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An acceptability study of triadic constructions in Hong Kong Cantonese

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Abstract

This paper investigates age-graded variation in the use of the Inverted Double Object Construction (IDOC) in Hong Kong Cantonese. IDOC is unique because it is currently only attested in Cantonese, not in Mandarin or English, and its grammaticality is determined by prosodic factors rather than purely syntactic ones; however, its use is now declining. We conducted a web-based acceptability task using audio stimuli that contrasted different types of direct objects (DO) and indirect objects (IO), and the presence or absence of a pause between DO and IO. The effect of age was also analysed. Participants were asked to rate test sentences produced with neutral focus intonation on a Likert scale. Our results showed that the acceptability of IDOC was determined by (i) the prosodic weight of IO; (ii) the relative prominence of DO and IO; (iii) the presence of a pause; and (iv) listeners' age.

Keywords: Triadic construction; Cantonese; Prosody; Relative prominence; Age-graded variation; Prosodic syntax

1. INTRODUCTION

The Inverted Double Object Construction (IDOC) is a non-canonical triadic construction attested in Hong Kong Cantonese (HKC) and its grammaticality is observed to be bound by a multitude of constraints, syntactic or otherwise. Here we present firsthand data on its age-graded variation with a view to understanding this lesser-studied construction from both linguistic and social perspectives. This construction is particularly interesting as it is only found in Cantonese and not in Mandarin or English. Moreover, the use of IDOC with matrix verbs other than *bei2* 'give' seems to have become less frequent nowadays, particularly among the younger generations (Tong, 2018). The cause of this change remains unclear, though language contact may be a conceivable reason since Hong Kong is a bilingual society with both Chinese and English as its official languages. Since IDOC does not exist in written Chinese, Mandarin, or English, well-educated young people may perceive it as an ungrammatical construction.

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1.1. Triadic constructions in Hong Kong Cantonese

In HKC, there are three attested triadic constructions: the Double Object Construction (DOC), the Prepositional Dative Construction (PDC), and the non-canonical Inverted Double Object Construction (IDOC) (Tong, 2018).

(1) Double Object Construction (DOC): S V IO DO

a.	*Ngo5*	*gaau3*	*keoi5*	*zung1man4*		
	I	teach	him	Chinese		
	'I teach him Chinese.'					
b.	**Ngo5*	*sung3*	*keoi5*	*jat1*	*bun2*	*syu1.*
	I	send	him	one	CLF	book
	'I send him a book.'					

(2) Prepositional Dative Construction (PDC): S V DO P IO

a.	**Ngo5*	*gaau3*	*zung1man4*	*bei2*	*keoi5.*		
	I	teach	Chinese	to	him		
	'I teach Chinese to him.'						
b.	*Ngo5*	*sung3*	*jat1*	*bun2*	*syu1*	*bei2*	*keoi5.*
	I	send	one	CLF	book	to	him
	'I send a book to him.'						

(3) Inverted Double Object Construction (IDOC): S V DO IO

a.	**Ngo5*	*gaau3*	*zung1man4*	*keoi5.*		
	I	teach	Chinese	him		
	'I teach Chinese to him.'					
b.	*Ngo5*	*sung3*	*jat1*	*bun2*	*syu1*	*keoi5.*
	I	send	one	CLF	book	him
	'I send a book to him.'					

In HKC, the DOC shown in example (1b) is not considered grammatical for conveying the transition of a direct object (DO) from the subject to the indirect object (IO). Instead, it serves different semantic purposes compared to the constructions in examples (2) and (3). Native speakers only use the PDC and the IDOC in examples (2) and (3) to express the semantic meaning of the transition of DO from the subject to the IO. The main difference between PDC and IDOC is the absence of the overt preposition *bei2* between the DO "book" and the IO "him" in IDOC, as shown in example (3b). PDC, shown in example (2), is used by speakers of all ages in HKC, while IDOC, shown in example (3), is grammatical but less frequently used (Tong, 2018). The following discussion will further explore the details of PDC (2) and IDOC (3).

1.2. Previous studies on IDOC

There are two prevailing accounts in the literature on how IDOC might have formed. One argues that IDOC was transformed from DOC. Another account contends that IDOC was formed by the omission of the preposition in a PDC (Bennett, 1979; Xu and Peyraube, 1997; Tang, 1998,2003). Tang (1998, 2003) proposed the above hypothesis based on Qiao's (1966) speculation on IDOC's possible acoustic correlates. Qiao (1966) claimed that there should be a pause between the DO and the IO. Tang (1998, 2003) further suggested that the pause duration of IDOC could be twice that of DOC, and he also observed that some native speakers tended to lengthen the last syllable of the IO, which was not in the final position of the construction. Tang (1998, 2003) claimed that his assumption could be accounted for under Selkirk's (1984) silent demibeat addition hypothesis. According to Selkirk (1984), a silent demibeat

is added at the end of a word; therefore, Tang (2003) suggested that there should be one demibeat following the DO and another demibeat following the covert preposition, resulting in two demibeats between the DO and IO in an IDOC, as in example (4), where 'x̲' represents a silent demibeat and 'Ø' stands for the null preposition. Compared with DOC in example (5), there should be only one demibeat between IO and DO as there is no covert preposition in between.

(4) Inverted Double Object Construction (IDOC):
. . . DO x̲ Ø x̲ IO. . .

(5) Double Object Construction (DOC):
. . . IO x̲ DO. . .

As Qiao (1966) and Tang (1998, 2003) were based on anecdotal evidence, it is important to find out the actual pause duration between the DO and IO in an IDOC through a carefully designed speech production experiment.

Tang (1998, 2003) and Tong (2018) pointed out that IDOC is also constrained by the choice of the matrix verb. The absence of an overt preposition is uniformly highly preferable when the matrix verb is *bei2* 'give', which is homophonous with the preposition *bei2* 'to'. The absence of the overt preposition was caused by phonological identity avoidance (Tang, 1998), whereas the preferability of the absence of overt preposition in IDOC with a matrix verb other than *bei2* 'give' is uncertain. Hence, we excluded IDOC with the matrix verb *bei2* 'give' from our consideration here.

Among these two types of IDOC, the one with the matrix verb *bei2* 'give' results from phonological identity avoidance, and the one with matrix verb other than *bei2* does not. Tong (2018) proposed that the latter was a kind of prosodic (re-)phrasing, which was used to shift focus. After deleting the preposition, the IO was cliticized on the phonological unit containing the DO. A clitic is 'a word that is stressless and immediately adjacent, juncturally or rhythmically speaking, to what follows or what precedes' (Selkirk, 1984). This explains why putting a heavy IO in IDOC was ungrammatical in HKC, as a heavy IO could not be cliticized (Tong, 2018). Prosodic (re-)phrasing, also known as 'boundary narrowing', might be the more universal correlate of focus, as proposed by Downing et al. (2004), Downing (2008), Ladd (1996) and Hayes and Lahiri (1991).

(6) Forming an IDOC from the deletion of preposition in a PDC:
V DO ~~P~~ IO

(7) Prosodic rephrasing:
(V DO)(IO) → (V DO IO) (Tong, 2018: 138)

(8)	*Ngo*	*sung*	*joeng*	*je*	**loeng*	*go*	*sai-lou/*	*maa-maa/*	*nei.*
	I	send	CLF	something	two	CLF	kid/	mother/	you
	'I send something to two kids/ mother/ you.' (*heavy IO)						(Tong, 2018: 113)		

1.3. The present study

In currently prevailing syntactic theories, across languages, sentence structures are thought to be governed by a small set of universal syntactic rules (Chomsky, 1971, 1981) known as Universal Grammar. However, a recent line of work led by Feng (1995, 2013) (known as 'Prosodic Syntax') has demonstrated prosody as an additional dimension to explaining grammar. That is, (i) an otherwise grammatical sentence can be ungrammatical due to prosodic reasons. For example, it is grammatical to say *du2 bao4* "read newspaper" but ungrammatical to say *yue4du2 bao4* "read

newspaper" (see Lu and Duanmu, 2002), and (ii) prosodic constraints can make an otherwise uneconomical sentence structure the preferred one, e.g. it is grammatical to say 'he put something on the chair' as 'Ta1 [[fang4-zai]le] yi3zi shang (He put-on ASP chair LOC)' but ungrammatical to say 'Ta1 [fang4-le] zai yi3zi shang (He put-ASP on chair LOC)' in Beijing Mandarin (see Feng, 2003). Similarly, there are prosodically constrained cases in our target language, HKC. For example, in HKC direct long passives, whenever there is a resumptive pronoun embedded, there must be an extra constituent, such as a frequency phrase, following that resumptive pronoun. Therefore, it is grammatical to say 'Zoengsaam is hit by the policeman' as 'Zoeng1saam1 bei2 ging2caat3 daa2-zo2 keoi5 jat1 haa5 (Zoengsaam PASS policeman hit-ASPECT him one slap)' but ungrammatical to say 'Zoeng1saam1 bei2 ging2caat3 daa2-zo2 keoi5 (Zoengsaam PASS policeman hit-ASPECT him)' (see Tong, 2017).

The phenomena mentioned above cannot be otherwise explained by purely syntactic rules, as they only regulate the syntactic structure of a sentence without considering prosodic information. For instance, both 'du2 bao4 "read newspaper"' and 'yue4du2 bao4 "read newspaper"' have a syntactic structure of [V O], hence the ungrammaticality of 'yue4du2 bao4 "read newspaper"' could only be attributed to prosodic reasons. Since the verb is a non-nuclear stress position while the object is, the verb cannot have more syllables than the object in Chinese.

IDOC in HKC presents exactly this case (*cf.* example (3b)). Firstly, the acceptability of IDOC is influenced by the prosodic weight of DO and IO, as will be shown in §1.3.1 and §4.2.1, which is not permitted in a purely syntactic framework. Secondly, IDOC is an abnormal and uneconomical triadic construction which should not exist without proper prosodic motivation, as stated in (ii). We are going to show in §4.2.1 that the prosodic weight of DO and IO is also related to the location of the nuclear stress.

Earlier work on prosodically constrained syntax has mainly taken a formal approach drawing on typological evidence. However, recently there is a growing body of empirical studies in this line of research (mainly on Chinese languages). Deng et al. (2008) conducted acceptability tasks and acoustic measurements (N = 32) to demonstrate that the transitivity of Mandarin complex verbs is constrained not only by the number of syllables they contain but also by their duration. Duanmu et al. (2018) conducted a judgment study (N = 18) to confirm that the choice of form, monosyllabic or disyllabic, used in Chinese [VO] phrases is prosodically constrained. Experimental verification (N = 15) on word length preference in Chinese [NN] compounds was conducted in Qin and Duanmu (2017), and the length preference of Chinese nominal structures in which an adjective modifies a noun was also confirmed by judgment tasks (N = 25) in Xue and Duanmu (2018). These studies have enriched formal research in prosodically constrained syntax; however, the number of participants in these experiments was relatively small. When encountering more unique structures, such as the non-canonical IDOC in Cantonese, it is necessary to expand the scale of the experiments to better understand the overall usage patterns within the speech community.

The present study seeks to unveil the linguistic and social factors that constrain the presence or absence of an overt preposition in triadic constructions. The absence of overt preposition results in IDOC, and IDOC is a construction attested in Cantonese but not in other Chinese languages, like Mandarin. Specifically, we will examine if the following factors influence native speakers' acceptability judgment: i) the prosodic weight of IO; ii) the presence or absence of pause between the DO and the IO; and iii) the age of the speakers.

1.3.1. The weight of IO

Previous studies on HKC triadic constructions are couched within purely syntactic frameworks, which are not sufficient to uncover the whole picture of the use of IDOC as IDOC is not always grammatical or preferable in conveying the transition of DO from the subject to the IO. As observed by Xu and Peyraube (1997), a 'prosodically heavy' IO is less likely to follow the DO in IDOC. This claim was supported by Tong (2018).

According to Tong (2018), the nuclear stress position of IDOC was found to be associated with the DO while the IO was a non-nuclear stress position. IDOC is argued to be prosodically motivated by a focus shift from IO to DO, therefore, only a 'light' enough IO should trigger its formation. Syntactic focus marking in tonal languages like Mandarin or Cantonese do not have clear phonetic cues (Kügler and Calhoun, 2020), therefore, researchers try to weigh the heaviness of constituents by the number of syllables of the constituents and the definiteness of the DPs. Lu and Duanmu (2002) listed two rules to account for the weight of the constituents in Mandarin.

(9) Nonhead Stress Rule

In a syntactic head-nonhead (or a nonhead-head) relation, the nonhead has greater stress than the head. (Lu & Duanmu, 2002: 124)

(10) Nonhead Length Rule:
In a syntactic head-nonhead (or a nonhead-head) relation, the head cannot have greater length than the nonhead. (Lu & Duanmu, 2002: 124)

In short, a longer constituent is usually heavier than a shorter one. In HKC, a single pronoun is only 1 syllable-long, whereas other noun phrases are usually more than 2 syllables in length. Moreover, according to Feng (2013), the weight of DPs is ordered as 'Pronoun < Definite Noun < Indefinite Noun' from light to heavy in Mandarin. Pronouns and definite nouns convey known information and are thus non-stressable.

To the best of our knowledge, there is no published research on the prosodic weight of DPs in HKC. Here we assume that HKC pronoun is also prosodically the lightest based on the above, and hence, one would expect that a light IO like a monosyllabic pronoun would be associated with higher acceptability of IDOC.

On the contrary, a heavy IO would be associated with lower acceptability of IDOC. However, the proper characterization of heaviness is also a problem. Syntactic branchingness alone is not sufficient to qualify an NP as heavy, whereas prosodic branching is the proper characterization of heavy NP in English (Inkelas, 1991). As there is no previous study on the prosodic weight of NPs in HKC, we also include branched NP (both syntactically and prosodically branched NP) in our study, to see whether there are significant differences between short NP, long NP and branched NP in HKC.

1.3.2. The absence of pause between IO and DO

As mentioned in §1.2, our target construction, IDOC with a matrix verb other than *bei2* 'give', is possibly a result of prosodic (re-)phrasing, which is used to shift focus from IO to DO.

According to Cinque's (1993) Depth Stress Principle, the most embedded constituent is given prominence. Therefore, in a PDC with an overt preposition, IO is given prominence and bears focus. In this case, the phonological unit coincides with the syntactic constituent (*cf.* example (11)), and the focus is not only borne by the most embedded syntactic constituent but also the last phonological unit. The case of an IDOC without cliticization is also the same, as in example (12).

(11) PDC:

[	V	DO	[	P	IO	]]
(	V	DO	)(	P	IO	)

(12) IDOC without cliticization:

[	V	DO	[	IO	]]
(	V	DO	)(	IO	)

Therefore, we have to eliminate the boundaries between the two phonological units to embed DO in the last phonological unit. To do so, IO must be phonologically cliticized. As IO is phonologically cliticized to (V DO), there should be no salient pause between the DO and IO in this type of IDOC.

Based on the foregoing discussion, we also tested whether the absence of a pause was more acceptable for the targeted IDOC.

1.3.3. The age factor

During her interview with native speakers, Tong (2018) observed that some young native speakers of HKC seldom used covert preposition when the matrix verb was not *bei2* 'give', unless the IO was a pronoun. In contrast, elder native speakers showed no preference for the types of IO when using covert preposition. Therefore, the use of covert preposition is a grammatical feature that can be argued to be undergoing age-graded variation, with elder speakers favoring its use much more than otherwise. As Tong (2018) observations were based on anecdotal evidence, it would be worthwhile to investigate this age-graded variation quantitatively on a large scale in order to gain a comprehensive understanding.

1.4. Predictions

As the first large-scale empirical study on Cantonese Prosodic Syntax, we aim to test the following predictions from existing formal accounts:

- Prediction 1: Pronoun IO yields the highest acceptability ratings.
- Prediction 2: A pause between DO and IO makes IDOC less acceptable.
- Prediction 3: Elder native speakers give higher ratings than younger native speakers in general.

Prediction 1 is based on Tong (2018) hypothesis that the nuclear stress position of IDOC is found to be associated with the DO, while the IO occupies a non-nuclear stress position. A pronoun is the most preferable candidate for a non-nuclear stress position, so we predict that sentence with pronoun IO will be more acceptable.

Prediction 2 is also based on the above hypothesis that IDOC is a prosodically motivated construction. To be prosodically-rephrased, the IO should be cliticized to the phonological unit containing the DO, forming a single prosodic constituent which consists of both DO and IO. As a result, there should be no prosodic phrase boundary between DO and IO. Therefore, we assume that a clear pause, which signifies a prosodic phrase boundary between DO and IO, makes IDOC less acceptable.

Prediction 3 is based on the observation in Tong (2018) that the non-canonical triadic construction, IDOC, is documented and widely accepted by elder people but less accepted by young adults.

2. METHOD

2.1. Participants

A total of 779 participants attempted the task, with each completing 90 %−100 %. Data from 220 participants (28.2 %) who did not complete the entire task were discarded. No further manipulation was performed on the data. The participants were recruited online through social media posts. The flyer stated that elder participants (who might not be familiar with online platforms) could participate with the assistance of someone else. Participation was voluntary and not remunerated.

Table 1 provides an overview of the distribution of participants in different age and gender groups. The three age groups covering ages 18 to 35 represented 62.2 % of all participants. In subsequent data analysis, participants were grouped into three generations, namely Young (aged < 30), Mid (30 – 53), and Elder (>53). Female participants accounted for 56.2 %. Of the participants, 10.4 % self-identified as 'near-native' in **English**, and 44.2 % reported being 'proficient'. For **Mandarin**, 6.4 % self-identified as having 'near-native' proficiency, while 27.4 % reported being 'proficient'. In general, younger participants had higher proficiency in English and Mandarin than elder ones. Further details can be found in Appendix B.

2.2. Materials

The target construction of our study is solely the IDOC with a matrix verb other than *bei2* 'give', as our main concern lies in the prosodic constraints of pauses and prosodic weight of IO and DO imposed on the non-canonical IDOC. Therefore, the test sentences are all IDOC [S V DO IO] with a main verb other than *bei2* 'give', and the distractors are IDOC with the main verb *bei2* 'give'. IDOC with the main verb *bei2* 'give' are used as distractors, as it is the standard usage in HKC and should yield higher ratings.

For the linguistic factors, the task was designed to reveal whether (i) the prosodic weight of the DO and IO, and (ii) the presence of silence pause between the DO and IO are related to the acceptability of IDOC sentences.

Table 1
Demographic overview of participants (N = 559).

Age	<18	18–23	24–29	30–35	36–41	42–47	48–53	54–59	60–65	>65	Grand Total
Female	1	44	65	78	49	34	19	19	4	1	314
Male	5	49	63	49	25	24	15	7	3	5	245
Subtotal	6	93	128	127	74	58	34	26	7	6	559

We designed five sets of test sentences and one set of distractors with the same syntactic construction as [S V DO IO]. The sentences within a set were minimal pairs. We controlled the subject, matrix verb and tense to be the same within a set of sentences to keep the variation to a minimum. There were 4 kinds of variants for both DO and IO in an IDOC, namely pronoun (e.g. *keoi5* 'him'), short noun phrase (NP) (e.g. *maan6-waa2* 'comics'), long NP (e.g. *zeoi3 san1 ceot1 baan2 go2 bun2 maan6-waa2* 'the latest comic') and branched NP (e.g. *loeng5 bun2 baak3-fo1-cyun4-syu1 tung4 jat1 zi1 bat1* 'two encyclopedias and one pen'). Therefore, there were 16 conditions for each set of sentences as listed in Table 2.

To test whether the presence of a silence pause between the DO and IO affects the acceptability of IDOC sentences, we chose to artificially insert a pause into naturally produced sentences for better experimental control.

To determine the best duration of the inserted pause, which represents the covert preposition *bei2* 'to', between the DO and the IO, we chose a silence duration shorter than a clause pause but longer than a boundary, and it should be audible. However, phonetic cues to a phrase boundary are often weak in tonal languages (Kügler and Calhoun, 2020), and there is currently no published study that can provide a reference value for this purpose. Hence, we interviewed 10 native speakers and asked them to listen to 8 IDOC sentences with an artificially inserted pause ranging from 30 ms to 100 ms in duration. They were asked to comment on whether the pause in question was clearly audible. Based on their comments, we decided to insert an 80 ms duration between DO and IO, as 80 ms was the threshold for an unambiguous pause to the listeners.

After recording six sets of sentences at a normal speaking rate by a 35-year-old native speaker, a silence period of 80 ms was inserted between DO and IO to generate corresponding stimuli with a pause. Thus, there were 192 test sentences and distractors in total, including 96 sentences with an inserted pause and 96 without. Each participant underwent 32 trials which covered all six sets. All the sentences used can be found in Appendix A.

Audio stimuli were produced by a female native HKC speaker with Qualified Teacher Status in Hong Kong. She was instructed to produce the target sentences clearly without placing narrow focus on any word. The sampling rate was 44,100 Hz. The intensity of the stimuli was normalized to 70 dB after recording.

2.3. Platform

The judgement task was conducted on the online platform Qualtrics to reach a larger group of participants. Upon arriving at the landing page, participants were asked to read an information sheet explaining the nature of the experiment and their rights as a participant. They were asked to proceed only if they grant their consent to being tested.

2.4. Procedures

Participants rated the acceptability of sentences on a 7-point Likert scale. A training session with eight trials was provided to help participants get familiar with the rating scale. Then they were asked to rate 32 sentences on acceptability.

Table 2
Conditions within a set of sentences.

Condition	DO	IO	Variant A	Variant B
a	pronoun	pronoun	with pause between DO & IO	no pause between DO & IO
b	branched NP			
c	long NP			
d	short NP			
e	pronoun	branched NP		
f	branched NP			
g	long NP			
h	short NP			
i	pronoun	long NP		
j	branched NP			
k	long NP			
l	short NP			
m	pronoun	short NP		
n	branched NP			
o	long NP			
p	short NP			

As the judgement of one sentence can influence that of another if the two are too similar, a Latin Square procedure was adopted to avoid exposure effect. The test sentences are thus rearranged into three lists.

Participants listened to random test sentences and distractors produced in neutral focus prosody. One sentence was played in each trial, where participants were asked to rate the recorded sentence on a 7-point Likert scale, where 7 stands for 'very natural (acceptable)' and 1 for 'very unnatural (unacceptable)' according to their intuition.

After the test, the participants were also asked to fill in a language background survey (*cf.* Appendix B).

2.5. Data analysis

Participants' responses were analysed using a cumulative link mixed effects model using the R package *ordinal* (Christensen, 2019) (see Table 3). No transformation was performed on the response data. Model construction followed a bottom-up approach. Starting with a null model with random intercepts for subjects and sentence set, we added fixed factors of interest one by one using the likelihood ratio test *anova()*. The added fixed factor was kept if it led to significantly better ($p < 0.05$) model fit than the model without it.

In the best-fitting model, random intercepts for subjects and sentence set were included, as were by subject random slopes for **DO** and **IO**. Fixed effects included main effects of **DO** (pronoun, branched NP, short NP, long NP [underscore indicating the baseline level here and henceforth]) ($X^2(3) = 1610.918$, $p < 0.001$), **IO** (levels same as **DO**) ($X^2(3) = 135.509$, $p < 0.001$), **Generation** (young, middle-aged, elder) ($X^2(2) = 11.218$, $p = 0.004$), **Pause** (deviation-coded) ($X^2(1) = 5.654$, $p = 0.017$), as well as two-way interactions of **DO:IO** ($X^2(9) = 353.094$, $p < 0.001$) and **IO:Pause** ($X^2(3) = 25.195$, $p < 0.001$). There was no other significant fixed factor or random slope.

3. RESULTS

Fig. 1 compares acceptability ratings (scale of 1 ∼ 7) under **DO**, **IO,** and **Pause** conditions. Among different **IO** conditions, **Pronoun** yielded the highest acceptability ($M = 2.187$, $SD = 1.733$), followed by **Branched NP** ($M = 2.017$,

Table 3
Model summary of (Response ∼ (DO + IO|SubjectID) + (1|Set) + IO*DO + Generation + Pause + IO:Pause). *Baseline levels: [**Pronoun**] for **DO** and **IO; [Elder]** for **Generation**. Pr(>|t|): * <0.05, ** <0.01, *** <0.001.*

	Fixed				**Random**	
					SD	
	β	***SE***	***z***	***Pr(>|z|)***	**Subject**	**Set**
(Intercept)					1.941	0.605
($IO_{Pronoun}$)					0.983	
$IO_{BranchedNP}$	1.819	0.177	10.263	<0.001		
IO_{LongNP}	1.888	0.175	10.810	<0.001	0.472	
$IO_{ShortNP}$	0.940	0.184	5.114	<0.001	0.645	
($DO_{Pronoun}$)					1.288	
$DO_{BranchedNP}$	4.312	0.177	24.422	<0.001		
DO_{LongNP}	3.672	0.176	20.896	<0.001	0.150	
$DO_{ShortNP}$	3.260	0.177	18.437	<0.001	0.299	
$Generation_{Mid}$	−0.618	0.327	−1.890	0.059		
$Generation_{Young}$	−0.003	0.333	−0.008	0.994		
Pause	0.784	0.193	4.062	<0.001		
$IO_{BranchedNP}$:$DO_{BranchedNP}$	−2.619	0.190	−13.755	<0.001		
IO_{LongNP}:$DO_{BranchedNP}$	−2.944	0.189	−15.590	<0.001		
$IO_{ShortNP}$:$DO_{BranchedNP}$	−2.039	0.195	−10.465	<0.001		
$IO_{BranchedNP}$:DO_{LongNP}	−2.361	0.191	−12.349	<0.001		
IO_{LongNP}:DO_{LongNP}	−2.736	0.190	−14.387	<0.001		
$IO_{ShortNP}$:DO_{LongNP}	−1.833	0.195	−9.376	<0.001		
$IO_{BranchedNP}$:$DO_{ShortNP}$	−2.106	0.193	−10.895	<0.001		
IO_{LongNP}:$DO_{ShortNP}$	−2.459	0.192	−12.794	<0.001		
$IO_{ShortNP}$:$DO_{ShortNP}$	−1.703	0.198	−8.613	<0.001		
$IO_{BranchedNP}$:Pause	−0.702	0.142	−4.943	<0.001		
IO_{LongNP}:Pause	−0.544	0.141	−3.875	<0.001		
$IO_{ShortNP}$:Pause	−0.473	0.149	−3.170	0.002		

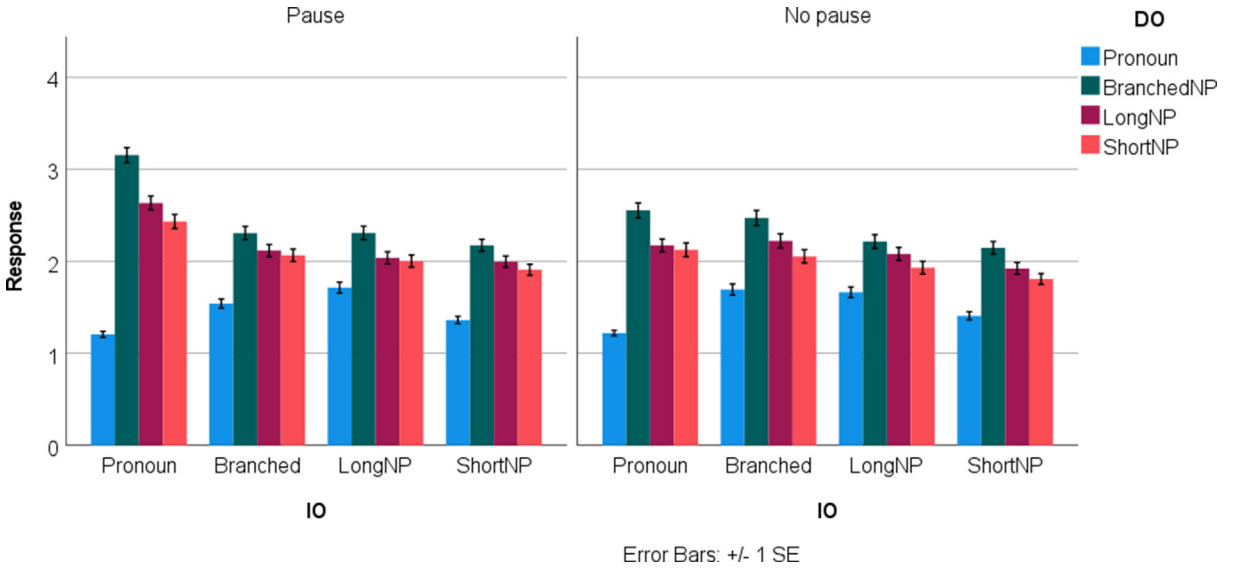

Fig. 1. Acceptability ratings under different IO, DO, and Pause conditions.

SD = 1.611), **Long NP** (*M* = 1.947, *SD* = 1.553), and **Short NP** (*M* = 1.815, *SD* = 1.387). Sentences with a **pause** (*M* = 2.054, *SD* = 1.610) were judged to be more acceptable than otherwise (*M* = 1.919, *SD* = 1.545). Among **DO** conditions, **Branched NP** yielded the highest acceptability (*M* = 2.372, *SD* = 1.769), followed by **Long NP** (*M* = 2.128, *SD* = 1.621), **Short NP** (*M* = 2.031, *SD* = 1.617), and **Pronoun** (*M* = 1.434, *SD* = 1.077).

Fig. 2 shows mean acceptability ratings of IDOC sentences under different **IO and Age** conditions. Acceptability ratings were the lowest for the age group **48–53** (*M* = 1.766, *SD* = 1.363) and the highest for those aged > **65** (*M* = 2.506, *SD* = 2.059).

DO pronoun yielded significantly lower acceptability ratings than **DO branched NP, DO long NP**, and **DO short NP** ($p < 0.001$); the same was true for **IO pronoun**, which yielded significantly lower ratings than **IO branched NP, IO long NP** ($p < 0.001$), and **IO short NP** ($p < 0.01$). Middle-aged participants gave lower ratings than their elder counterparts although the difference was non-significant ($\beta = -0.618$, $SE = 0.327$, $z = -1.890$, $p = 0.059$). Post-hoc comparisons using the *emmeans* package (Lenth, 2020) further revealed that middle-aged participants gave significantly lower ratings than young participants ($p < 0.001$). Sentences with a **Pause** yielded lower ratings than those without one ($\beta = 0.784$, $SE = 0.193$, $z = 4.062$, $p < 0.001$).

The interaction between **DO** and **IO** reflects the different relative **IO** ratings under different **DO** conditions. That is to say, while the main effect of **IO** indicates that **IO Pronoun** yielded the lowest overall ratings, followed by **IO branched NP**, **IO long NP**, and **IO short NP**, this order varied under different **DO** conditions (see Fig. 1). In fact, in all DO conditions except baseline **DO pronoun**, **IO Pronoun** instead yielded the highest acceptability ratings. The interaction

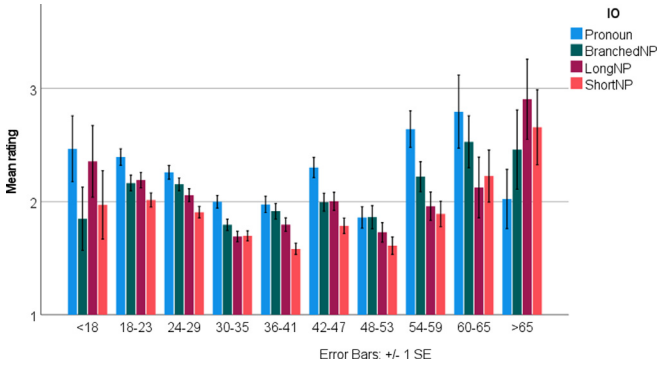

Fig. 2. Mean acceptability ratings under different IO and Age conditions.

between **IO** and **Pause** reflects that the differences between IO conditions and baseline **IO Pronoun** vary across Pause conditions. For example, in sentences with no pause **IO BranchedNP** instead yielded the highest ratings (β = −0.702, *SE* = 0.142, *z* = −4.943, *p* = <0.001).

4. DISCUSSION

4.1. Summary of findings

This paper set out to test the following: (Prediction 1) Pronoun IO yields the highest acceptability ratings; (Prediction 2) A pause between DO and IO makes IDOC more unacceptable; and (Prediction 3) Elder native speakers give higher ratings than younger native speakers in general. Table 3 and Fig. 1 showed that IO pronoun yielded the highest acceptability in general, thus supporting Prediction 1; the presence of an artificial silence duration of 80 ms yielded lower ratings than otherwise for all conditions except under DO pronoun, thus supporting Prediction 2; the elder generation did not give higher ratings than young participants, thus refuting Prediction 3.

4.2. Predictions supported

4.2.1. IO pronoun yielded the highest acceptability rate (Prediction 1)

We removed IDOC with matrix verb *bei2* 'give' which was formed by phonological identity avoidance in our study as mentioned in §1.2. Therefore all the IDOCs we were looking at were those proposed to be formed by prosodic (re-) phrasing by Tong (2018). This kind of IDOC was suggested to be motivated by the shift of focus from the IO to the DO, and it resulted in the IO being cliticized onto the phonological phrase in which the DO was embedded. The IO should be light enough to be cliticized. Pronoun IO is definite and only 1 syllable in length, that it yielded the highest ratings lends support to our assumption that HKC pronoun is prosodically the lightest, hence the most suitable IO for an IDOC formation. This trend could not prevail under DO pronoun as DO pronoun was unfavored prosodically. The information it conveys is given, therefore the pronoun DO is less prominent (*cf.* §1.3.1), which makes DO pronoun not suitable to sit in a nuclear stress position. Moreover, based on the study of the interaction of syntax and prosody, the notion of stress was determined in a relation (Liberman and Prince, 1977; Zubizarreta, 1998), which can also be named as 'relative prominence'. Zubizarreta (1998) further suggested a focus prominence rule based on this relation.

(13) Focus prominence rule
Given two sister nodes Ci (marked [+F]) and Cj (marked [-F]), Ci is more prominence than Cj. (Zubizarreta, 1998: 88)

DO pronoun was too light to bear the focus of an IDOC, thus the focus shifting was doomed to failure, and hence for all IO conditions under DO pronoun, they probably yielded significantly lower ratings than other DO conditions. Under DO pronoun, IO pronoun yielded the lowest acceptability, followed by Short NP, Branched NP and Long NP. This reversed trend suggests that although the shift of focus is aborted, the relative prominence should be maintained by matching a relatively heavier IO to this light DO pronoun.

4.2.2. The presence of a pause yielded lower ratings (Prediction 2)

The presence of 80 ms silence duration yielded lower ratings than the absence of such, supporting Prediction 2. Prediction 2 was proposed based on Tong (2018) prosodic (re-)phrasing hypothesis. If IDOC was formed by cliticizing IO to the prosodic phrase DO was embedded in, it was natural to deduce that there would be no salient pause between DO and IO. This result supported our assumption in §1.2 that HKC IDOC should be divided into two types, as they have different driving force for their formation. The targeted IDOC, the one with matrix verb other than *bei2* 'give', is supported to have a reformation of prosodic unit as mentioned in §1.2 and §1.3.2 as the absence of pause symbolizes the elimination of the prosodic boundary between DO and IO. Therefore, 'prosodic (re-)phrasing' is a correlate of focus in HKC based on the findings in §4.2.1 and §4.2.2.

4.3. Predictions not borne out

4.3.1. Elder native speakers give higher ratings (Prediction 3)

Syntactic variables are argued to be less disposed to social stratification than phonological and lexical variables (Romaine, 1984; Cheshire, 1996; Winford, 1996); however, our results suggest otherwise. Apart from linguistics factors,

we also investigate whether broad social factors might have conditioned the syntactic variation in forming triadic constructions in HKC in this research. Although elder native speakers did not give higher ratings than younger native speakers, Fig. 2 shows that middle-aged participants gave slightly lower ratings than their elder counterparts. The ratings given by young (<18, 18–23, 24–29), mid (30–35, 36–41, 42–47, 48–53) and elder (54–59, 60–65, >65) generations form a u-shaped curve. The result suggests that there is age-graded variation in the acceptability of IDOC; both elder and young generations favor it more than the mid generation.

The age groups vary in their education levels as well as language proficiency in English, Mandarin, and Chinese writing (Appendix B). This reflects the ecological validity of the Hong Kong population, where the younger generation generally is more proficient in English and Mandarin compared to other generations (Hong Kong Special Administrative Region, 2022). However, one might expect that higher language proficiency in English and Mandarin would lead to lower ratings, but our results suggest otherwise. The ratings given by the young generation are significantly higher than those of the mid generation, providing evidence that the effect of age is robust.

The ratings given by the mid generation are significantly lower than those of the young generation, which supports the view that there is an age-graded variation occurring in Hong Kong Cantonese. Our targeted IDOC is not favored nowadays, based on two reasons, (i) the acceptability ratings for all sentences were rather low, suggesting that the targeted construction is not the most favorite construction even with a suitable prosodic condition, and (ii) the young generation gave higher ratings than their middle-aged counterparts, which is in line with the common pattern that middle-aged (in their 40 s) speakers tend to use the formal, standard variety, while adolescents use vernacular forms more frequently (e.g. Downes (1998) who compared gender-based differences in language use across numerous speech communities; Grama et al (2023) who demonstrated the linguistic and social mechanism underlying age-grading in Tyneside English speakers).

4.4. Limitations

To study the linguistics and social factors of language variation and change, we should carefully control the tested sentences and the stimuli to ensure their naturalness.

One limitation of our study was that the duration of pause was inserted artificially instead of being produced naturally. This might have reduced the naturalness of our stimuli sentences and, in turn, affected the ratings given by the participants. However, we preferred this approach to hold all other conditions constant, to test only the influence of the presence or absence of the pause on the acceptability rate.

Secondly, as the targeted IDOC is not favored nowadays. Although the acceptability ratings show significant differences, most participants gave rather low ratings to all sentences.

Lastly, this study was an online experiment open to all native HKC speakers, where demographic information, including age, was collected after the task was completed. Consequently, the sample was inevitably unbalanced. While we have used mixed-effects modelling which is suited for analysing data with unbalanced sample sizes, admittedly, it would have been ideal to have more elder participants. Future studies could verify our findings with more elder participants.

5. SUGGESTIONS FOR FURTHER RESEARCH

We have shown the linguistics and social factors of the variation and change in HKC IDOC, and there are two suggestions for future study.

Our study suggests that IDOC is not favored nowadays, PDC is more preferable than IDOC in most circumstances. This age-graded variation is not just about age but might also be related to education background. According to Chambers, 'Grammatical variables tend to mark social stratifications more sharply than phonological ones, and so most grammatical variables function as class makers (Chambers, 2003)', 'this is especially true of grammatical features that are stigmatized, that is, features that are subject to overt comment in the community and are "corrected" by teachers and parents when they are used in social settings where standard speech is expected. (Chambers, 2013)' Grammatical variation is represented in the written language and more likely to be included in the curriculum of the education system. HK is a bilingual society, in which the official written languages are Chinese and English. However, in both languages, the use of covert preposition as in IDOC is ungrammatical whereas the use of overt preposition *bei2* 'to' as in PDC is grammatical. Therefore, it is highly possible that these syntactic variations are exposed to evaluation, in which, the 'correct' PDC is elevated and the 'incorrect' IDOC is marginalized. Overt evaluation might be one element at play, but it might play a minor role. Further studies are needed to discover whether there are significant differences between the more educated and the less educated individuals.

As the first empirical study on HKC IDOC, here we have presented firsthand acceptability data on this understudied phenomenon. Future researchers could consider conducting a production study to examine whether the current findings are echoed in native speakers' actual speech.

6. FURTHER IMPLICATIONS

In previous studies of Chinese dialects, linguists usually focused their research within a pure syntactic or phonetic framework. However, our study suggested that IDOC in HKC is constrained by the relative prominence of the objects in the nuclear stress domain (*cf.* §4.2.1). Hence, it appears to also suggest that an interface of syntax and prosody might broaden the explanation power when confronted with some otherwise strange constructions. Some of the differences in constructions between Chinese dialects might be constrained by prosody instead of just syntactic constraints. For example, Tong (2018, 2023) suggested that the prosodic properties of prepositions in each Chinese dialect (*esp*. the type of nuclear stress rule applicable to that dialect) might be a major predictor of the kinds of prosodic syntax phenomena observed.

Moreover, our results suggested the linguistic factors that constrained the use of IDOC; these observations would be helpful for the language learners of HKC.

7. CONCLUSIONS

Our study examined a non-canonical triadic construction in HKC, and with a quantitative analysis, the results demonstrate that HKC speakers use covert preposition variably in IDOC with matrix verbs other than *bei2* determined by a suite of strong linguistic and social contexts:

- with lighter IO;
- with no pause between DO and IO;
- with elder generation.

Our results show that the acceptance rate of using IDOC with matrix verbs other than *bei2* is constrained by prosodic factors. Native speakers prefer a light IO to shift focus successfully from IO to DO.

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CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Angel Man-Shan Tong: Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Albert Lee:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Methodology, Formal analysis, Conceptualization.

Data availability

Data will be made available on request.

Declaration of competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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APPENDIX A. SUPPLEMENTARY DATA

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