to the speaker or to someone else. The results of this informal survey confirm that interpretation (a) is always preferred to interpretation (b). An anonymous reviewer reports that he or she shares this intuition.

other low-affectedness situations, for example, with stative verbs (cf. the contrast between (4a) and (4b)).¹³

The link between inalienability and affectedness rests on the assumption that possessors are perceived to be more strongly affected by an action performed on an inalienable possession than on an alienable one; in other words, an event involving an inalienable possessum necessarily “happens to” the possessor and not just to the possessum (Wierzbicka 1988), whereas this is not always the case for an alienable possessum. This intuition goes back to Bally (1925/1996), who argues that “each phenomenon, action, state or quality which affects any part whatsoever of the personal domain, automatically affects the whole person. The part of the body directly affected is only the medium for a condition which spreads to the whole system” (p. 33). While this intuition has been shared by multiple researchers (König and Haspelmath 1998; Linzen 2014; Shibatani 1994; Wierzbicka 1988), in future work it would be beneficial to move away from intuitions and demonstrate the connection between inalienability and affectedness using a quantitative measure of affectedness. An initial measure could be derived from the results of an experiment in which participants rated the degree to which the possessor is affected in a sample of sentences. Such a continuous quantitative measure would also accord with the intuition that affectedness is not a binary property of an event: the possessor can be perceived as somewhat affected, strongly affected or not affected at all by an event.

7 Conclusion

Languages that have a PD construction typically require the possessor in that construction to be *affected*: the event needs to be perceived as having “happened to” the possessor. While this is often the case in Hebrew as well, this language appears to be unusually tolerant of low-affectedness possessors in PD (Linzen 2014). This paper explored the possibility that Hebrew PD is undergoing historical change whereby the role of acceptability is being eroded. It focused in particular on the acceptability of non-body-part possessums; since possessors are typically seen as more affected by events happening to their body parts than by events happening to other possessums (Haspelmath 1999; Wierzbicka 1988), an increase in the acceptability of non-body-part possessums would suggest that affectedness is becoming less central to speakers’ choice of possessive construction.

¹³ I thank an anonymous reviewer for pointing out this prediction.

A blog corpus study was reported that showed that younger speakers are more likely than older speakers to use PD with non-body-part possessums. Under the assumption that generational differences reflect language change (Bailey et al. 1991), this finding confirms that there is a change in progress in the distribution of the construction.

Two possible trajectories of change were contrasted: constant-rate syntactic change (Kroch 1989), which predicts that PD should become more common overall at the expense of OP; and semantic bleaching as part of a grammaticalization process (Heine 1997), which predicts a change in the degree of association between PD and possessor inalienability, with no necessary reduction in the use of OP.

It was found that PD is not becoming more common overall at the expense of OP: the overall proportion of PD constructions was stable across age groups. At the same time, the effect of inalienability on the choice of construction was weaker in younger speakers. This pattern of results supports the semantic bleaching hypothesis. While Hebrew PD retains a statistical preference for body-part possessums, this preference is becoming progressively weaker. If the process continues at the same pace, and other components of possessor affectedness follow in the footsteps of possessum inalienability, PD may eventually become bleached of the affectedness meaning component altogether and turn into a general-purpose possessive construction.

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Appendix

Sources for attested examples:

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- (1) http://books.google.com/books?id=MoLknxsPqxC&pg=PA69&lpg=PA69&dq=%22i+hit+him+on+the+knee%22&source=bl&ots=SsKTXWG8-6&sig=I3lGdQGdyOYmUR0wOHYryw-cF4U&hl=en&sa=X&ei=Q1B2U8_BBI2hqAaCq4KQBA&ved=0CDIQ6AEwAQ
 - (2) <http://www.nrg.co.il/online/1/ART2/045/838.html>
 - (3) <http://lf2.co.il/forum/archives/1/viewtopic.php?t=4222&postdays=0&postorder=asc&start=30&sid=0353cac12164eb2ff5a806448a5d3d6f>
 - (4a) <http://www.ynet.co.il/Ext/App/TalkBack/CdaViewOpenTalkBack/0,11382,L-3249375,00.html>
 - (5a) <http://www.rosh1.co.il/?p=32758>
 - (9) http://forum.mac-it.co.il/archive_single_view.php?id=348307&gid=347999
 - (10) <http://www.anime-il.com/index.php?showtopic=100726&mode=threaded&pid=1748960>
 - (11) <http://www.ynet.co.il/articles/0,7340,L-4294443,00.html>
 - (12) <http://www.yeshiva.org.il/ask/?id=80986>
 - (13) <http://www.ynet.co.il/home/0,7340,L-1821-167-10203802,00.html>
 - (18) <http://www.fxp.co.il/showthread.php?t=10515150>
 - (21) <http://www.haaretz.co.il/misc/1.1514575>
 - (22) <http://www.haaretz.co.il/misc/1.776300>
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