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9-19-2022

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### Recommended Citation

Leung, Justin (2022) "Variation in Path Encoding in Motion Events in Toronto Heritage Cantonese," *University of Pennsylvania Working Papers in Linguistics*: Vol. 28: Iss. 2, Article 10.  
Available at: <https://repository.upenn.edu/pwpl/vol28/iss2/10>

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## Variation in Path Encoding in Motion Events in Toronto Heritage Cantonese

### Abstract

This study examines path encoding in motion event expression in Toronto Heritage Cantonese using a variationist sociolinguistic methodology informed by studies on the typology of motion events (Talmy 2000). Cantonese inherently exhibits some variability in that both satellite-framing and verb-framing strategies of path encoding are grammatical and natural (Yiu 2014). Work on motion events in bilinguals suggest that typologically different languages may have crosslinguistic effects on motion event expression (Filipović 2011, Brown and Gullberg 2008, Wang and Wei 2019, among others). In light of this body of work, I investigate the linguistic and social factors that are relevant to the variation seen in Toronto Heritage Cantonese and Hong Kong Cantonese, the homeland variety. Spontaneous speech from 23 sociolinguistic interviews from the Heritage Language Documentation Corpus (Nagy 2011) is analyzed by extracting all relevant examples of motion event expression (n = 1991). Intergenerational and diatopic comparisons are made using comparative variationist methods. The results suggest stable variation in the homeland speakers, but change among the heritage speakers, which cannot be attributed to simplification or contact with English.

# Variation in Path Encoding in Motion Events in Toronto Heritage Cantonese

Justin Leung\*

## 1 Introduction

This study employs a variationist approach in investigating the expression of directional motion events in Toronto Heritage Cantonese (THC) in comparison to the patterns in Hong Kong Cantonese (HKC), the homeland variety. The goals of this study are to tease apart the effects of various linguistic and social factors that are relevant to variation in motion event expression and to interpret the effects of these factors in light of the various forces that have been suggested in the literature to shape heritage grammar: language-internal change, crosslinguistic influence from the majority language, incomplete acquisition, and attrition later in life (Benmamoun et al. 2013).

Studies in bilingualism have shown that typologically different languages may have crosslinguistic effects in the expression of motion events (Filipović 2011, Brown and Gullberg 2008, Wang and Wei 2019, among others). On the other hand, studies of heritage languages often describe characteristics of heritage speakers as simplification. Because Cantonese inherently shows some variation in how motion events are expressed (Yiu 2014), it is interesting to investigate whether heritage speakers of Cantonese show a preference for a particular variant due to greater availability in the majority language or simplification of the grammar. The results of this study suggest that there is stable variation in the homeland speakers but change among the heritage speakers. I argue that these changes in THC cannot be attributed to simplification or contact-induced change.

## 2 Background

### 2.1 Toronto Heritage Cantonese

Heritage language speakers represent a distinct case of bilingualism/multilingualism occurring due to immigration to a country whose majority language is different from the language spoken in the homeland. This unique setting is ideal for investigation of the extent to which different factors shape language. Cantonese, the prestige variety of Yue Chinese primarily spoken in Guangzhou, China, as well as Hong Kong and Macau, is the heritage language of a number of Chinese diasporic communities that trace their heritage back to Guangdong, Hong Kong and Macau. In Toronto, Cantonese is one of the most spoken heritage languages with 306,700 speakers, 81% of which have reported it as their mother tongue and 60% of which report to speak it regularly at home, and is only second to Mandarin (Statistics Canada 2017).

### 2.2 Path Encoding in Motion Event Expression

The typology of motion events was first formalized by Talmy (2000), who proposes that the world's languages can be divided into two types based on how Path is encoded in motion event expression. Verb-framed (V-framed) languages encode Path in the main verb, while satellite-framed (S-framed) languages encode it in a satellite, "the grammatical category of any constituent other than a nominal or prepositional-phrase complement that is in a sister relation to the verb root" (Talmy 2000:222). The examples in (1, 2), where the path-encoding element is bolded, illustrate the difference between S-framed and V-framed languages.

- (1) The ball rolled **out**. [English, S-framed]

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\*This paper is based on research for my MA forum paper. I would like to acknowledge Naomi Nagy, Cristina Cuervo, HLVC research assistants ([https://ngn.artsci.utoronto.ca/HLVC/3.2\\_active\\_ra.php](https://ngn.artsci.utoronto.ca/HLVC/3.2_active_ra.php); [https://ngn.artsci.utoronto.ca/HLVC/3.3\\_former\\_ra.php](https://ngn.artsci.utoronto.ca/HLVC/3.3_former_ra.php)), and the reviewers and audience at FoCaL-4, NACCL 33, and NWAV-49 for their contributions. All remaining errors are my own.

- (2) La balle est **sortie** (en roulant).  
 the ball AUX exited by rolling  
 ‘The ball exited (by rolling).’ [French, V-framed]

In Talmy’s system, Path has three main components: Vector, Conformation and Deixis. However, crosslinguistic examination suggests at least some independence of Deixis (the component that specifies motion with respect to the speaker and/or the addressee) from the other components of Path. Languages often have commonly used verbs that encode Deixis, even in languages that have few non-deictic Path (hereafter, simply Path) verbs, such as English (*come, go*) (Matsumoto and Kawachi 2020). In many languages, Deixis occupies a morphosyntactic slot distinct from Path (Lamarre 2008, Matsumoto and Kawachi 2020).

Zooming in to the Chinese languages, Old Chinese has been characterized as a V-framed language, and in the development of Old Chinese into the modern Chinese languages, a typological shift from V-framing towards S-framing in the modern varieties is observed (Peyraube 2006, Shi and Wu 2014, Yiu 2014). Yiu (2014) argues that while modern varieties of Chinese, including Cantonese, generally favour S-framing, they are not purely S-framed and they lie on a S–V continuum, with Cantonese using V-framing in more contexts than Mandarin. In a diachronic investigation on motion event expression in Cantonese, Yiu (2014) shows that modern Cantonese is more S-framed than 19th-century Cantonese.

While both Cantonese and English are traditionally considered S-framed languages, there are differences between them that make it possible to examine the possibility of crosslinguistic effects in motion event expression in THC. One such difference is in the tolerance of V-framing Path. Cantonese allows both V-framing and S-framing of Path in colloquial speech, as shown in (3a) and (3b), respectively.<sup>1</sup> English allows V-framing of Path, but most Path verbs in English are Latinate in origin (usually via French, a V-framed language) and not as common as their S-framed verb-particle counterparts in colloquial speech (Cappelle 2012, Wang and Wei 2019). Another difference is that Cantonese can express Deixis in the main verb (4a) or in a satellite (4b), but English lacks Deictic satellites and must use verbs to express Deixis (Lamarre 2008, Wang 2018).

- (3) a. go<sup>3</sup>-go<sup>3</sup> **ceot**<sup>1</sup> gaai<sup>1</sup> jiu<sup>3</sup> daai<sup>3</sup> hau<sup>2</sup>-zaau<sup>3</sup>.  
 CLF-CLF exit street must wear mouth-cover  
 ‘Everyone going out to the streets must wear a face mask.’  
 (CXM52A)
- b. hou<sup>2</sup> daai<sup>6</sup> bou<sup>6</sup>fan<sup>6</sup> jan<sup>4</sup> ne<sup>1</sup>, ji<sup>5</sup>ging<sup>1</sup> zau<sup>2</sup> zo<sup>2</sup> **lok**<sup>6</sup> hoeng<sup>1</sup>gong<sup>2</sup>.  
 very big part person SFP already run PFV descend Hong.Kong  
 ‘a big majority of people have already fled down to Hong Kong.’  
 (C1M52A)
- (4) a. ngo<sup>5</sup> **heoi**<sup>3</sup> zo<sup>2</sup> Hamilton  
 1SG go PFV Hamilton  
 ‘I went to Hamilton’  
 (C1M52B)
- b. git<sup>3</sup>-fan<sup>1</sup> gam<sup>2</sup> mai<sup>6</sup> bun<sup>1</sup> zo<sup>2</sup> **lei**<sup>4</sup> li<sup>1</sup>dou<sup>6</sup> lo<sup>1</sup>  
 form-marriage so then move PFV come here SFP  
 ‘[I] got married, so then [I] moved here’  
 (C1F58A)

<sup>1</sup>Cantonese examples are given with Jyutping romanization, with faithful representation of phonetic variants used by the speakers where applicable and possible within the romanization system. Examples from the Heritage Language Documentation Corpus show the speaker code in parentheses. Abbreviations: 1 = first person, 3 = third person, AUX = auxiliary, CLF = classifier, MOD = modifying marker *ge*<sup>3</sup> (similar to Mandarin *de*), PFV = perfective, PL = plural, SFP = sentence-final particle, SG = singular.

### 2.3 Hypotheses and Predictions

Based on the theoretical and empirical findings mentioned above, there are two notable forces of change that could shape the expression of motion events in THC. First is incomplete acquisition or language attrition, where THC speakers would show simplification in their motion event expression. This may be structural simplification, which would predict that V-framing is used more in THC overall, especially with speakers who have less exposure to Cantonese and/or identify less with the identity as a Hongkonger. It could also be simplification of the variable system (as established by multivariate analysis), which would be realized as a loss of significant factors governing the variable. Second is contact with English, where one would expect that THC would diverge from HKC towards English. I predict that THC would use less V-framing of Path and more V-framing of Deixis than HKC based on the observations in Section 2.2.

## 3 Methodology

### 3.1 Data

The data comes from the Heritage Language Documentation Corpus (Nagy 2011), which records ten languages spoken in the Greater Toronto Area, one of which is Cantonese. Heritage speakers and homeland speakers were interviewed by one or two members of the heritage language community to obtain audio-recorded sociolinguistic interviews and responses to the Ethnic Orientation Questionnaire (EOQ), which were subsequently transcribed in Jyutping and traditional Chinese characters with time-aligned annotations in ELAN. The sociolinguistic interviews, which aimed to elicit the vernacular of the speakers, are a great source of data for investigating motion event expression because characterization of a language variety within the Talmian typology should be reflective of colloquial speech (Talmy 2000:27). The EOQ, which was only used with the heritage speakers, asked a series of questions about the speakers' ethnic identification, language, language choice, cultural heritage, parents, partner, and experience and opinions of ethnic discrimination. Based on oral responses to the questionnaire, each question has been coded with a score of 0, 1, or 2, with 0 representing orientation towards English/Canada and 2 representing orientation towards Cantonese/Hong Kong. The mean of the scores for the entire questionnaire have been assigned to each speaker.

The corpus adopts a careful definition of the different groups of speakers to ensure that the sources of variation are controlled. The homeland speakers of Cantonese were born and raised in Hong Kong, the homeland of the majority of Cantonese speakers in Toronto.<sup>2</sup> The first generation (Gen1) heritage speakers were born and raised in Hong Kong, immigrated to Toronto after the age of 18 and have lived in Toronto for at least 20 years. The second generation (Gen2) speakers were born and raised in Toronto or immigrated to Toronto before the age of 6 and born to parents who would qualify to be Gen1 heritage speakers. A sample of 23 sociolinguistic interviews conducted with Cantonese speakers in the decade of 2009–2019 were included in this study for analysis. This sample is as balanced as possible for generation and sex.<sup>3</sup>

Deictic	Non-deictic
嚟 / 來 / 黎 / 蒞 <i>lai<sup>4</sup>/lei<sup>4</sup></i> 'come'	上 <i>soeng<sup>5</sup></i> 'ascend', 落 <i>lok<sup>6</sup></i> 'descend'
去 <i>heoi<sup>3</sup></i> 'go'	出 <i>ceot<sup>1</sup></i> 'exit', 入 <i>jap<sup>6</sup></i> 'enter'
	埋 <i>maai<sup>4</sup></i> 'approach', 過 <i>gwo<sup>3</sup>/go<sup>3</sup></i> 'pass'
	返 / 翻 / 番 <i>faan<sup>1</sup></i> 'return'

Table 1: Directional morphemes included in this study.

<sup>2</sup>One homeland speaker (CXF77A) was born in Nantou, Bao'an (now part of Nanshan District, Shenzhen, Guangdong), a town near Hong Kong, and moved to Hong Kong in their youth.

<sup>3</sup>Age cannot be balanced because of the definition of Gen1 heritage speakers, which excludes all speakers ages 38 or younger, and because the oldest Gen2 speaker interviewed is 44 at the time of the interview.

Tokens were extracted in ELAN by searching in the Chinese character transcripts of the sociolinguistic interviews from beginning to end for the directional morphemes in Table 1.

### 3.2 Variables

This study treats constructions featuring at least one directional morpheme expressing a spatial displacement as a variable system governed by linguistic factors. The crucial point of variation lies in the syntactic position of the directional morpheme in the verbal domain. The directional morpheme can either be in the main verb of a clause (V-framed), as shown in (5), or in a satellite (S-framed), as shown in (6).<sup>4</sup> A satellite (Deictic or not) can be a directional complement to the main verb, as in (6a–b). A Deictic satellite can also be a directional complement to another directional complement, as in (6c). The envelope of variation is circumscribed in two ways: form and meaning. Formally, a motion event expression must contain a directional morpheme that occupies the position of either the main verb of a clause or a satellite. Semantically, the expression must express a change of position from one point in space to another (often in physical space, but it could also be in metaphorical space).

- (5) a. keoi<sup>5</sup> ceot<sup>1</sup> zo<sup>2</sup> go<sup>3</sup> apartment  
 3SG exit PFV CLF apartment  
 ‘he exited the apartment’  
 (C2F22A)
- b. ngo<sup>5</sup>-dei<sup>6</sup> heoi<sup>3</sup> zo<sup>2</sup> backyard go<sup>2</sup>dou<sup>6</sup>  
 1-PL go PFV backyard there  
 ‘We went to the backyard’  
 (C2M22A)
- (6) a. keoi<sup>5</sup> zau<sup>2</sup> zo<sup>2</sup> lok<sup>6</sup> hoeng<sup>1</sup>gong<sup>2</sup> lo<sup>1</sup>  
 3SG run PFV descend Hong.Kong SFP  
 ‘He went down to Hong Kong’  
 (C1F78A)
- b. o<sup>5</sup> wui<sup>5</sup> haam<sup>3</sup> tung<sup>4</sup>maai<sup>4</sup> zau<sup>2</sup> heoi<sup>3</sup> maa<sup>1</sup>mi<sup>4</sup> dou<sup>6</sup>  
 1SG will cry and run go mom there  
 ‘I would cry and go to where Mom is’  
 (C2F16B)
- c. jau<sup>5</sup> mou<sup>5</sup> di<sup>1</sup> ze<sup>1</sup>hai<sup>6</sup> saang<sup>1</sup>bou<sup>2</sup> ge<sup>3</sup> jan<sup>4</sup> haang<sup>4</sup> go<sup>3</sup> lei<sup>4</sup> aa<sup>3</sup>  
 have have.not CLF that.is unfamiliar MOD person walk pass come SFP  
 ‘whether there are like strangers walking over (towards the speaker)’  
 (C1F58A)

Sex, age, generation, and ethnic orientation (EO) are included as social factors that may be relevant to the dependent variable. Age is treated as a binary categorical factor (younger or older) in order to detect any apparent time effects.<sup>5</sup> The generation to which a speaker belongs is relevant, as heritage speakers are expected to behave in more English-like ways than homeland speakers, and among the heritage speakers, Gen2 speakers should pattern more closely to English than Gen1 speakers. EO is measured by the EO score derived from the EOQ responses. One would expect speakers with lower orientation towards Hong Kong or lower reported usage of Cantonese to pattern closer to the English patterns.

<sup>4</sup>Even though there may be additional semantic information (e.g. manner) given by the main verb in a S-framed construction, these two constructions can be considered variants of a sociolinguistic variable because both variants refer to the same event, and thus, the two variants would have the same referent and would “hav[e] the same truth value” (Labov 1972:188). According to Wu (2016:447), speakers “can choose to describe motion events with either S- or V-framed encoding means and be grammatically correct with either option.”

<sup>5</sup>The split between younger and older speakers is different in each generation due to the age distribution in the sample: age 39 was the cutoff for the homeland and Gen2 speakers, while age 60 was the cutoff for Gen1 speakers.

The linguistic constraints included event type (self-motion or caused motion), the presence of a locative object (present or absent), the presence of a purpose phrase (present or absent), and, for Path tokens only, the presence of Deixis (present or absent). Examples illustrating how these constraints are coded are shown in (7).

- (7) a. Self-motion, **locative object** present, [purpose phrase] present, *Deixis* absent  
 zau<sup>6</sup> go<sup>3</sup> **gaa<sup>1</sup>laa<sup>4</sup>daai<sup>6</sup>** [duk<sup>6</sup> syu<sup>1</sup>] lo<sup>1</sup>  
 then pass Canada read book  
 ‘then [I] got across to Canada to study’  
 (CXM52A)
- b. Caused motion, **locative object** absent, [purpose phrase] absent, *Deixis* present  
 cau<sup>1</sup> tung<sup>2</sup> jyu<sup>2</sup> go<sup>3</sup> heoi<sup>3</sup>  
 lift bucket fish pass go  
 ‘lift the bucket of fish over there’  
 (CXF77A)

### 3.3 Data Analysis

The collected data were analyzed using multivariate analysis. Each generation is analyzed separately for intergenerational and diatopic comparisons. The effects of multiple factors on the dependent variable are considered together in mixed-effects models. These models are built starting with a step-up/step-down analysis on the linguistic factors (presence of a locative object, presence of a purpose phrase, and, for Path tokens only, presence of Deixis)<sup>6</sup> and social factors (sex, age, and EO score), with speaker as a random effect. These models were then tweaked by replacing factors with interactions between factors if there are obvious interaction effects in cross-tabulation of two factors. The models with the lowest AIC score were selected as the best models. These models give us three lines of evidence for comparing the generations: whether a factor is statistically significant ( $p < 0.05$ ), how the factors are ranked relative to each other as measured by the range of factor weight, and how the factor levels are ranked for each factor (Tagliamonte 2013).

## 4 Results

From the corpus, 1991 tokens of motion event expression were coded and analyzed, giving 1520 tokens of Deixis and 1072 tokens of non-deictic Path.<sup>7</sup> Statistical analysis was performed in the statistical software R, using Rbrul for multivariate analysis.

### 4.1 Co-event Verbs

Generation	Self-motion			Caused motion		
	Type	Token	TTR	Type	Token	TTR
Homeland	18	73	0.25	45	74	0.61
Heritage Gen1	38	116	0.33	85	163	0.52
Heritage Gen2	15	50	0.30	18	32	0.56

Table 2: Type/token ratios (TTRs) of co-event verbs from the data.

Co-event verbs, verbs that express Manner, Cause, etc. of motion, have been examined to compare the quantity and variety of verbs used in each generation. Table 2 shows the type/token ratio (TTR) of co-event verbs in self-motion and caused motion events, respectively, for each generation.

<sup>6</sup>Event type is not included as a factor in the models because all the caused motion events have been excluded from multivariate analysis. See Section 4.2 for details.

<sup>7</sup>Note that 601 tokens contained both Deixis and Path.

Both tables show that the TTRs do not differ much across generations (0.25–0.33 for self-motion and 0.52–0.61 for caused motion), indicating similar varieties of co-event verbs.

## 4.2 Categorical Patterns

Several categorical results (or “knockouts”) were found in the data. Caused motion events were never found to be encoded with V-framing of Deixis. Caused motion events were also not found to be expressed with V-framing of Path if a locative object, purpose phrase and/or Deixis are present. As such, caused motion events have been excluded from the main analysis altogether for two reasons: knockouts have effects that are too strong for the statistical models to handle appropriately, and it also makes the data more comparable between the two types of directional morphemes. Removing all caused motion tokens leaves us with 1289 tokens of Deixis (394 homeland, 672 Gen1, 223 Gen2) and 833 tokens of Path (266 homeland, 396 Gen1, 171 Gen2).

## 4.3 Mixed-effects Variable Rule Analysis

Mixed-effects models were built for each type of directional morpheme (Deixis and Path) and each generation (homeland, Gen1 and Gen2), giving a total of six models.

### 4.3.1 Deixis

	Homeland			Gen1			Gen2		
Total <i>N</i>	394			672			223		
AIC	512.29			860.04			274.34		
	FW	% VF	<i>N</i>	FW	% VF	<i>N</i>	FW	% VF	<i>N</i>
<b>LOCATIVE OBJECT</b>									
present	0.63	64.4	160	0.61	72.9	240	0.62	73.0	100
absent	0.37	43.6	234	0.39	56.5	432	0.37	47.2	123
<i>Range</i>	26			22			25		
<b>PURPOSE PHRASE</b>									
present	0.60	58.7	138	0.57	68.1	263	[]	52.5	61
absent	0.41	48.4	256	0.43	58.7	409	[]	61.1	162
<i>Range</i>	19			14					
<b>PURPOSE PHRASE:AGE</b>									
absent:younger	[]	54.1	135	[]	61.2	188	0.65	73.7	114
present:younger	[]	60.0	55	[]	73.8	126	0.55	56.1	41
present:older	[]	57.8	83	[]	62.8	137	0.55	45.0	20
absent:older	[]	42.1	121	[]	56.6	221	0.27	31.2	48
<i>Range</i>							38		
<b>SEX</b>									
female	[]	53.4	223	[]	62.3	324	0.58	68.9	122
male	[]	50.3	171	[]	62.4	348	0.42	46.5	101
<i>Range</i>							16		
<b>EO (log-odds)</b>		NA			−1.61			[]	

Table 3: Significant factors constraining verb-framing (VF) of Deixis in self-motion events, with SPEAKER as a random intercept. Square brackets indicate that the factor is not significant. NA = not applicable.

As presented in the models in Table 3, five factors have been found to be relevant in constraining V-framing of Deixis in self-motion events: the presence of a locative object, the presence of a purpose phrase, age, sex, and the EO score. In all three generations, the presence of a locative object was consistently found to be a significant factor, where its presence favours V-framing. The presence



of a purpose phrase was found to favour V-framing in homeland and heritage Gen1. In heritage Gen2, the interaction of the presence of a purpose phrase and age was found to be significant; in particular, it shows that younger speakers use V-framing more than older speakers, and that younger speakers show a flipped ranking of factor levels for the presence of purpose phrase compared to all the other speakers. The speaker’s sex was found to be a significant factor in heritage Gen2, where female speakers favour V-framing more than male speakers. The EO score was only a significant factor in heritage Gen1, where a high EO score disfavours V-framing. These results suggest that there is no indication of change in the homeland, and that there is change occurring in the heritage speakers.

4.3.2 Path

	Homeland			Gen1			Gen2		
Total <i>N</i>	266			396			171		
AIC	238.91			343.75			124.52		
	FW	% VF	<i>N</i>	FW	% VF	<i>N</i>	FW	% VF	<i>N</i>
<b>LOCATIVE OBJECT</b>									
present	0.66	91.3	127	□	83.3	187	□	91.7	96
absent	0.34	74.1	139	□	81.3	209	□	78.7	75
Range	32								
<b>PURPOSE PHRASE</b>									
present	□	86.5	52	0.68	92.9	84	0.80	96.3	27
absent	□	81.3	214	0.32	79.5	312	0.20	84.0	144
Range				36			60		
<b>DEIXIS</b>									
absent	□	88.2	102	0.64	88.9	190	□	92.4	105
present	□	78.7	164	0.36	76.2	206	□	75.8	66
Range				28					
<b>DEIXIS:AGE</b>									
absent:younger	□	87.7	57	□	89.4	66	0.86	96.9	65
absent:older	□	88.9	45	□	88.7	124	0.53	85.0	40
present:older	□	83.7	98	□	76.9	121	0.36	79.3	29
present:younger	□	71.2	66	□	75.3	85	0.20	73.0	37
Range							66		
<b>EO (log-odds)</b>		NA			-2.21			□	

Table 4: Significant factors constraining verb-framing (VF) of Path in self-motion events, with SPEAKER as a random intercept. Square brackets indicate that the factor is not significant. NA = not applicable.

Five factors have been found to constrain V-framing of Path; in addition to the presence of a locative object, the presence of a purpose phrase, age, and the EO score, which were significant factors for Deixis, and the presence of Deixis was also found to be relevant to the encoding of Path, as shown in Table 4. Unlike with Deixis, speaker sex was not found to be a significant factor. The presence of a locative object was only significant for the homeland group, and it was the only significant factor for this group. As with the case of the V-framing of Deixis, presence of a locative object favours V-framing of Path in the homeland group. With the heritage speakers, two linguistic factors replaced the presence of a locative object, namely the presence of a purpose phrase and the presence of Deixis; the presence of a purpose VP favours V-framing, and the presence of Deixis disfavors it. In Gen2, the presence of Deixis interacts with age, where the presence of Deixis has a greater effect in younger speakers than in older speakers. Gen1 also has the EO score as a significant factor, which similar to the Deictic tokens, has a negative correlation with V-framing. As with Deixis, these results suggest that no change is occurring in the homeland population, but change has occurred among the heritage speakers.

#### 4.4 Summary

Table 5 summarizes the findings above. For Deixis, homeland and Gen1 have identical models other than the addition of the EO score; Gen1 and Gen2 have similar models, and it indicates a change that flips the ranking of the factor levels of the presence of a purpose phrase, adds a significant sex-based effect, and loses the EO effect. For Path, there is a stark difference between the homeland and heritage models; it indicates a change, exchanging the presence of a locative object with two other linguistic factors. From Gen1 to Gen2, the change is an increase in importance for the presence of Deixis.

Factor	Deixis			Path		
	Homeland	Gen1	Gen2	Homeland	Gen1	Gen2
EVENT TYPE	caused motion is categorically S-framed			caused motion is categorically S-framed when Locative, Deixis, and/or Purpose are present		
LOCATIVE PURPOSE	present present	present present	present present (older), absent (younger)	present NS	NS present	NS present
DEIXIS AGE	NA NS	NA NS	NA interacts with Purpose	NS NS	absent NS	absent interacts with Deixis
SEX	NS	NS	female	NS	NS	NS
EO	NA	lower	NS	NA	lower	NS

Table 5: Factors that favour V-framing of Deixis and Path. NA = not applicable; NS = not significant.

## 5 Discussion

### 5.1 Linguistic Factors

The multivariate models that emerged from the data suggest that linguistic factors are generally more important than social factors in determining the variation, which is consistent with other variationist sociolinguistic work on heritage languages.

The clearest effect is the event type effect, which yielded some categorical results. Caused motion events clearly favour S-framing of both Deixis and Path. While V-framing of caused motion events is a possibility in Cantonese, it seems to be constrained by a crosslinguistic tendency to disfavour V-framing of caused motion. Within the Chinese languages, Mandarin and Wu do not allow V-framing to express caused motion, and it has been rare to find in narratives even in Cantonese (Yiu 2014). This tendency is also observed in German (S-framed), Polish (S-framed) and even Spanish (V-framed) (Lewandowski 2021). This may be explained by the fact the caused motion events imply an additional participant in the event when compared to self-motion events, which means that introducing a co-event verb would allow further description of the Manner of causation (Lewandowski 2021). This explanation is also supported by the variety of co-event verbs in caused motion events, which is higher than that in self-motion events.

The presence of a locative object favours V-framing of Deixis in all three generations, while for Path, this effect is only significant for homeland speakers. One possible explanation for this effect is that when the locative object, which is a Ground element, is focused on, it competes with the co-event within the speaker's attention (cf. Chau 2006:5). This may also explain why presence of Deixis alongside Path disfavors V-framing, at least in the heritage speakers. In general, in Cantonese, Path usually requires (at least pragmatically) Ground in the form of a locative object or Deixis (Yiu 2014).<sup>8</sup> When Path is S-framed, there is more focus on the co-event, which may make

<sup>8</sup>Matsumoto and Kawachi (2020:10) consider Deixis to be “a combination of a Vector plus a (very special)

use of a more “lightweight” specification of Ground—Deixis—more likely than when there is no co-event (V-framed).

## 5.2 Forces of Change in Motion Event Expression

The two types of directional morphemes allow us to see two distinct cases of change in the heritage population. In the case of Deixis, homeland and Gen1 pattern together, meaning that the innovation is in Gen2. In particular, the younger Gen2 speakers have flipped the effect of purpose phrase presence: S-framing of Deixis is more favoured when the purpose phrase is present than when it is absent. This innovation does not support the prediction that heritage speakers have simplified speech because S-framing is assumed to be more structurally complex than V-framing (Lin and Nicoladis 2018). It is also difficult to attribute the change to contact with English because the innovation favours S-framing of Deixis, which is not available in English. In the case of Path, Gen1 is shown to be the innovative group, and Gen2 has inherited the innovation. The significant factors of purpose phrase and Deixis presence seem to show an increase of factor significance at the expense of losing the significance of locative object presence. It is difficult to ascertain the exact reasons for such a radical difference between the homeland and heritage variable systems, but the significance of these new factors may be accounted for by universal principles, as explained in the previous sections.

The EO scores indicate that in Gen1, both Deixis and Path are more V-framed for speakers with lower EO scores. This is unlikely to be due to contact with English because while it is in the expected direction for Deixis (as English only has V-framed Deixis), it is in the opposite direction for Path. While it may be possible to attribute this effect to structural simplification, as V-framed structures are simpler than S-framed ones, it seems unlikely because the effect is not clear in Gen2 speakers, who generally have lower EO scores than Gen1 speakers. The models also show an addition of significant factors, which would go against simplification of the grammar (in another sense).

In sum, there is not much evidence that the changes in the heritage speakers are due to incomplete grammars or contact with English. Instead, these changes may be language-internal.

## 6 Conclusion

This study has demonstrated that variation in motion event expression in Cantonese is constrained by various linguistic factors. The insignificance of social factors in the homeland indicates that the variation in motion event expression is stable in HKC. Changes are observed in THC, but they are not likely to be attributable to contact with English or attrited grammar. This continues a trend in variationist sociolinguistic studies of heritage languages in which minimal contact-induced change and attrition effects are observed.

The patterns also show that Gen1 could be inheritors of homeland patterns (as in the case of Deixis) or innovators that pass down their innovations to Gen2 (as in the case of Path), indicating that they are a critical population to observe. This illustrates the need for multiple comparisons in heritage language studies to have a better understanding of variation and change in heritage languages (Nagy 2011, Tse 2016). Having the homeland and Gen1 speakers as two “baselines” for Gen2 gives a better sense of the trajectory of change in heritage languages.

While this study has shed some light on the linguistic constraints on encoding strategies in Cantonese, it has several inadequacies that can be remedied with further research. Due to the nature of the data, it was difficult to obtain a full range of event types, particularly the expression of non-agentive events. Other methods, such as targeted elicitation with eye-tracking, may be needed to elicit more data on event types not found in interviews and examine on-line processing of events. Furthermore, without a comparable study of motion event expression in English, it is too quick to dismiss the possibility of contact-induced change altogether. These investigations in the future would situate the patterns observed in this study in a fuller picture, further teasing apart the different forces that shape the heritage grammar.

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Ground (i.e., first person”).

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