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The semantics of embedding predicates influence the acceptability of internally headed relative clauses in Korean

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Abstract: This study examines whether embedding predicates' semantic type affects the acceptability of internally headed relative clauses (IHRCs) in Korean. Existing studies on Korean IHRCs have primarily focused on their highly limited distribution, employing three research approaches to understand their restricted use: (i) explaining their formal restrictions using a set of rules; (ii) describing how they are used with naturally occurring data; (iii) refuting their existence as an independent construction in Korean by providing alternative explanations for how the interpretation of IHRCs is construed. Although these approaches have significantly enhanced the understanding of the use of IHRCs in Korean, whether a specific semantic type of embedding predicates renders an IHRC construal in a more acceptable manner has not been explored. To address this research gap, we conducted an acceptability judgment task. The results showed significantly higher acceptability, compared to the control condition, for predicates implying physical contact between entities but not for those that do not. This finding may indicate that Korean IHRCs serve as an example of a partially productive or verb-class-specific construction. This study contributes to the understanding of partial productivity or local generalization in language use and the interaction between a human and an object.

Keywords: internally headed relative clauses; acceptability judgment; semantic type of predicates; partially productive construction; verb-class-specific construction

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List of abbreviations

A	actor
ACC	accusative
ADN	adnominalizer
ART	article
CAUS	causative
COMP	complementizer
CONTIN	continuous
COP	copula
DECL	declarative
e	exclusive
ERG	ergative
GEN	genitive
INTR	intransitive
IPFV	imperfective
LOC	locative
NMZ	nominalizer
NOM	nominative
ns	non-singular
p	plural
PFV	perfective
PROG	progressive
PRS	present
PST	past
PUT	future
REL	relative clause
s	singular
SUBJ	subject
TOP	topic
U	undergoer

1 Background

Similar to other aspects of linguistic knowledge, argument structure undergoes continuous change (Diessel 2019). This study examines how such change occurs in the type of verbs associated with a particular schema. Focusing on internally headed relative clauses (IHRCs) in Korean, we propose that IHRC construals emerge by extending verb usage. Furthermore, we examine whether item-based analogy influences the innovative use of argument-structure constructions, forming Korean IHRCs as either partially productive or verb-class-specific constructions (e.g., Boas 2003; Croft 2012; Goldberg 1995, 2019; Perek 2016; Suttle and Goldberg 2011). We argue

that a usage-based approach helps explain the limited distribution of Korean IHRCs and enriches our knowledge of the interaction between two entities in the cognitive model given by Verspoor (2000).

A relative clause (RC) construction comprises a head noun and an RC. The semantic function of the head noun is to establish a set of entities (Keenan and Comrie 1977), and that of an RC is to provide information about the head noun. The information given by an RC either assists in focusing – or restricting – the reference of the head noun or provides further background information about the head noun, which is already uniquely identified (Dixon 2010, p. 314). In (1), for instance, "who was bleeding" can be identified as an RC narrowing down the denotation of the head noun "the man" by providing information about him.

(1) John brought the man who was bleeding to the hospital.

In (1), the head noun appears before the RC. English is a language that uses post-nominal RCs. Expanding our investigation to different languages reveals other types of RCs in terms of the position of the head noun vis-a-vis the RC. The Korean examples in (2) and (3) illustrate this.

(2) John-un phi-lul hulli-ko iss-nu-n namca-lul
John-TOP blood-ACC bleed-CONTIN-IPFV-REL man-ACC
pyengwon-ey teli-ko ka-ass-ta.
hospital-to bring.person-and go-PST-DECL.
'John brought the man who was bleeding to the hospital.'

(3) John-un namca-ka phi-lul hulli-ko iss-nu-n
John-TOP man-NOM blood-ACC bleed-CONTIN-IPFV-REL
kes-ul pyengwon-ey teli-ko ka-ass-ta.
KES-ACC hospital-to bring.person-and go-PST-DECL.
'John brought the man who was bleeding to the hospital.'

The RC in (2) is an example of a prenominal RC, with the head noun *namca* 'man' appearing after the RC *phi-lul hulli-ko iss-nun* 'who was bleeding.' In the RC, the head noun is deleted along with its case marker. The head noun appearing outside the RC is supported by how the head noun is marked by the accusative marker *-lul*, which reflects its grammatical role in the matrix clause, rather than the nominative marker *-ka*, which would reflect its grammatical role in the RC. Prenominal RCs, as in (2), comprise the predominant RC type in Korean. The example in (3) includes an IHRC. This RC type can be distinguished from prenominal RCs by two formal features. First, unlike in (2), the head noun in (3) appears in the RC, and the head noun *namca* 'man' is marked by the nominative case marker *-ka*. Second, the RC in (3) is marked by the combination of a relativizer and *kes* 'thing,' which can be

considered a quasi-nominalizer in Korean (Jo 2003; Kim 1984; Mun 2017). This RC type, in which the head noun appears within the RC, is found only in a few languages. In Dryer's (2013) sample, 24 languages use IHRCs as their sole RC type, and 10 languages use IHRCs as their non-primary RC type; Korean falls into the latter group. Furthermore, the distribution of Korean IHRCs is highly restricted, making them even more unique.

To understand the restricted use of Korean IHRCs, existing studies have employed three research approaches: (i) explaining their formal restrictions by proposing a set of rules (Chung and Kim 2003; Jhang 1991, 1994; Kim 2016, 2008b, 1996, 2002; Lee 2006); (ii) investigating how they are used in naturally occurring data (Cho 2014, 2016; Lee 2020a, 2020b, 2021a, 2021b); (iii) refuting their existence as an independent construction and offering an alternative construction in which an IHRC construal can be made (Chung 1999; Kim 2013; Mun 2012, 2017; Park 1994, 2022a, 2022b, 2019; Park and Yeon 2023; Ryu 2022; Yeon and Park 2021).

The first approach concerns grammatical restrictions in the formation of IHRCs. The head noun tends to take a grammatical role as a subject or object in an RC, as in (4a) and (4b), respectively. In (4a), there is only one participant (Mary), and it is marked by the nominative case marker *-ka* in the RC. Similarly, in (4b), *phili-* 'a flute' is understood as the head noun marked by the accusative case marker *-lul* in the RC.

(4) a. John-un Mary-ka naka-lyeko ha-nu-n
John-TOP Mary-NOM go.out-be.about.to-IMFV-REL
kes-ul pwuthcap-ass-ta.
KES-ACC catch-PST-DECL
'John caught Mary, who was about to leave.'

b. John-un Mary-ka phili-lul pwul-ko iss-nu-n
John-TOP Mary-NOM flute-ACC play-CONT-IMFV-REL
kes-ul nnakachay-ess-ta.
KES-ACC snatch-PST-DECL
'John snatched the flute that Mary was playing.'

Additionally, the head noun can take a subject, object, or oblique role in a matrix clause, as illustrated in (5), (6), and (7), respectively.

(5) a. *emeni-ka konghang-ey tochakha-ø-n kes-i
mother-NOM airport-at arrive-PFV-REL KES-NOM
na-eykey cenhwaha-si-ess-ta.
I-DAT call-HON-PST-DECL
'My mother, who arrived at the airport, called me up.'

b. ai-ka eli-ø-n kes-i yenge-to
child-NOM young-PFV-REL thing-NOM English-also
cal ha-nta.
well do-DECL
'The child who is young speaks English, too.'

(6) a. na-nun emeni-ka konghang-ey tochakha-ø-n
I-TOP mother-NOM airport-at arrive-PFV-REL
kes-ul cip-ulo mosi-e o-ass-ta.
KES-ACC home-to take.HON-LIK come-PST-DECL
'I took home my mother, who arrived at the airport.'

b. na-nun sakwa-ka sikthak wi-ey
I -TOP apple-NOM dining.table up-on
nohi-e iss-nu-n kes-ul cip-e
be.put-CONT-IPFV-REL KES-ACC take-LNK
tul-ess-ta.
pick.up-PST-DEC
'I picked up the apple that was put on the dining table.'

(7) a. *na-nun emeni-ka konghang-ey tochakha-ø-n
I-TOP mother-NOM airport-at arrive-PFV-REK
kes-eykey insaha-ess-ta.
KES-DAT greet-PST-DECL
'I greeted my mother, who arrived at the airport.'

b. Mary-nun mwul-ul kkulhi-ø-n kes-ulo khephi-lul
Mary-TOP water-ACC boil-PFV-REL KES-with coffee-ACC
tha-ess-ta.
make-PST-DECL
'Mary prepared a cup of coffee with the water that she boiled.'
(c.f. Chung 1999, p. 8)

When the head noun takes an object role in a matrix clause (hereafter object IHRC), it shows less semantic restriction on the referent of the head noun compared to non-object IHRCs. Specifically, the head noun can refer to a human without any derogative meaning. In (5a), (6a), and (7a), the head noun is *emeni* 'mother,' and only the object IHRC in (6a) turns out grammatical. Unlike in (5a) and (7a), the head noun is *ai* 'child' in (5b) and *mwul* 'water' in (7b), which are not sensitive to derogative meaning, and both sentences turn out grammatical. The semantic restriction regarding the referent of the head noun can be understood in terms of the degree of grammaticality of *kes*, as described in the examples below.

(8) a. John-un Mary-ka cwu-ø-n kes-ul
John-TOP Mary-NOM give-PFV-REL KES-ACC
selap-ey neh-ess-ta.
drawer-in put-PST-DECL
'John put the thing that Mary gave (to him) in the drawer.'

b. John-un Mary-ka tolao-ø-n kes-ul
John-TOP Mary-NOM come.back-PFV-REL KES-ACC
al-ass-ta.
know-PST-DECL
'John knew that Mary came back.'

c. John-un Mary-ka naka-lyeko ha-nu-n
John-TOP Mary-NOM go.out-be.about.to-IMFV-REL
kes-ul pwuthcap-ass-ta.
KES-ACC catch-PST-DECL
'John caught Mary, who was about to leave.'

In (8a), *kes* 'thing' has its lexical meaning and is used as a dependent noun referring to what Mary gave to John. However, in (8b), *kes* forms a nominalizer (without any lexical meaning) associated with the relativizer *-un*. *Kes* in (8c), an IHRC example, also does not seem to have any lexical meaning, and it has been considered a kind of (dependent) pronoun (Chung and Kim 2003; Kim 2007, 2009, 2022; Lee 2006), nominalizer (Jo 2003; Kim 1984), complementizer (Jhang 1994; Yoon 1991), or schematic noun (Park 2022a, b; Park and Yeon 2023; Yeon and Park 2021). The ungrammaticality of the sentences with the non-object IHRC in (5a) and (7a), whose head noun refers to an honorific human being, may suggest that the grammaticality of *kes* in object IHRCs is different from that in non-object IHRCs (Kim and Song 2022; Lee 2021a).

Furthermore, the RC shows an aspectual restriction when the head noun takes an object role in a matrix clause such that it should represent a temporary state; specifically, an in-progress state is achieved by any sentence with a progressive aspect, regardless of the lexical aspect of a predicate, but a target state is achieved only by a sentence with a perfective form of a telic predicate (Kim 2008b). Examples of in-progress and target states are given in (9a) and (9b), respectively.

(9) a. John-un Mary-ka naka-nu-n kes-ul
John-TOP Mary-NOM go.out-IMPF-REL KES-ACC
pwuthcap-ass-ta.
catch-PST-DECL
'John caught Mary, who was going out.'

b. John-un Mary-ka ppang-ul mantul-ø-n
John-TOP Mary-NOM bread-ACC make-PERF-REL
kes-ul mek-ess-ta.
KES-ACC eat-PST-DECL
'John ate the bread which Mary made.'
(Adapted from Kim (2008b), ex. 16–17)

Unlike the IHRCs in (9), those in (10) do not represent a temporary state. The embedded predicate in (10a) is an adjective, whereas the one in (10b) is a stative verb; both examples turn out ungrammatical.

(10) a. *Minho-ka yengliha-n kes-ul koylophi-ess-ta.
M-NOM clever-and thing-ACC pick.on-PST-DECL
'(Someone) picked on Minho, who (since he) is clever.'
b. *Minho-ka Sue-lul salangha-nun kes-ul
M-NOM S-ACC love-and thing-ACC
phokhaynghay-ess-ta.
assault-PST-DECL
'(Someone) physically assaulted Minho, who (since he) loves Sue.'
(Kim 2002, p. 555)

Notably, the aspectual restriction is required only for object IHRCs. The non-object IHRC in (11) does not represent a temporary state, with an adjective being used as an embedded predicate, but it does not turn out ungrammatical.

(11) Mary-nun oskam-i pwutulep-ø-n kes-ulo aki
Mary-TOP cloth-NOM soft-PERF-REL KES-with baby
os-ul cis-ess-ta.
clothes-ACC make-PST-DEC
'Mary made baby's clothes with the cloth, which is soft.'
(Lee and Song 2023, p. 468)

Furthermore, some idiosyncrasies in Korean IHRCs cannot be encapsulated in a set of rules. For example, an adjective is used as an embedded predicate in object IHRCs in (12), but these do not turn out ungrammatical. However, as Mun (2012) marks (12a) with a question mark, the IHRC in (12a) is less acceptable than the one in (12b), which cannot be clearly explained by grammatical rules.

(12) a. ?na-nun kkoch-i ppalka-Ø-n kes-ul
I-TOP flower-NOM red-PERF-REL KES-ACC
kkekk-ess-ta.
pick-PST-DEC
'I picked the flower that is red.'

b. na-nun tolmeyngi-ka tantanha-Ø-n kes-ul cwup-ese
I-TOP stone-NOM hard-PERF-REL KES-ACC pick.up-and
tenci-ess-ta.
throw-PST-DEC
'I picked up the stone that is hard and threw it.'
(Mun 2012, p. 47)

In addition to the aspectual restriction, previous studies have argued that only a set of predicates, such as a stage-level predicate or a verb that lexically requires its object to refer to a referential individual, can take IHRCs as the object. For example, as Kim (2002) shows, in (13a) the individual-level predicate *salangha-* 'love' is used as an embedding predicate, and the embedded clause cannot be interpreted as an IHRC.[1] Conversely, in (13b), the stage-level predicate *ttayly-* 'hit' is used as an embedding predicate, and the embedded clause can be interpreted as an IHRC.

(13) a. *kangaci-ka pakk-ey naka-nun kes-ul salangha-n-ta.
puppy-NOM outside go-and thing-ACC love-PRS-DECL
'(Someone) loves his dog that (usually) goes out (for a walk with him).'

b. kangaci-ka pakk-ey naka-nun kes-ul ttayly-ess-ta.
puppy-NOM outside go-and thing-ACC hit-PST-DECL
'(Someone) hit the dog that is going out (for a walk).'
(Kim 2002, p. 554)

Similarly, Chung and Kim (2003, p. 53) state that "when the matrix predicate is a type of recognition verb such as *po-* 'see', *al-* 'know', and *kiekha-* 'remember,'" only an event reading is possible, which does not permit an IHRC construal. The embedding predicate in (14b) is *mollu-* 'not know,' and the embedded predicate does not yield an IHRC construal.

(14) a. John-un Mary-ka talli-nu-n kes-ul cap-ass-ta.
John-TOP Mary-NOM run-IPFV-REL KES-ACC catch-PST-DECL
'John caught Mary who was running.'

b. John-un Mary-ka talli-nun kes-ul mollu-ess-ta.
John-TOP Mary-NOM run-IPFV-REL KES-ACC not.know-PST-DECL
'John didn't know that Mary was running.'
(Chung and Kim 2003, p. 52)

When a perceptive or factive verb is used as an embedding predicate, however, disagreement arises about whether the embedded clause is an IHRC, as existing studies have excluded perceptive and factive verbs (Chung and Kim 2003; Kim 2016,

1 It should be noted that the sentence in (13a) is grammatical if it is interpreted as 'his dog loves to go out (for a walk with him).'

2007, 2009; Lee 2021a, 2021b), included only a specific example of perceptive verbs (Jo 2003), or included perceptive and (some) factive verbs (Lee 2006; Mun 2017; Park 2022b). For instance, Jo (2003) regards (15a), not (15b), as an example of IHRCs because it is only interpretable as an IHRC construal. Conversely, Park (2022b) suggests that (15b) and (15c) are amenable to an IHRC construal. Although Lee (2006) suggests the embedded clause in (15d) as an example yielding an IHRC construal, whether the example in (15d) can be interpreted as "Mary already knew the answer to that question John explained" is doubtful; this approach is found only in Lee's (2006) work.

(15) a. Sunae-ka Suil-i T.V.-lul sa-n
NOM NOM ACC buy-PST
kes-ul po-ass-ta.
Kes-thing-ACC see-PST-DECL
'Sunae saw the T.V. that Suil bought.'
(Jo 2003, p. 555)

b. Mia-nun totwuk-i tomangchi-nun kes-ul po-ass-ta.
M-TOP thief-NOM run.away-AND Kes-ACC see-PST-DECL
'Mia saw the thief, who was running away.'
'Mia saw the whole scene, where the thief was running way.'
(Park 2022b, p. 288)

c. Mia-nun totwuk-i tomangchi-nun kes-ul
M-TOP thief-NOM run.awya-AND KES-ACC
kiek-hay-ss-ta.
remember-PST-DCL
'Mia remembered the whole scene, where the thief was running away.'
'Mia remembered the thief, who was running away.'
(Park 2022b, p. 291)

d. Mary-nun John-i ku mwunce-uy tap-ul
Mary-TOP John-Nom that question-GEN answer-ACC
selmyengha-nu-n kes-ul al-ko-iss-ess-ta.
explain-PRS.IPFV-REL kes-ACC know-PROG-PST-DECL.
'Mary knew (the fact) that John explained the answer to that question.'
'Mary already knew the answer to that question John explained.'
(Lee 2006, p. 170)

In this study, we argue that only a specific example of perceptive verbs, such as (15a), can yield an IHRC construal for three reasons. First, as Park (1994, p. 46) indicates, the entity reading found in (15b) and (15c) "comes as a pragmatic consequence of that semantic interpretation." Essentially, in a scene, we see the participants involved in it. Second, an immediate perception of the state of affairs is distinguished from an

immediate perception of the individual (Dik and Hengeveld 1991). For example, although the implication is that the subject of the matrix clause perceived an individual, (16b) is not conventionally analyzed as both an immediate perception of the state of affairs and an immediate perception of the individual.

(16) a. I saw your brother last night. (Immediate perception of the individual)
b. I saw him walk down the street. (Immediate perception of the state of affairs)
(Dik and Hengeveld 1991, p. 237–239)

Third, IHRC examples similar to (15a) appear in other studies. Bickel (1999), for instance, investigates several Kirant languages, such as Belhare, Limbu, and Athpare, which exhibit two similarities to Korean. First, they have prenominal RCs with IHRCs as a minor type. Second, although prenominal RCs and IHRCs are marked by nominalization devices, only IHRCs have the same surface shape as nominalized clauses. Although these languages differ from Korean in that whether the nominal clause is a complement clause or an IHRC can be distinguished by the presence or absence of the agreement (Mun 2017, p. 69), they offer helpful resources for determining IHRCs in Korean. Disambiguating complement clauses and IHRCs, Bickel (1999) provides examples from Athpare (17a) and Belhare (17b) as IHRCs and an example from Belhare (18) as a complement clause.

(17) a. khan-na asen meruba a-in-u-na pu-metta-ŋ!
2s-ERG yesterday goat 2-buy-3U-ART look-CAUS-1s
'Show me the goat you bought yesterday!'
b. lambu-e gari-chi ŋ-koĩ-ŋa-ha chitt-he-m-chi-m-ma.
way-LOC car-ns 3ns-fall-INTR.PFV-NMZ find-PT-1pA-nsU-1pA-e
'On the road, we came across cars broke down.'

(18) maʔi khoŋ-a-ha nis-e-ŋ.
person play-SUBJ-N see-PST-1sA
'I saw the person playing.'

In the IHRCs in (17), *pu-* 'look' and *chitt-* 'find' are used as a matrix predicate, and in the complement clause in (18), *nis-* 'see' is used as a matrix predicate. The embedded clauses recognized as an IHRC in (17) allow only an IHRC construal. In (17a), the goat was purchased yesterday; thus, only the goat – and not the event of purchasing it – can be presented. Similarly, in (17b), the car had already broken down by the time the subject of the matrix clause came across it, and what they observed was only the car – an entity – which was broken. Although the matrix predicates in (17) are not exactly the perceptive verb "see," the examples in (17) being identified as IHRCs supports our argument that only a specific example of perceptive verbs, such as in (15a), can yield an IHRC construal.

Unlike the first approach, the second approach empirically shows that IHRCs appear in naturalistic spoken and written corpora of Korean, with unique pragmatic functions. Lee (2020a) found 39 IHRCs in spoken and 58 in written sentences out of 10,000 samples, comprising the form of *kes*. In the spoken data, 14 examples take a subject role in an RC, and 25 examples take an object role. In the written data, 26 examples take a subject role in an RC, and 32 examples take an object role. Similarly, Cho (2016) finds 99 examples of IHRCs in spoken data, with the head noun taking a subject role in an RC ($N = 30$) and an object role in an RC ($N = 69$). Examining naturally occurring IHRCs, Lee (2020a) proposes six pragmatic functions of IHRCs that are not shared by prenominal RCs: (i) quickly representing the common argument; (ii) interacting with the audience; (iii) representing information strategically; (iv) accurately representing the order of events; (v) dropping the common argument; (vi) being allowed to have the particle of the common noun in an RC.

Finally, the third approach to the restricted use of IHRCs refutes the existence of IHRCs as an independent construction, and some of the researchers adopting this approach have suggested an alternative construction in which IHRCs can be categorized as a complement clause of a null perception verb (Chung 1999; Park 1994), noun complement construction (Mun 2017; Park 2019),[2] adnominal clause + a schematic noun *kes* (Park 2022a, b; Park and Yeon 2023; Yeon and Park 2021), adjunct (Kim 2013), or not an IHRC (Mun 2012; Ryu 2022).

The main reason behind refuting Korean IHRCs as independent constructions is that they do not have their own encoding strategy and exhibit idiosyncrasies that cannot be explained by a set of rules. However, we are reluctant to discharge IHRCs from Korean, instead preferring to wait for better evidence, for several reasons (see also Sun 2023). First, for IHRCs, sharing encoding strategies with other constructions is not uncommon (Bickel 1999; DeLancey 1989; Dixon 2006; Ebert 1994; Genetti 1992; Matisoff 1972; Noonan 1997). Second, although IHRCs may resemble other constructions, only IHRCs take an argument role in a matrix clause with unique grammatical restrictions and pragmatic functions. Third, the existence of idiosyncrasies may imply that the boundaries between different constructions are vague, as some typical examples show consistent grammatical features (c.f. Lee 2020a). Fourth, although the differences in grammatical constraints between object and non-object IHRCs may suggest that Korean IHRCs are merely interpreted based on context, this

2 Analyzing IHRCs as noun complement constructions in which a dependent noun *kes* 'a thing' follows a complement clause marked by a relativizer is adopted in the 7th national primary Korean curriculum as described in Yu (2018, pp. 450–451). However, this approach cannot incorporate examples in which the head noun of the IHRC refers to an honorific human being such as *emeni* 'mother' in (5a).

phenomenon may also indicate that object IHRCs are developing into a distinct construction (c.f. Kim and Song 2022; Lee 2021a).

2 A new approach to understanding object IHRCs in Korean

While these three approaches have advanced the understanding of Korean IHRCs, more attention should be given to the role of embedding predicates, especially for object IHRCs. Predicates that allow object IHRC construals do not generally take clauses as arguments, which explains their low frequency and acceptance (see Section 5.3). To understand the phenomenon, we examine the semantic type of verbs allowing an IHRC construal. As some perceptive verbs allow an object IHRC construal, whereas factive verbs do not (see Section 1), we also investigate the shared features of these predicates. We discuss that Korean object IHRCs are a suitable candidate for partially productive or verb-specific constructions.

An IHRC construction in Korean has a form analogous to that of perceptive and factive verb constructions (Chung and Kim 2003; Jo 2003; Kim 2004a, b, c, 2008a, 2009; Lee 2021b; Mun 2017; Park 2022a, b; Yeon and Park 2021, 2023).

(19) a. John-un [Mary-ka naka-lyeko ha-nu-n
John-TOP Mary-NOM go.out-be.about.to-IPFV-REL
kes]-ul al-ass-ta.
KES-ACC know-PST-DECL
'John knew that Mary was about to leave.'

b. John-un [Mary-ka naka-lyeko ha-nu-n
John-TOP Mary-NOM go.out-be.about.to-IPFV-REL
kes[-ul po-ass-ta.
KES-ACC see-PST-DECL
'John saw the scene that Mary was about to leave.'

c. John-un [Mary-ka naka-lyeko ha-nu-n
John-TOP Mary-NOM go.out-be.about.to-IPFV-REL
kes]-ul pwuthcap-ass-ta.
KES-ACC catch-PST-DECL
'John caught Mary who was about to leave.'

When *al-* 'know' or *po-* 'see' is used as an embedding predicate, as in (19a) and (19b), the bracketed part is considered a part of the perceptive and factive verb constructions, respectively. In (19c), *pwuthcap-* 'catch' is used as an embedding predicate, and the bracketed part has the construal of an IHRC. Nevertheless, when *pwuthcap-*

'catch' is used as an embedding predicate, a mismatch between syntax and semantics arises. Structurally, the entire clause *Mary-ka naka-lyeko ha-nun-n kes* functions as the object of the embedding predicate. Nonetheless, semantically, only the head noun *Mary* is the object of the action *pwuthcap-* 'catch.' The construal of IHRCs comes from this mismatch, in which the head noun appears in an embedded clause and can be interpreted as the object of the embedding predicate (Shibatani 2018, p. 354). Verbs such as *pwuthcap-* 'catch' typically take a noun phrase as their object; thus, for such verbs, taking a nominal clause as their object is highly unusual, as in (19c). In other words, the construal of IHRCs appears to be engendered via the creative use of verbs.

Two things should be noted. First, the creative use of verbs appears only when embedded clauses are marked by the quasi-nominalizer – the combination of a relativizer and *kes* (Jo 2003; Park and Yeon 2023; Yeon and Park 2021). When other nominalizers such as *-um* and *-ki* are used, as in (20), the sentences turn out ungrammatical.

(20) a. *Mia-nun Gio-ka tomangka-um-ul cap-ass-ta.
M-TOP G-NOM runaway-NMZ-ACC catch-PST-DECL
'Mia caught Gio, who was running away.'

b. *Mia-nun Gio-ka tomangka-ki-lul cap-ass-ta.
M-TOP G-NOM runaway-NMZ-ACC catch-PST-DECL
'Mia caught Gio, who was running away.'
(Park and Yeon 2023, p. 152)

The ungrammaticality of the examples in (20) highlights the key role of *kes* in an IHRC construal. As shown in Section 1, the meaning of *kes* in a particular example is not always clear, covering a continuum of abstract meanings, such as a part of a nominalizer or concrete object (i.e., a thing). Previous studies have primarily focused on the versatility of *kes* to explain how an IHRC construal is triggered in Korean. Jo (2003, p. 554) attributes this ambiguity regarding *kes* and its generality in terms of being used in perceptive and factive verb constructions to the IHRC construal, proposing that "matrix verbs excluding a nominalized clause (i.e., proposition) forces to turn a nominalizer *kes* into a pronominal *kes* by selecting a referential NP within a clause as its binder." Therefore, the rise of the IHRC in Korean is motivated by a forced processing, rather than syntactic legitimacy that it uniquely establishes." Park and Yeon (2023, p. 153) suggest that "metonymy is the fundamental source of the interpretations of the IHRCs" (see also Park 2022a, b; Yeon and Park 2021). Defining *kes* as a schematic nominal devoid of semantic content, they show how *kes* "transparently mediates an entity in the adnominal clause and the matrix predicate" (Park and Yeon 2023, p. 152). They further explain that *kes* deals with the possible semantic conflict between the adnominal clause and an embedding predicate, such as *cip-* 'pick up,' by being connected not to the entire embedded clause but to the active zone, which refers to an entity.

Second, the perceptive verb construction in (19b) shows more similarity to IHRCs than the factive one. Perceptive verb constructions allow an entity construal of the embedded clause (described in Section 1), which can be considered an example yielding an IHRC construal. However, object IHRCs exhibit grammatical restrictions parallel to those of perceptive verb constructions. This feature is not shared by factive verb constructions, as indicated by Kim (2008a), who argues that the embedded clauses of object IHRCs and perceptive verb constructions do not allow an individual-level predicate such as *yeppu-* 'pretty' or the indicative mood marker *-ta*.[3] As perceptive verb constructions share the encoding strategy and grammatical restriction, in addition to yielding event and entity construals, we can assume that perceptive verb constructions may function as an incubator for the birth of an object IHRC in Korean. Essentially, perceptive verb constructions may have stimulated or accelerated the extension of the usage of verbs that do not typically take a clause as their argument.

In sum, an object IHRC construal is created through the innovative use of verbs, and the result seems to be supported by the similarities between IHRCs and existing constructions, such as perceptive verb constructions. This engenders the question of which verbs would allow this innovative use of taking a clause as their argument, as opposed to an NP. We can explore the answer by referring to the usage-based approach, whose findings show that, when a word is used in a creative or unconventional manner, words semantically similar to it may also attain the new usage, forming partially productive or verb-class-specific constructions (Boas 2003; Croft 2003, 2012; Goldberg 1995, 2006, 2016a, b, 2019; Perek 2015, 2016; Suttle and Goldberg 2011). The examples in (21) illustrate this.

(21) a. John blew the napkin off the table.
b. Frank sneezed the napkin off the table.
(Goldberg 1995, p. 152)

Although "sneeze" does not usually appear as a predicate in caused-motion constructions, it can be ratified as in (21b) through its semantic similarity to the verb "blow" in (21a). In other words, the use of "sneeze" is extended through its semantic overlap with "blow": both verbs describe air emission (Boas 2003, 2005; Perek 2015; Goldberg 1995; Goldberg and Jackendoff 2004). As described in previous studies, one of the factors constraining the innovative use of words observed in (21b) is semantic similarity. For instance, not every air-emission verb is ratified in caused-motion constructions. Whether an unexpected verb can be used in a caused-motion construction can vary depending on how similar it is to the one that is conventionally used

3 Although Kim (2008a) argues that the embedded event time cannot be posterior to the embedding event time in object IHRCs and perceptive verb constructions, Sun (2023, p. 71) points out counterexamples. Thus, we have not included this restriction as a common feature.

in that construction (e.g., Boas 2003). As seen in (22), "breath," "pant," and "wheeze" in (22b–d) do not sound as acceptable as "cough" in (22a), while "exhale" and "inhale" in (22e–f) are ungrammatical.

(22) a. Marc coughed the napkin off the table.
b. ?Kirsten breathed the napkin off the table.
c. ?Jenn panted the napkin off the table.
d. ??Julio wheezed the napkin off the table.
e. *Katie exhaled the napkin off the table.
f. *Joshua inhaled the napkin off the table.
(Boas 2003, pp. 272–273)

This varied acceptability can be explained by the strength of the air emission that each verb connotes when other conditions are the same: the more it is similar to "blow," the more it is acceptable. As an IHRC construal can be created through the extension of the usage of verbs, examining whether an IHRC construal is more acceptable when a certain semantic type of verb is used as its embedding predicate is reasonable.

Therefore, we investigated the potential influence of embedding predicates' semantic type on the acceptability of Korean IHRCs. To test whether IHRCs with a certain semantic type of embedding predicates show a higher acceptance rate, we conducted an acceptability judgment task. Specifically, by narrowing down IHRCs with a head noun taking an object role in the matrix clause, we predicted that predicates that imply physical contact between two entities take IHRCs as their arguments more naturally than those that do not. By focusing on object IHRCs, we tried to control the grammatical role of the head noun in the matrix clause that can affect the acceptability of IHRCs (Jhang 1991; Kim 2002; Kim and Song 2022; Lee 2020a; Mun 2012).

Within this narrowed scope, we referred to Verspoor (2000) to categorize the subtypes of embedding predicates. Based on Edelman (1989), Verspoor (2000, p. 212) suggests three types of interactions between a person and an object: direct physical, mental, and rational (Figure 1). Among these interactions, embedding predicates that render an IHRC construal indicate a direct physical interaction between the subject of the embedding clause and the object, the entity in the embedded clause. In (23), for instance, John interacts with a cookie that exists in his immediate environment.

(23) John-un Mary-ka khwukhi-ul mantul-e twu-ø-n
John-TOP Mary-NOM cookie-ACC make-CONT-PFV-REL
kes-ul cip-e mek-ess-ta.
KES-ACC pick-LNK eat-PST-DECL
'John picked up and ate the cookie that Mary baked.'

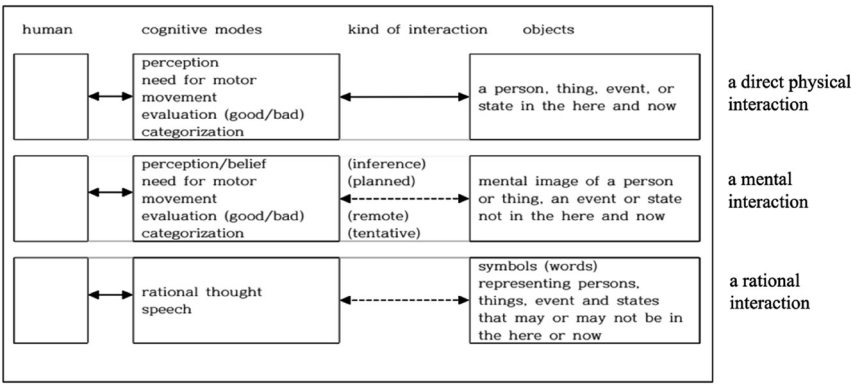

Figure 1: Cognitive modes and their respective objects (Verspoor 2000 p. 212).

This interaction between John and the cookie can be identified as a direct physical interaction because the cookie itself, as opposed to its image or symbol, exists in the same space and time. Unlike *cip-* 'pick' in (23), verbs such as *al-* 'know' do not render an IHRC construal. When *al-* 'know' is used as an embedding predicate that takes a clause marked by the combination of a relativizer and *kes* as its argument, a rational interaction is indicated between the subject of the embedding clause and the object, the proposition described in the embedded clause. For instance, in (24), John – the subject of the embedding clause – interacts with a symbol representing an event that does not exist in his immediate environment.

(24) John-un Mary-ka khwukhi-ul mantul-e twu-ø-n
John-TOP Mary-NOM cookie-ACC make-CONT-PFV-REL
kes-ul al-ass-ta.
KES-ACC know-PST-DECL
'John knew that Mary baked the cookies.'

The perceptive verb *po-* 'see' engenders a more complicated situation. It may or may not allow an IHRC construal when it takes a clause marked by the combination of a relativizer and *kes* as its argument (see Section 1).

(25) a. John-un Mary-ka khwukhi-ul mantul-e twu-ø-n
John-TOP Mary-NOM cookie-ACC make-CONT-PFV-REL
kes-ul po-ass-ta.
KES-ACC see-PST-DECL
'John saw the cookies that Mary baked.'

b. John-un Mary-ka khwukhi-ul mantul-ko iss-nu-n
John-TOP Mary-NOM cookie-ACC make-PROG-IPFV-REL
kes-ul po-ass-ta.
KES-ACC see-PST-DECL
'John saw the scene where Mary was baking cookies.'

c. John-un khwukhi-ka cepsi wi-ey eps-nu-n
John-TOP cookie-NOM plate upside-at not.exist-IPFV-REL
kes-ul po-ass-ta.
KES-ACC see-PST-DECL
'John saw the scene where the cookie was not on the plate.'

Among the examples in (25), only (25a) involves a direct physical interaction between the subject of the embedding clause and the object, which is the entity in the embedded clause. The subject of the matrix clause, *John*, interacts with an entity that exists in his immediate environment. Conversely, (25b) shows a direct physical interaction between the subject of the embedding clause and the object; nonetheless, this time, it is the event described in the embedded clause, not an entity. Similarly, the embedded clause in (25c) is not identified as an IHRC because it describes a situation in which an entity does not exist. One can see a situation in which a particular entity does not exist, but one cannot see an entity that does not exist. In other words, *John* can interact with a situation in his immediate environment, but he cannot interact with an entity that does not exist in his immediate environment.

The ungrammaticality of the example in (26) can be explained in a similar manner. While *cip-* 'pick' is used as an embedding predicate in (23) and (26), no direct physical interaction occurs between the subject and object, the entity in the embedded clause in (28), as one cannot pick up something that does not exist in one's immediate environment.

(26) *John-un khwukhi-ka cepsi wi-ey eps-nu-n
John-TOP cookie-NOM plate upside-at not.exist-IPFV-REL
kes-ul cip-e mek-ess-ta.
KES-ACC pick-LNK eat-PST-DECL
'John picked up and ate the cookie that was not on the plate.'

In sum, an object IHRC construal can be rendered when the embedding predicate ensures a direct physical interaction between the subject of the embedding clause and an entity in the embedded clause. Compared to previous studies, referring to the types of interactions between the subject of the embedding clause and the object facilitates a more sophisticated understanding of when an object IHRC construal is created. For instance, a stage-level predicate (Kim 2002) or a verb that lexically requires its object to refer to a referential individual (Chung and Kim 2003) has been

suggested as a requirement for an embedding predicate to render an IHRC construal. However, although *po-* 'see' is a stative predicate rendering an event reading, it allows an IHRC construal as in (25a) – when a direct physical interaction is implied between the subject of the embedding clause and an entity in the embedded clause. This adheres to our prediction in this study.

Considering these observations, we divided verbs that ensure a direct physical interaction between the subject of the embedding clause and an entity in the embedded clause into two groups based on whether they imply physical contact (Phil 2004; Shin 2017). Defining physical contact as activities that include touching using body parts or tools (c.f. Faber and Marial Usón 1999; Kim 2000, 2017; Phil 2004; Rambaud and Briones 2002; Viberg 1999), we predicted that verbs assuming physical contact between two entities are more likely to render an IHRC construal resulting in higher acceptability. This prediction was based on how, when physical contact occurs between two entities, a direct physical interaction is naturally implied, which ensures the existence of a common argument (or the head noun). In this sense, verbs assuming physical contact may serve as a core group among verbs that ensure direct physical interaction between two entities. We tested our prediction with five different types of embedding predicates. First, among verbs ensuring direct physical interaction between two entities, we used those that imply physical contact (e.g., *pwuthcap-* 'catch'). Second, among verbs ensuring direct physical interaction between two entities, we used those that do not imply physical contact (e.g., *pwulu-* 'call'). Third, we used perceptive verbs (e.g., *po-* 'see'), followed by factive verbs (e.g., *al-* 'know'). Perceptive and factive verbs were used because they take clauses marked by the combination of a relativizer and *kes* as their arguments, productively sharing the encoding strategy with object IHRCs. Nevertheless, although perceptive verbs share grammatical restrictions regarding embedded clauses with IHRCs, factive verbs do not, as described in this section. We did not use any examples with perceptive verbs in which only an entity construal is available, as in (25a), as perceptive verbs may allow an IHRC construal. Finally, we used adjectives (e.g., *manh-* 'many') as a baseline for ungrammatical sentences.

3 Acceptability judgment task

To examine whether embedding predicates' semantic type affects the acceptability of IHRCs, we generated 40 sentences with five types of embedding predicates, adhering to Keating and Jegerski's (2015) recommendation to include twice as many filler items as there are target items.

3.1 Participants

A total of 80 native Korean speakers were recruited from a major university in Seoul, South Korea, based on Lee and Song's (2020) work.[4] After receiving task instructions, participants signed the written informed consent form (approved by the Institutional Review Board of the authors' university) and were paid approximately $10 for their participation.

3.2 Material and design

As this study focuses on the effect of the types of embedding predicates on the acceptability of IHRCs, we created eight sentences for each of the five conditions (Table 1). Each type of embedding predicate was differentiated by its semantic features. The first two sets, IHRC_P and IHRC_NP, comprised predicates that can take IHRCs as their arguments. However, physical contact between two entities was implied only in IHRC_P. The predicates in PER (perceptive verbs) and KNO (knowledge verbs) appeared as embedding predicates in perceptive and knowledge verb constructions, respectively. Finally, CON (control condition) comprised ungrammatical adjectives. To control for any potential effect of embedded clause predicates, four different types of predicates in the embedded clause were used across the conditions (Table 2).[5] Furthermore, 150 sentences were used as fillers, comprising 24 grammatical sentences, 24 ungrammatical sentences, 42 indecisive sentences, and 60 sentences for another research project irrelevant to this study. We created four different versions of the 40 experimental sentences by changing the nouns (i.e., four different stimulus lists) to prevent the properties of the nouns from affecting the acceptability judgment. Our participants were randomly assigned to one of these four lists.

3.3 Procedure

The acceptability judgment task was conducted via an online survey platform. The participants were presented with one sentence at a time on a computer screen,

4 In Lee and Song's (2020, p. 51) study, 83 participants were recruited, but data from three participants were excluded for the data analysis. Two were excluded due to a technical issue, and one was excluded owing to their highly incorrect responses to the control items (>20 %).

5 Although the achievement predicate *cha*-can mean "kick" or "cold," the possibility of it being interpreted as "cold" is excluded by adding the modal expression *-(u)lyeko ha-* 'be about to,' which is not compatible with adjectives in Korean.

Table 1: The five types of embedding Predicates.

Type of predicate	With physical contact IHRC_P	Without physical contact IHRC_NP	Perception PER	Knowledge KNO	Control CON
Examples	*pwuthcap*-'catch' *mil*-'push'	*pwulu*-'call' *manna*-'meet'	*po*-'see' *tut*-'hear/ listen'	*al*-'know' *molu*-'do not know'	*manh*-'many' *kippu*- 'pleased'

Table 2: Predicates in the embedded clauses.

Types of predicates	Verbs			Adjectives
	Activity ACT	Accomplishment ACC	Achievement ACH	State STA
Examples	*ul*- 'cry'	*mek*- 'eat'	*cha*- 'kick'	*cak*- 'small'

followed by numbers ranging from 1 (very unnatural) to 7 (very natural), and instructed to decide on the acceptability of the sentences by clicking on a number. The task began with six practice trials, followed by 40 test trials and 150 fillers in a random order. On average, the total duration of the experiment was 15–20 min.

4 Results

We analyzed the data of 72 participants who completed the task, after excluding participants who did not complete the task ($N = 2$) or showed less than 50 % accuracy in their grammatical judgment of the filler sentences ($N = 6$). The results of the acceptability judgment task are shown in Figure 2. We used R (R Core Team 2024) and *lme4* (Bates et al. 2015) to perform a linear mixed effects analysis of the relationship between acceptability ratings (z-scored) and predicate type. In the model, we entered predicate type and stimuli list as fixed effects, as well as the random intercepts for subjects and sentences as random effects [lmer(Resp(z) ~ PredicateType + List + (1| Subj) + (1|item)]. Additionally, multiple comparisons among the predicate types were conducted using *lsmeans* (Lenth 2016) with Bonferroni correction. The results revealed that List effect was not significant ($\beta = -0.035$, SE = 0.018, $t = -1.94$, $p = 0.057$). The multiple comparisons showed significant differences between each pair of conditions, except for CON versus IHRC_NP, IHRC_NP versus IHRC_P and KNO versus PER (see Table 3). The results have two implications. First, although we observed no

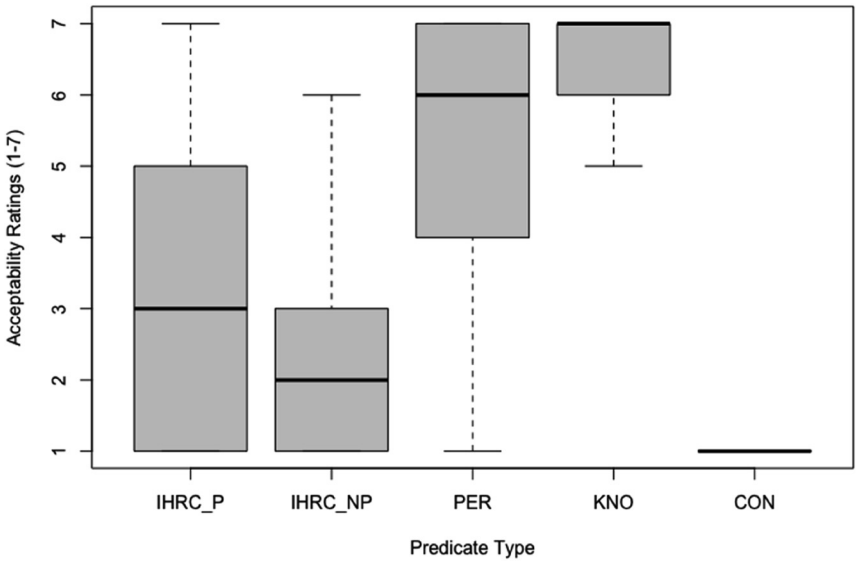

Figure 2: Means and standard deviations of acceptability judgement.

difference between IHRC_P and IHRC_NP, the fact that IHRC_P, not IHRC_NP, showed significantly higher acceptability than the CON condition supports our prediction: predicates implying physical contact accommodate IHRCs more naturally as their arguments than those that do not. Second, the acceptability of IHRC_P was lower than that of factive (i.e., KNO) and perceptive (i.e., PER) verb constructions but higher than that of ungrammatical sentences (i.e., CON).

Table 3: The results of multiple comparisons with Bonferroni correction.

Contrast	Estimate	*t*	*Adjusted p*
CON vs. IHRC_P	−0.849	−4.475	0.0013
CON vs. IHRC_NP	−0.405	−2.137	0.3878
CON vs. PER	−1.566	−8.255	<0.0001
CON vs. KNO	−2.093	−11.029	<0.0001
IHRC_NP vs. IHRC_P	−0.444	−2.339	0.2444
IHRC_NP vs. PER	−1.161	6.118	<0.0001
IHRC_NP vs. KNO	−1.687	8.892	<0.0001
IHRC_P vs. PER	−0.717	3.779	0.0051
IHRC_P vs. KNO	−1.243	6.553	<0.0001
KNO vs. PER	0.526	2.774	0.0837

CON, control condition; IHRC_P, verbs that can take IHRCs as their arguments and imply physical contact between two entities; IHRC_NP, verbs that can take IHRCs as their arguments and do not imply physical contact between two entities; PER, perceptive verbs; KNO, knowledge verbs.

5 Discussion

We tested whether the semantics of embedding predicates influence the acceptability of object IHRCs in Korean. Specifically, we predicted that verbs that imply physical contact between two entities are more likely to render an object IHRC construal, resulting in higher acceptability, than verbs that do not. Although our prediction was supported by the acceptability judgment task, four issues should be discussed further: exemplary sentences, world knowledge, low acceptability, and limitations.

5.1 Exemplary sentences and the acceptability of IHRCs

In the acceptability judgment task, significantly higher acceptability relative to the CON condition was found for IHRC_P (*pwuthcap-* 'catch' and *mil-* 'push') but not IHRC_NP (*manna-* 'meet' and *pwulu-* 'call'); among the predicates in IHRC_P, *pwuthcap-* 'catch' showed higher acceptability than *mil-* 'push.' The former difference can be understood in terms of the semantic difference between the two groups: only the predicates in IHRC_P imply physical contact. However, the latter difference requires further explanation because *pwuthcap-* 'catch' and *mil-* 'push' belong to the same semantic group (i.e., IHRC_P). In this section, we explore possible explanations for the acceptability difference between *pwuthcap-* 'catch' and *mil-* 'push,' which may point to the possibility that a certain verb, such as *pwuthcap-* 'catch,' serves as an exemplary member of object IHRCs.

5.1.1 Extension of the usage of verbs and item-based analogy

The two predicates in IHRC_P (i.e., *pwuthcap-* 'catch' and *mil-* 'push') imply physical contact, and *pwuthcap-* 'catch' showed the highest acceptance rate among the predicates taking IHRCs as their objects. One way to understand this is to observe the polysemous feature of the verbs *cap-* 'catch' and *pwuthcap-* 'catch.' The verb *cap-* 'catch' generally does not take an abstract entity as its object. However, its usage seems to have been extended metaphorically (Park 2022a). For instance, the *Standard Korean Language Dictionary* provides "checking or taking a picture of a momentary scene or appearance" as one of the meanings of *cap-* 'catch' and provides a relevant example (27).

(27) kyungchal-i pemhayng hyencang-ul cap-ass-ta.
police-NOM crime scene-ACC catch-PST-DECL
'The police caught the scene of the crime.'

In this case, *cap-* 'catch' is used metaphorically without assuming physical contact between two entities. Although *pwuthcap-* 'catch' is not listed with this meaning in the aforementioned dictionary, a similar usage is found for it, as in (28).

(28) kwanseycheng-i kacca milswu hyencang-ul
customs.service-NOM fake smuggling scene-ACC
pwuthcap-ass-supnita.
catch-PST-DECL
'The Korea Customs Service caught the scene of smuggling of fake goods.' (Google)

Furthermore, in (29), the noun *hyencang* 'scene' is modified by an RC, in which case the sentence looks similar to the IHRC in (30). In the case of the IHRC in (30), *kes*, a part of the quasi-nominalizer (see Section 1), is used instead of *hyencang* 'scene.'

(29) ku-tul-un yeswunim-i kwucen yulpep-ul eki-nu-n
he-PL-TOP Jesus-NOM oral law-ACC break-IPFV-REL
hyencang-ul pwuthcap-ulye ko hyeolan-i-ess-supnita.
scene-ACC catch-in.order.to bloodshot.eye-COP-PST-DECL
'They made frantic attempts to catch the scene in which Jesus is breaking the oral law.' (Google)

(30) seng-ul peli-ko tocwuha-nu-n kes-ul
castle-ACC abandon-and run.away-IPFV-REL KES-ACC
pwuthcap-ass-supnita.
catch-PST-DECL
'We caught the man, who was running away abandoning the castle.' (Google)

Considering these examples, we can assume that an IHRC construal may be more acceptable in line with the extension of the usage of verbs such as *cap-* 'catch' and *pwuthcap-* 'catch.' In turn, predicates that share similar semantic features with these verbs may become more acceptable when they take IHRCs as their objects, forming an exemplary cluster of predicates that imply physical contact. Such a predicate cluster can be schematized as follows:

(31) a. [X]-NOM/TOP [Xentity]-ACC [Vcatch].→Typical usage
b. [X]-NOM/TOP [Xscene]-ACC [Vcatch].→Extended usage
c. [X]-NOM/TOP [REL Xscene]-ACC [Vcatch].→Extended usage
d. [X]-NOM/TOP [REL KES]-ACC [Vcatch].→IHRC construal
e. [X]-NOM/TOP [REL KES]-ACC [Vphysical contact].→IHRC construal

In this conjecture, exemplary verbs such as *cap-* 'catch' and *pwuthcap-* 'catch' cause other verbs to take IHRCs as their objects based on semantic similarities (Croft 2003, 2012; Diessel 2019; Goldberg 2016b, 2019). As (31d) becomes more acceptable, so does (31e), through the semantic resemblance between Vcatch and Vphysical contact. In other words, the conjecture in (31) suggests that IHRCs in Korean are partially productive or verb-class-specific constructions.[6] Nonetheless, we are not arguing that the use of Korean IHRCs is triggered by verbs such as *cap-* 'catch' or *pwuthcap-* 'catch.'[7] Rather, we are offering a possible explanation for why IHRC_P showed a higher acceptance rate than IHRC_NP and why *pwuthcap-* 'catch' showed the highest acceptance rate in the acceptability judgment task. The conjecture in (31) – in which the use of IHRCs expands, centering around an exemplary cluster of predicates – enables an explication of the highly restricted distribution of IHRCs and explains why certain examples of IHRCs are perceived as more acceptable by Korean speakers.

Notably, the conjecture in (31) shows continuity between typical and extended usages of the verb *pwuthcap-* 'catch,' as it appears to undergo semantic change and may be in an overlap stage, allowing layering or the coexistence of variants (Hopper 1991; Traugott and Dasher 2002). Therefore, the continuity of the conjecture in (31) can be understood in two ways. First, all examples in (31) are used, although examples like (31d and e) appear less often than those in (31a–c). Second, the examples in (31d and e) reflect typical and extended usages in the way they are interpreted. More specifically, *kes* in (31d and e) can be interpreted as an event, as in (31b and c), or an entity, as in (31a). Regarding the dual interpretation of *kes* in (31d and e), we can refer to Lee and Song (2023); as part of a survey, the IHRC in (32) was shown to native Korean speakers, who were then asked two questions, which are listed in (33). The results are shown in Table 4.

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6 Notably, the "way" construction (example given below) started with a few general motion verbs and extended its usage to include a wider range of other semantic types of verbs, which resulted in a highly idiosyncratic construction (Diessel 2019; Israel 1996; Mondorf 2010; Perek 2018; Traugott and Trousdale 2013).

(i) a. John dug his way out of prison.
b. Sam joked his way into the meeting.
c. Sue whistled her way to the front door.
(Diessel 2019, p. 128).

7 Examples that can be considered IHRCs are found in Middle Korean (Lee 1994; Mun 2012). However, in these examples, an abstract noun *i* 'a person' is used (Lee 1994, pp. 54–56) instead of *kes*. Incidentally, the use of *-un/nun kes* 'relativizer KES' for encoding nominal clauses spread exponentially from the end of the 19th century and throughout the 20th century, replacing or competing with the standard nominalizers *-(u)m* and *-ki* (Mun 2017, pp. 52–58). See also Rhee (2008) for the rise and fall of Korean nominalizers.

Table 4: Frequency and proportion of answers to (35).

Answer to (35)	Interpretation	Frequency	% Out of 83	% Out of (¬)A
A: 'yes'	Entity reading	23	27.71 %	52.27 %
A: 'yes'	Event reading	21	25.30 %	47.73 %
¬A: 'no'	Unacceptable	39	46.99 %	100.00 %

(32) kyengchal-i totwuk-i tomangka-nu-n kes-ul
Police-NOM thief-NOM run away-IMPF-REL KES-ACC
cap-ass-ta.
catch-PST-DEC
'The police caught the thief who was running away.'

(33) Do you think that this sentence is acceptable? (Answer 'yes' or 'no')
a. If 'yes,' then what do you think *kes* in this sentence designates?
b. If 'no,' then why do you think this sentence is not acceptable?

As in Table 4, those who judged the example in (32) as acceptable can be split into two groups based on the interpretation of *kes*: 52.27 % of participants interpreted *kes* as an entity, while 47.73 % interpreted it as an event. As the typical usage of *cap-* 'catch' involves taking an entity as its object, and its extended usage involves taking an event as its object, we can argue that the participants who interpreted *kes* as an entity interpreted *cap-* 'catch' with its typical meaning and that the participants who interpreted *kes* as an event interpreted *cap-* 'catch' with its extended meaning. The interpretations of the usages in (31a) and (31b and c) are found in (31d and e). This suggests that Korean speakers may have different argument structures for the verb *cap-* 'catch,' as the usage of this verb is in the process of semantic extension.

Finally, the conjecture in (31) has an implication for the mechanism of innovative verb use. Although exemplary verbs, such as *cap-* 'catch' or *pwuthcap-* 'catch,' are starting to be used in an innovative manner through the extension of their meanings, other verbs are used in new constructions through their semantic similarity to such exemplary verbs. In essence, although the innovation began with the metaphorical use of an item, it has been extended by an item-based analogy.

5.1.2 Examining verb-specific effects

The fact that *pwuthcap-* 'catch' was found to be more acceptable than *mil-* 'push' despite both implying physical contact indicates the presence of verb-specific effects, similar to lexical effects in other alternations, such as the possessor noun in the genitive alternation (Dubois et al. 2023, p. 438; Heller et al. 2017, p. 14) or the infinitive

verb in the English future marker alternation (Engel 2022, p. 213). Thus, for the sake of investigating if the higher acceptance rate of *pwuthcap-* 'catch' resulted from the general high frequency of this verb, we checked whether the skewed frequency effect impacted our results such that the higher acceptance rate of *pwuthcap-* 'catch' can be attributed to its higher frequency (Bybee and Eddington 2006; Divjak 2017; Kempen and Harbusch 2005). The lexical frequency of the predicates in IHRC_P and IHRC_NP confirms our observation. Table 5 shows the frequency of the predicates in IHRC_P and IHRC_NP based on Kim (2005). The frequency of the predicates in IHRC_NP is 10 times higher than that of the predicates in IHRC_P.[8] In IHRC_P, the frequency of *pwuthcap-* 'catch' is half that of *mil-* 'push.' Thus, our observation cannot be countered based on the frequency effect. The acceptability of the less frequent set of IHRC_P was higher than that of the more frequent set of IHRC_NP, and the acceptability of the less frequent predicate *pwuthcap-* 'catch' was higher than that of the more frequent predicate *mil-* 'push.'

Similarly, to examine whether *pwuthcap-* 'catch' appears frequently in object IHRCs, we reanalyzed the IHRC data found in Lee (2020b) and Cho (2016) as a post hoc analysis. We identified nine object IHRCs in spoken data in Lee (2020b), and in one example, a predicate implying physical contact was used as an embedding predicate (*mwukk-* 'tie'). Additionally, we identified 24 object IHRCs in spoken data in Cho (2016), and in four examples, a predicate implying physical contact was used as an embedding predicate (e.g., *neh-* 'put' or *manci-* 'touch'). Furthermore, we identified 28 object IHRCs in written data in Lee (2020b), and in 17 examples, a predicate implying physical contact was used as an embedding predicate (e.g., *kkwuleo-* 'drag,' or *kacyeo-* 'fetch,'). Although we found no instance of *pwuthcap-* 'catch' or *cap-* 'catch' being used as an embedding predicate in those 17 examples, the semantically similar word *pwuthtul-* 'hold' was used twice. The post hoc analysis seems to support the conjecture in (31), as the higher acceptance rate of *pwuthcap-* 'catch' may not be attributed to the higher frequency of IHRCs in which *pwuthcap-* 'catch' is used as an embedding predicate. On the other hand, if *cap-* 'catch' and *pwuthcap-* 'catch' serve as exemplary verbs and cause other verbs to take IHRCs as their objects based on semantic similarities, we may find more IHRC examples in which such verbs are used as an embedding predicate. Nevertheless, the result of the post hoc analysis does not show the expected outcome. The unexpected outcome may reflect the discrepancy between frequency and acceptability concerning low-frequency constructions in previous studies (Arppe and Järvikivi 2007; Bader and Häussler 2009; Bermel and Knittle 2012a, b; Divjak 2008; Kempen and Harbushch 2005, 2008). Alternatively, it may require further explanation,

8 *Pwulu-*has three different meanings: (i) 'call one's name,' (ii) 'sing (a song),' and (iii) 'feel full.' In this study, we considered only its first meaning. Thus, Table 5 only contains the frequency of *pwulu-*used in this sense. The frequencies of the second and third meanings were 7 and 23, respectively.

Table 5: The Frequency of the predicates in IHRC_P and IHRC_NP.

Type of predicate	Example	Frequency
IHRC_P	*pwuthcap-* 'catch'	108
	mil- 'push'	287
	Total	395
IHRC_NP	*pwulu-* 'call'	1,807
	manna- 'meet'	2,094
	Total	3,901

in line with Divjak's (2017, p. 372) argument that "it is not so much the case that usage frequency has problems predicting acceptability judgments at the low end of the frequency spectrum. It is rather the case that the wrong type of frequency data has been foregrounded."

Regarding the post hoc analysis, two aspects must be noted. First, the pragmatic functions of IHRCs can be considered one of the factors that might have contributed to the lack of object IHRCs with a matrix predicate implying physical contact in spoken data (see Section 1). For instance, IHRCs represent the head noun more quickly than prenominal RCs, and this function can be used more often in spoken data. This pragmatic role might have contributed to various predicates taking IHRCs as their arguments in spoken data. Second, the lack of object IHRCs with *cap-* 'catch' or *pwuthcap-* 'catch' as their matrix predicate may suggest that more than one subtype of predicates allows the extension of the usage of predicates – object IHRCs are a set of verb-class-specific constructions. This assumption is supported by Perek (2015, pp. 111–142), who describes the conative construction as a set of verb-class-specific constructions incorporating four constructions, namely ingesting, cutting, pulling, and hitting.

5.2 World knowledge and the acceptability of IHRCs

As shown in Section 2, a predicate may extend its usage through its semantic similarity to one that has already attained a new usage. For example, one factor affecting the acceptability of the sentences in (22b–f) is each verb's semantic similarity to "cough" in (22a). Essentially, the sentence with the predicate showing higher semantic similarity to "cough" represents a higher acceptance rate than those showing lower semantic similarity. Although the semantic similarity between two predicates is a critical factor in the acceptability judgment in (22), world knowledge also is crucial in how acceptable a sentence can be. The examples in (34) illustrate this.

(34) a. Kirsten came back from a 5k run and was out of breath. Breathing heavily, she sat down and breathed the napkin off the table.
b. Jen held her breath for 45 seconds. Then she panted the napkin off the table.
c. Julio wheezed the feather off the table. (Boas 2003, p. 273)

When the examples in (22b–d) are corroborated by contextual background information, their acceptability can be improved, as in (34a–c). More specifically, the extra information increases the strength of the air emission of "breathe" and "pant" in (34a–b) or changes the "napkin," the object of the caused-motion construction, to the "feather," which is readily movable by a slight movement of the air, in (34c).

As mentioned in previous studies, the acceptance of IHRCs also appears to be impacted by world knowledge (Kim 2008a, b, 1996, 2002; Lee 2021b). This feature is found in our study as well. As seen below, (35a) shows a higher acceptance rate than (35b): approximately 6.53 (SD = 1.01) and 3.68 (SD = 2.29), respectively.

(35) a. kyengchal-un chelswu-ka koyangi-lul
policeman-TOP Cheolsoo-NOM cat-ACC
cha-lyeko ha-nu-n kes-ul pwuthcap-ass-ta.
kick-be.about.to-IPFV-REL KES-ACC catch-PST-DECL
'A policeman caught Cheolsoo, who was about to kick a cat.'
b. kyengchal-un yenghi-ka wul-ko iss-nu-n
policeman-TOP Yeonghee-NOM cry-CONTIN-IPFV-REL
kes-ul pwuthcap-ass-ta.
KES-ACC catch-PST-DECL
'A policeman caught Yeonghee, who was crying.'

The difference in the acceptance rate between (35a) and (35b) seems to reflect the likelihood of each situation occurring in real life based on the situations described in IHRCs. For instance, if a policeman witnesses someone who is going to kick a cat, as in (35a), trying to stop that action would not be unexpected. In this regard, catching the person can be a plausible reaction. However, if a person is crying, as in (35b), catching them would not be as plausible as the action in (35a). Unlike IHRCs, the prenominal counterparts to (35a) and (35b) do not seem to differ: (36b) is as acceptable as (36a).

(36) a. kyengchal-un koyangi-lul cha-lyeko ha-nu-n
policeman-un cat-ACC kick-be.about.to-IPFV-REL
chelswu-lul pwuthcap-ass-ta.
Cheolsoo-ACC catch-PST-DECL
'A policeman caught Cheolsoo, who was about to kick a cat.'

b. kyengchal-nun wul-ko iss-nu-n yenghi-lul
policeman-TOP cry-CONTIN-IPFV-REL Yeonghee-ACC
pwuthcap-ass-ta.
catch-PST-DECL
'A policeman caught Yeonghee, who was crying.'

Regarding IHRCs, when the event in the embedded clause is relevant to that in the matrix clause, such that the latter is a relevant reaction to the former (c.f. Lee 2021a, b), the acceptance rate tends to be higher. The fact that real-life experience or world knowledge affects the acceptability of IHRCs in Korean can be connected to the relevancy condition described by Kuroda (1976, p. 270), who argues that "for a headless relative clause (*an IHRC in this study*) to be acceptable, it must be interpreted pragmatically in such a way that it is directly relevant to the pragmatic content of its matrix clause."

This engenders the question of why world knowledge affects the acceptability of Korean object IHRCs. To address this, we first examine the likelihood of the overlap of the two events described in the embedded and matrix clauses. Specifically, we can refer to how plausible the event in the embedded clause is in relation to the event in the matrix clause to explain the different acceptance rates between (35a) and (35b). The overlap of the two events in (35a) is more likely to occur than the overlap of those in (35b), leading to the higher acceptance rate of (35a). The overlap of the two events has been aptly specified in previous studies as temporal, causal, and concessive relations between the embedded and embedding events. In Kim (2008a, b, p. 116), for instance, temporal, causal, and concessive relations are understood as "the most commonly found readings for an embedded clause across languages." Furthermore, Lee (2021a, b) explains that these three adverbial relations are derived from a perception–reaction relation between the embedded and embedding clauses. When the reaction is expected by world knowledge, a temporal or causal relation is rendered. When the reaction is not expected by world knowledge, a temporal or concessive relation is rendered. In essence, one way that world knowledge affects the acceptability of Korean object IHRCs is to render or not render a temporal, causal, or concessive relation between the embedded and embedding events.

Notably, Korean object IHRCs provide an example of how background information affects the acceptability of less conventional (or unconventional) uses of a verb. As shown above, regarding the uses of "breathe," "pant," and "wheeze" in caused-motion constructions, background information can affect their acceptability by changing the dynamic force relation between the air emission and the movable object. Essentially, a "language user's linguistic decisions are not always semantically motivated, suggesting the two factors, that is, semantic fit and experience, are in principle independent of each other" (Diessel 2015, 2019, p. 124). In the case of the examples in (35), real-life

experience or background information helps the verbs fit into the meaning or function of caused-motion constructions. Similarly, as shown above, the object IHRCs in Korean are received more naturally when matrix verbs imply physical contact between the subject of the matrix clause and the object in the embedded clause. Additionally, they are more sensitive to background information than their prenominal counterparts, which further indicates that object IHRCs in Korean are a suitable candidate for a partially productive or verb-specific construction.

5.3 Reflections on the low acceptability of Korean IHRCs

In this section, we examine the low acceptability of Korean IHRCs and offer potential attributing factors. As shown in , the absolute scores of the acceptability judgment task for IHRC_P and IHRC_NP were 3.27 and 2.26, respectively; these were much lower than the scores for KNO (6.29) and PER (5.00). The low acceptability of Korean IHRCs can be understood in terms of multiple aspects. First, an IHRC construal is possible through innovative uses of verbs such as *pwuthcap-* 'catch.' More specifically, *pwuthcap-* 'catch' does not usually take a clause as its object (see Section 1). Jo (2003, p. 557), for instance, explains the "marginality of the IHRC in Korean" by characterizing an IHRC construal as "forced processing" for dealing with the syntax–semantics mismatch. Second, statistical preemption or competition among expressions can contribute to the low acceptability of Korean IHRCs. Goldberg (2019, p. 75), for instance, explains why the example in (37a) is less acceptable (or unacceptable) than the one in (37b): when speakers have access to a more familiar way of expressing their intended meaning in a given context, a less familiar way of expressing the same message can be curtailed by the existence of the more familiar alternative.

(37) a. ?She explained her the news.
b. She told her the news.

Similarly, the existence of the major RC type in Korean – prenominal RCs – may contribute to the low acceptability of IHRCs, as suggested by Lee et al. (2023). Fourth, the low frequency of IHRCs may explain their low acceptability. For instance, according to Bybee and Eddington (2006, p. 349), "grammaticality or acceptability judgments are heavily based on familiarity, that is, the speaker's experience with language in use. Sequences of linguistic units that are of high frequency or resemble sequences of high frequency will be judged more acceptable than those that are of low frequency or do not resemble frequently used structures."

Although the general acceptability of IHRCs is low, some examples have high acceptability scores, as in (35a). This has two possible implications. First, this supports Korean IHRCs being a partially productive or verb-specific construction. In

other words, the existence of examples of IHRCs with a high acceptance rate can be readily explained if an IHRC construal is created through an extension of the usage of certain verbs. Second, the three interactions between a human and an object in the cognitive model given in Verspoor (2000) may be gradient in nature. For instance, typical verbs may exist among those that allow a direct physical interaction between the subject of the matrix clause and the object in the embedded clause, and they may show different features depending on the language. In Korean IHRCs, this typicality seems to function as a relevant factor regarding their acceptability, as shown by our findings. In essence, when verbs implying physical contact are used as an embedding predicate, IHRCs may be more acceptable; this, in turn, suggests that a direct physical interaction is recognized as a separate category in the speaker's mind and functions as a constraint for a syntactic construction in Korean.

5.4 Limitations and future studies

This study contributes to understanding partial productivity or local generalization in language use by proposing a suitable candidate for a partially productive or verb-specific construction in Korean. It also enriches the understanding of the interaction between the subject of the matrix clause and the object in the embedded clause, for which Verspoor (2000) specifies a cognitive model, by providing an example of a direct physical interaction that only permits interactions between two entities existing in the here and now. Nevertheless, it has several limitations concerning the scope of the subject and applicability of the findings. First, our findings have a narrow scope: they are not valid for subject IHRCs since no object exists with which a subject can interact. Most previous studies on Korean IHRCs have provided formal constraints that can be applied only to object IHRCs, showing that object IHRCs are different from subject IHRCs in terms of constraints (see Section 1). Even studies that have provided examples of subject IHRCs have not offered a unified explanation that can be applied to subject and object IHRCs. To attain a unified understanding of IHRCs in Korean, future research can investigate historical Korean data to examine whether object IHRCs can be developed into different constructions. Second, the extent of the generalizability of our findings is questionable because they are based on the verbs *pwuthcap-* 'catch' and *mil-* 'push' alone. As highlighted in , *pwuthcap-* 'catch' being more acceptable than *mil-* 'push' despite both implying physical contact indicates verb-specific effects. Although proving that these two verbs are representative of the category of physical contact would be ideal, two issues arise. First, the subcategorization of the verbs in this category has not been systematically provided in Korean. Second, although physical contact is suggested as a semantic type of verb, its core feature varies depending on researchers, which affects both lists of verbs

belonging to it and of its core members. Faber and Marial Usón (1999, p. 183), for instance, subcategorize verbs based on the result of an action. In this approach, *ttayli-* 'hit' or *chi-* 'hit' can be classified as a verb of contact, whereas *pwuthcap-* 'catch' and *mil-* 'push' are classified as verbs of possession and of movement, respectively. Furthermore, considering the degree of force and the existence of continuity of an action, Kim (2000) classifies *manci-* 'touch' as a verb of contact but does not do the same for *mwuncilu-* 'rub,' which is classified as a verb of physical contact by Viberg (1999). Kim (2017) classifies *pwuthcap-* 'catch' as a verb of physical contact as its definition includes a body part in the *Standard Korean Dictionary* (which the author uses as a reference). Conversely, *mil-* 'push' is missing from his list of verbs of physical contact, possibly because its definition does not include a body part in the dictionary, even though *mil-* 'push' can also imply an activity involving body parts. Phil (2004) lists a few examples of verbs of contact without providing a defining feature of this category. Although neither *pwuthcap-* 'catch' nor *mil-* 'push' is included in this list, similar verbs such as *manci-* 'touch' and *nwulu-* 'press' are present. Such complex issues regarding ensuring the generalizability of the results can be addressed by adopting two alternative methods in future studies. An experiment that includes a more varied selection of verbs implying physical contact can be conducted. Alternatively (or simultaneously), corpus-based research can be conducted, in which IHRCs are annotated with regard to the type of embedding predicate to see whether the same effect appears – embedding predicates implying physical contact are more likely to occur in IHRCs than those without this implied meaning.

6 Conclusions

In this study, we investigated Korean IHRCs, focusing on embedding predicates, to enhance our understanding of the limited distribution of IHRCs. Specifically, we examined whether embedding predicates' semantic type influences the acceptability of IHRCs. The results showed significantly higher acceptability, compared to the control condition, for predicates implying physical contact between entities but not for those that do not. This finding may indicate that Korean IHRCs can be considered a partially productive or verb-class-specific construction. This study contributes to understanding partial productivity or local generalization in language use and the interaction, discussed in Verspoor's (2000) work, between a human and an object.

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