Chapter 6. Gesture with the causative-inchoative alternation

6.1 Introduction

6.1.1 Background and motivation for studying the causative-inchoative alternation

The present chapter examines the causative-inchoative alternation, which consists of high-transitive (referred to as “transitive” in what follows in this chapter) and intransitive clauses with similar types of events. As noted in Chapter 4, both transitive and intransitive constructions of the alternation involve the same events, which consist of external causation and an entity’s resultant change of state or location. However, the choice of transitive or intransitive constructions in speech reflects different construals of these events. As maintained in Langacker (2008a: 385), by using a transitive construction, a speaker profiles the whole chain of the event, namely, both the external causation and the entity’s change of state/location; by using an intransitive construction, a speaker has an absolute construal of the event; that is, only the change of state or location of the entity is profiled, rather than any external causation which brings about the change.

The motivations for investigating this alternation are as follows. To begin with, in Chapter 5, gestures were found to correlate with the type of transitivity, including transitive and intransitive constructions. However, in the dataset for that chapter, prototypical transitive events co-occurring with gestures were mainly placement events (e.g. in terms of clauses with put) while prototypical intransitive events were mainly internally-caused motion events (e.g. in terms of clauses with go, dance). It thus remains unclear whether the difference in gestures together with transitive and intransitive clauses is correlated with transitivity or simply with the type of event. Therefore, the current chapter examines the causative-inchoative alternation, which consists of transitive and intransitive clauses with similar types of events. In this vein, the relation between gesture and transitivity versus the types of events can be established. The second motivation is that the path property in motion events – one sub-type of events expressed by the causative-inchoative alternation – is believed to play a role in gestural use, regardless of transitivity (Parrill 2010). The other aim of the present chapter is thus to investigate the relation between motion events with this path property (of the Figure and the Agent), transitivity and gestural use, whereby the relation between transitivity and gesture can be identified (more details can be found in Chapter 4).

Considering these motivations together, the present chapter aims to examine a) whether the above events — events with caused change of state/location — play a role in gesture, regardless of transitivity; and b) whether two types of path in motion
events (that is, the Agent’s and the Figure’s paths) play roles in gesture, regardless of transitivity. Specifically, the following research questions are addressed in this chapter:

1) Does gesture differ with respect to transitivity when the alternation involves the same events (external causation + physical or metaphorical change of location)? Examples under investigation are *he opened the door vs. the door opened, he broke the glass vs. the glass broke, and he rolled down the window vs. the window rolled down.*

2) Does gesture relate to the path property of the Figure (that is, +/− explicit Figure’s path or +/− OBL) in motion events, regardless of transitivity? If so, how? If not, how does gesture relate to the path of the Figure and transitivity respectively? Examples for examination include *she dropped the ring (TRAN - OBL) vs. the ring dropped (INTR - OBL), and she dropped the ring off the boat (TRAN + OBL) vs. the ring dropped off the boat (INTR + OBL).*

3) Does gesture relate to the path property of the Agent (that is, +/− Agent’s path) in motion events, regardless of transitivity? If so, how? If not, how does gesture relate to the path of the Agent and transitivity respectively? Examples under investigation include *he moved his toupee up (TRAN - Agent’s path) and he moved the sofa out of the room (TRAN + Agent’s path) versus the painting moved from the bed room to the garage (intransitive motion constructions).*

4) This will lead to a discussion of the following question: To what extent do the above gestural behaviors relate to the ways in which speakers may be conceptualizing transitive and intransitive constructions of the alternation (that is, in terms of +/− a profile of external causation)? To what extent do the gestures relate to properties of the events examined above?

Note that this study focuses on representational gestures, driven by the finding in Chapter 5 and other studies that representational, deictic, and discourse-related gestures seem to involve different cognitive origins and in particular that only representational gestures seem to relate to the type of transitivity. Like the other chapters in this thesis, the frequency of representational gestures produced and the gestural Modes of Representation constitute major categories for investigation.

6.1.2 Verbs used in the alternation and the scope of the present study

A widely acknowledged list of verbs licensing the causative-inchoative alternation is provided by Levin (1993: 28), including *Break verbs (e.g. break, tear, shatter), Bend verbs (e.g. bend, fold, wrinkle), Roll verbs*\(^{38}\) (e.g. *roll, drop, drift*), and Others (e.g. *jump and fly*), constitute ‘manner of motion verbs’.

\(^{38}\) This term, as well as the other terms, is from Levin (1993). According to Levin, Roll verbs, together with Run verbs (e.g., *jump and fly*), constitute ‘manner of motion verbs’.
open, close, widen, blacken). Examples are given in Table 6.1. These verbs are usually classified into two sub-categories: verbs of change of state (Break verbs, Bend verbs, and Others) and verbs of change of location (the Roll verbs). The former entail changes in a property of an entity, as in cases like she broke a vase, she bent the stick and she opened the door, whereas the latter entail changes in the location of an entity, as in, for example, she rolled the car down the embankment and she moved the picture to that room. As for the relation between these two categories, the present study follows Goldberg’s (1995: 83) position that “change of state” is understood as a metaphorical change of location, that is, a movement to a new location.

Table 6.1 Types of verbs licensing the causative-inchoative alternation and their examples (Levin 1993: 28)

<table>
<thead>
<tr>
<th>Types of verbs</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Break verbs</td>
<td>break, chip, crack, crash, crush, fracture, rip, shatter, smash, snap, splinter, split, tear</td>
</tr>
<tr>
<td>Bend verbs</td>
<td>bend, crease, crinkle, crumple, fold, rumple, wrinkle</td>
</tr>
<tr>
<td>Roll verbs</td>
<td>bounce, drift, drop, float, glide, move, roll, slide, swing including MOTION AROUND AN AXIS: coil, revolve, rotate, spin, turn, twirl, twist, whirl, wind</td>
</tr>
</tbody>
</table>
| Others         | a) ZERO-RELATED TO ADJECTIVE, e.g. dry, empty, loose, open, smooth  
b) CHANGE OF COLOR, e.g. blacken, redden, whiten  
c) -en VERBS, e.g. awaken, brighten, broaden  
d) -ify VERBS, e.g. intensify, purify, solidify  
e) -ize VERBS, e.g. decentralize, fossilize, neutralize, stabilize, westernize  
f) AMUSE-TYPE PSYCH-VERBS, e.g. delight, puzzle, sadden, sicken, thrill  
g) Others, e.g. close, collapse, enlarge, expand |

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39 This term is taken from Levin (1993). By using the term “zero-related”, Levin “does not intend to take any position with respect to the debate as to whether the derivational process involves the addition of a category-changing zero-morpheme or not” (1993: 3).
The present study only considers verbs used with literal meanings in this alternation, thus excluding metaphorical expressions such as *he broke the rule* and *the world opened up to you at that moment*, since the issue of metaphor is not a concern of the present research. Transitive and intransitive activities depicting bodily motions, such as *he opened the eyes* and *he folded his arms*, fall outside the scope of the present chapter as well, since in these activities agents and patients belong to the same participants (that is to say, they lack external causation), and thereby they can be viewed as either transitive or intransitive semantically.

### 6.2 Method

#### 6.2.1 Database

The present study is based on all American talk show programs in English in the Red Hen database except *The Late Late Show with Craig Ferguson* and *The Late Show with David Letterman*, since the rest of the TV programs are already sufficient for the present research. Thus, a total of 12 talk show programs are involved, including *Late Night with Conan O'Brien, Late Night with Jimmy Fallon, Late Night with Seth Meyers, The Ellen DeGeneres Show, The Jay Leno Show, The Megan Mullally Show, Tonight Show with Conan O'Brien, Tonight Show with Jay Leno, Tonight Show with Jimmy Fallon*, which are from the KNBC channel, *The Late Late Show with James Corden, The Late Show with Stephen Colbert*, which are from the KCBS channel, and *Jimmy_Kimmel_Live*, which is from KABC.

Only the monologue and interviewing portions of talk show programs were included, thereby excluding the following portions: playing games on the show, singing (some talk shows invite singers to sing at the beginning), advertisements, reading portions, where speakers’ hands were usually invisible, and hosts often held a piece of paper as they read something from the internet, and phone call, in which the speaker’s hand movement might be influenced by the fact that the interlocutor is invisible. Note that monologues were included in this chapter and in the coming chapters (that is, Chapters 7 and 8). This is different from Chapter 5, which only concerns data from interviews. Including monologues (together with interviews) in Chapters 6, 7 and 8 is driven by the fact that the data from interviews were either not sufficient for analysis (as in Chapter 7) or difficult to search from the database through the existing search interface (as in Chapter 8).

#### 6.2.2 Data collection

1) **Verbal item selection**

For the categories of breaking, bending, and rolling, the two most frequent verbs in the Red Hen database were chosen: *break, tear, bend, fold, drop, move*. As for the
‘Others’ category, the verbs examined were open and close, since a) these two verbs are widely used as good examples to illustrate the causative-inchoative alternation and their construal (Hale & Keyser 1986; Langacker 2008a); and b) they might be more likely to be accompanied by representational gestures than the other verbs in this category, such as intensify, purify, solidify, because of their motor-spatial nature. In addition, the motion verb roll was also included in the research, since intransitive motion events relating to this verb were frequently examined in previous studies, and thus it might be of interest to examine whether the accompanying gestures would differ depending on the transitivity of this verb in speech. Consequently, the following verbs were included in the data retrieval: break, tear, bend, fold, drop, move, open, close, and roll.

2) Data retrieval
The verbs chosen were retrieved from the above talk show programs one by one.40 The access period was around 11 years, ranging from January 1st, 2005 to November 18th, 2015, which was the longest access period at the point of the data search. Note that only the simple past tense and participle forms of verbs (-ed) were included in the retrieval, excluding the present tense of verbs or the progressive forms. The present tense was excluded because intransitive clauses with the present tense of these verbs (e.g., the door opens easily) usually depict entities’ properties rather than their changes of state or location, which therefore belong to the category of “the middle alternation” rather than the causative-inchoative alternation under investigation. Exclusion of the progressive aspect of verbs attempts to rule out the possibility that the prospective gestural difference is simply caused by the difference in the verbs’ aspects, such as the different aspects used in he’s opening the door vs. the door opened.

3) Noise filtering
“Noises” were excluded from the data retrieved, which mainly included the following: a) metaphorical expressions, such as that opened the door to all pop music; b) cases depicting bodily motion such as his eyes closed and I bent down to her level; c) intransitive cases which depicted agentive internally caused motion, such as I rolled over and walked into work, since in the causative-inchoative alternation, the intransitive clauses depicted changes with an external causation in the frame, as discussed above, whereas these cases were self-propelled activities; d) cases in

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40 The data were retrieved verb by verb, program by program, manually. However, thanks to technical developments, it can now be done all at once through the NewsScape interface, as done in Chapter 8.
which both of the speaker’s hands were invisible on the screen; and e) cases in which the speaker was performing a real action.

This yielded a corpus of 711 clauses involving the above verbs.

6.2.3 Speech coding

1) Transitivity coding
Transitivity was coded in terms of whether there was an object in the clause or not, which is the same distinction that was made in the previous chapter. If there was an object involved, it was coded as “transitive”; if not, it was coded as “intransitive”, e.g., she opened the door (transitive) and the door opened (intransitive).

The verbs tear, bend, and fold were hardly used in intransitive clauses in the corpus. For instance, in the case of the verb tear, there were 61 transitive uses but only 4 intransitive uses in the corpus. Clauses with these three verbs were therefore excluded from the research (total N=65).

This yielded a total corpus of 527 transitive clauses and 119 intransitive clauses with verbs of break, open, close, move, drop, and roll.

2) Coding of Figure’s path: explicit or implicit path (+/- a directional oblique phrase/OBL)
In order to investigate the relation between the path property of the Figure in motion events, transitivity, and gestural use, clauses with the verbs referring to changes of physical location — including uses of move, drop, and roll — were further coded as to whether or not they involved an explicit path in the Figure; that is whether a directional oblique phrase (OBL) is involved or not, such as he dropped a fork off the boat (+ OBL) vs. our waiter dropped a fork (- OBL). In the corpus, a directional phrase mostly referred to a directional prepositional or an adverb phrase, as in we moved the items out of the way and I just moved his chair closer to the one we already have. Note that the oblique phrases (OBL) sometimes simply consisted of an adverb, as in he rolled down the window.

Among the 298 clauses referring to physical change of location, there are 154 with oblique phrases (+ OBL) and 144 cases without (-OBL).

3) Coding of Agent’s path: +/- path
In order to investigate the relation between the Agent’s path property in motion events, transitivity, and gestural use, clauses with the verbs referring to changes of physical location — including move, drop, and roll — were also coded for whether the Agent was necessarily involved in a displacement or not, such as he moved his toupee up or he rolled down the window (- Agent’s path) vs. he moved the sofa out of
the bedroom or he rolled the car down the embankment (+ Agent’s path). The category “Unclear” was also included as a label, since there were cases in which it was difficult to tell whether the Agent was involved in a displacement or not. For instance, in the case of he moved his basket (to make room for others in the supermarket), the Agent he could stand in a location and simply move his basket, and with equal likelihood he could move the basket as he moved his location. Note that all dropping activities were considered as events without the Agent’s path, since the Agent’s displacement was not involved in these activities, either in activities of making or letting objects fall, such as he dropped the fork and I dropped eggs out of the window, or in activities involving putting objects in a place without formality such as he dropped off some cookies for us. Note also that this category (+/- Agent’s path) is not applied in the case of intransitive clauses, given that intransitive clauses do not explicitly express the Agent.

All the cases with the Agent (N=108) except those involving the verb drop (N=146) were given to a second coder, since subjectivity is probably involved in the coding of this category. The agreement was 70%. A major disagreement concerned cases of rolling vehicles (N=14), such as in I rolled my mom’s car. These cases indeed involved displacement of the Agent, but the motions were different from those of other cases, as in they rolled in a trophy. The former cases (cases like I rolled my mom’s car) mostly referred to motion of the Figure and the latter (cases like they rolled in a trophy) referred to motion of the Agent. These cases, therefore, were noted separately, rather than included in the category “the Agent with path” or “the Agent without path”. All other cases of disagreement were discussed between coders. They were either solved through discussion or simply were collapsed into the label “Unclear” when there was disagreement between coders. The corpus ultimately consists of 29 events with the Agent’s path and 202 events without the Agent’s path (including all cases of 146 dropping activities), as well as 9 cases which were unclear.

6.2.4 Gesture coding

Gesture identification All 646 clauses were coded for whether they were accompanied by a gesture or not. In the corpus, there are 569 clauses accompanied by gestures and 77 clauses that are not.

Gesture type coding All gestures (N=569) were further coded according to gesture types adapted from McNeill (1992) and Kendon (2004). The categories include representational and non-representational gestures (the latter including deictic and discourse-related gestures; definitions are provided in Chapter 5). Fifty gestures were given to a second coder for a cross-check. The reliability between coders was 83%. After a discussion of cases of disagreement, the main coder
re-coded the rest of the data. That yielded 412 representational gestures and 149 non-representational gestures as well as 8 uncertain cases.

**Gestural Modes of Representation (MoR) coding** All representational gestures (N=412) were further coded in terms of their MoR. The categories comprise Acting with object, Acting only, Tracing, Molding, and Embodying (definitions and coding hierarchies are again provided in Chapter 5). Again, fifty gestures were given to a second coder for a cross-check. The reliability between coders was 91%. The coding yielded 244 Acting gestures, 1 Acting-only gesture, 143 Tracing gestures, 11 Molding gestures, and 6 Embodying gestures, as well as 7 uncertain cases. Due to the rare occurrence of the Acting-only gestures (miming intransitive actions, such as miming a dancing activity, N=1), this category was not considered further in this study.

### 6.3 Examples of Acting and Tracing gestures

This section provides examples of gestural Modes of Representation in the corpus. Only Acting-with-object gestures (hereafter simply referred to as “Acting” gestures) and Tracing gestures will be illustrated with examples, since gestures belonging to the other two modes (Molding and Embodying) were not frequent in the data (examples of the two modes can be found in Chapter 5).

#### a) Examples of Acting gestures

A speaker sometimes mimed a specific activity depicted in speech. For example, when a speaker said *I opened the door (and walked straight into their dressing room)*, he made the gesture shown in Figure 6.1. He held two fist ed hands and then moved them from the center to the sides, as if opening a sliding door.

![Figure 6.1 Gesture with *I opened the door*](image)

Another example involves a speaker (the daughter of a former US president) describing how her boyfriend was once trying to catch up with her father and
suddenly her father’s bodyguards in another car came out, and she produced the following utterances: *And so he was trying to speed up to catch up, and a secret service door opened, and he flew 100 feet.* Together with the clause *a secret service door opened,* she made the gesture shown in Figure 6.2. In this gesture, she held a fisted hand and moved to her right, as if grasping and opening the car door, rather than simply tracing a general movement of the door.

![Figure 6.2 Gesture with a secret service door opened](image)

**b) Examples of Tracing gestures**

Tracing gestures refer to manual movements that a speaker makes to depict a general movement involved in an activity, rather than to mime the specific activity. For example, when a speaker was describing that he was lying on a bed in a room, and someone opened the door and came in, he produced the following utterance: *One day, the door opened and I was laying on my bed and I was reading a book.* Together with the clause *the door opened,* he made the gesture shown in Figure 6.3. Specifically, he moved one of his flat open hands away from his body, as if he was representing the door with his flat hand and also tracing the trajectory movement of the door, without miming the opening activity.

![Figure 6.3 Gesture with the door opened](image)
A second example is as follows. Together with the utterance *my mom opened the door*, a speaker made a gesture as follows (see Figure 6.4). She used one left open flat hand and moved from her center to the left, in which she simply traced a general movement of the activity, rather than specifying the agentive opening activity.

![Figure 6.4 Gesture with *my mom opened the door*](image)

### 6.4 Gestures and the causative-inchoative alternation

This section considers the causative-inchoative alternations with verbs of change of state or location, including the verbs *break, open, close, move, drop* and *roll* in the corpus. It aims to see whether gesture differs with respect to transitivity when the events involved in the alternation are similar, and if so, how.

#### 6.4.1 Gestural rate

The frequencies of representational gestures accompanying the causative-inchoative alternation in speech are shown in Table 6.2. Note that “With Rep.” represents constructions with representational gestures, while “Without Rep.” represents constructions without representational gestures, including those with non-representational gestures and those without any gestures.

<table>
<thead>
<tr>
<th></th>
<th>With Rep.</th>
<th>Without Rep.</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Transitive</td>
<td>341</td>
<td>65</td>
<td>181</td>
</tr>
<tr>
<td>Intransitive</td>
<td>71</td>
<td>61</td>
<td>45</td>
</tr>
</tbody>
</table>
Overall, more than 60% of transitive and intransitive constructions were accompanied by representational gestures: 65% and 61% respectively. The gestural rates for this alternation are much higher than those for high-transitive and intransitive clauses on average, at 10% and 14% respectively, as shown in Chapter 5. Provided that this alternation concerns events involving an external causation and a change of state or location that it brings about, the present result suggests that this large quantity of gestures produced might be largely related to the dynamicity in these events. It is worth noting that the gestural rates for the two types of constructions do not differ substantially (p>0.05, χ²=0.12, df=1). In other words, the frequency of representational gestures produced seems not to relate to the type of transitivity in speech. This may suggest that the frequency of gestures used tends not to be sensitive to the semantic difference between the two types of transitivity, that is, profiling an external causation or not, in the case of the causative-inchoative alternation.

6.4.2 Gestural Modes of Representation

This section presents the results in terms of Modes of Representation that speakers employed when making gestures together with the causative-inchoative alternation in the corpus. Table 6.3 gives an overview of the gestural modes involved in these two types of clauses.

<table>
<thead>
<tr>
<th></th>
<th>Acting</th>
<th></th>
<th></th>
<th>Molding</th>
<th></th>
<th></th>
<th>Embodying</th>
<th></th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Transitive</td>
<td>237</td>
<td>70</td>
<td>87</td>
<td>26</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>336</td>
</tr>
<tr>
<td>Intransitive</td>
<td>7</td>
<td>10</td>
<td>56</td>
<td>82</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>68</td>
</tr>
</tbody>
</table>

We can see that, firstly, Acting and Tracing gestures were more frequent than Molding and Emboding ones, with respect to both types of transitivity. Only a small number of gestures were made via the latter two modes in both types of clauses: around 3% and 8% respectively. Secondly, transitive clauses were more frequently accompanied by Acting gestures than by Tracing gestures – 70% vs. 26%, respectively. By contrast, intransitive clauses were more frequently accompanied by Tracing
gestures than Acting gestures – 82% vs. 10%, respectively. This difference is statistically significant ($p < 0.01$, $\chi^2 = 84.49$, df=1, phi=0.47).

These results indicate that although the causative-inchoative alternation involves similar kinds of events (that is, all involving an external causation in speakers’ background knowledge), transitive and intransitive constructions of the alternation were not accompanied by the same gestures, such as gestures which can refer to the external causation – Acting gestures. Instead, the two types of constructions were accompanied by gestures of different modes, namely, the more frequent use of the Acting mode with respect to transitive clauses, as opposed to the more frequent use of the Tracing mode in terms of intransitive ones. This suggests that gestural Modes of Representation largely correlate with the type of transitivity in speech, but not with the relevant events in reality. One likely explanation for this is that transitive and intransitive constructions of the alternation, as hypothesized in Langacker (2008a: 385), afford different means by which speakers conceptualize events with externally caused change of state or location, which, in turn, could be expressed in different Modes of Representation in the accompanying gestures.

6.5 Gestures and the causative-inchoative alternation with implicit or explicit Figure’s path

I now turn to a subset of the causative-inchoative alternation – motion constructions, which refer to changes of physical location in entities (including transitive and intransitive uses of move, drop, and roll in the corpus). More specifically, this section investigates transitive and intransitive motion constructions of the alternation which involve the explicit or implicit path in the Figure (that is, the mover in motion events) respectively, namely with/without directional oblique phrases (OBL), e.g., she dropped the ring (TRAN - OBL) vs. the ring dropped (INTR - OBL), and she dropped the ring off the boat (TRAN + OBL) vs. the ring dropped off the boat (INTR + OBL). The aim of the section is to examine whether gesture use is highly correlated with the motion properties of the Figure in these motion events, regardless of transitivity, as predicted by Parrill (2010), and if so, in what way. If not, the question is how gesture relates to this property of events and transitivity respectively.

6.5.1 Gestural rate

Table 6.4 displays the number and proportions of representational gestures accompanying transitive and intransitive constructions with and without directional oblique phrases (OBL).
Overall, more representational gestures accompanied constructions with OBL than those that did not. Specifically, more representational gestures accompanied transitive constructions with OBL (71%) than transitive constructions without OBL (47%). This difference is statistically significant ($p<0.01, \chi^2=12.1, df=1, \phi=0.22$). The same goes for intransitive constructions. Intransitive constructions with OBL were much more often accompanied by representational gestures (67%) than intransitive constructions without OBL were (33%), although the difference is not statistically significant ($p>0.05, \chi^2=3.40, df=1$), probably due to the low frequency with which intransitive constructions without OBL (INTR-OBL, N=15) occurred in the data. The results indicate that the gesture production likelihood increases as there are oblique phrases (OBL) to encode the path of the Figure versus if there are not, that is, explicit versus implicit path of the Figure in motion constructions. The reason is probably that the choice of an explicit path in motion events (with OBL) reflects a profile of the path of the Figure, which in turn could be manifested in the frequency of gestures produced. This finding complements the prevalent view that gestures are likely to occur when a spatial path in events is involved, by indicating that the frequency of gestures produced is sensitive to an explicit or implicit encoding of a Figure’s path in motion events.

However, the frequency of representational gestures tends not to differ with respect to transitive and intransitive construction in speech. Specifically, the frequency of gestures accompanying transitive motion constructions without OBL is not significantly different from that accompanying intransitive motion constructions without OBL ($p>0.05, \chi^2=0.40, df=1$). Similarly, the frequencies of representational
gestures accompanying transitive and intransitive constructions with OBL do not differ significantly (p>0.05, \( \chi^2 = 0.63, \text{df}=1 \)). These results indicate that the quantities of gestures produced tend not to relate to transitivity in speech, which is the same as the result in Section 6.4. Both results suggest that the frequency of gestures produced is not likely to be linked with a (non-)profile of external causation of events which distinguishes transitive from intransitive constructions.

6.5.2 Gestural Modes of Representation
This section only concerns Acting and Tracing gestures, since the three other gestural Modes of Representation – Acting only, Molding and Embodying – were too rare in the corpus, as indicated in Section 6.4.2. The results of these two gestural modes are given in Table 6.5.

Table 6.5 Gestural Modes of Representation with respect to the causative-inchoative alternation with/without directional oblique phrases (+/-OBL)

<table>
<thead>
<tr>
<th>Mode of Representation</th>
<th>Acting</th>
<th>Tracing</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td><strong>TRAN - OBL</strong> (e.g., <em>he dropped the ring</em>)</td>
<td>42</td>
<td>76</td>
<td>13</td>
</tr>
<tr>
<td><strong>INTR - OBL</strong> (e.g., <em>the ring dropped</em>)</td>
<td>2</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td><strong>TRAN + OBL</strong> (e.g., <em>he dropped the ring off the boat</em>)</td>
<td>53</td>
<td>66</td>
<td>27</td>
</tr>
<tr>
<td><strong>INTR + OBL</strong> (e.g., <em>the ring dropped off the boat</em>)</td>
<td>0</td>
<td>0</td>
<td>20</td>
</tr>
</tbody>
</table>

To begin with, gestures occurring with transitive constructions with OBL (TRAN+OBL) were compared with those occurring with transitive constructions without OBL (TRAN-OBL). Table 6.5 shows that although slightly more Tracing gestures were produced to accompany transitive constructions with OBL (TRAN+OBL) (34%) than transitive constructions without OBL (TRAN-OBL) (24%), this difference is not statistically significant (p>0.05, \( \chi^2 = 1.15, \text{df}=1 \)). That is to say, a significant correlation between the Figure’s path property with transitive constructions and the gestural Mode of Representation was not found.

Next, gestures accompanying intransitive constructions with OBL (INTR+OBL) were compared with those accompanying intransitive constructions without OBL (INTR-OBL). As shown in Table 6.5, more Tracing gestures accompanied intransitive
constructions with OBL (INTR+OBL) (100%) than intransitive constructions without OBL (INTR-OBL) (50%). Given the small data size of intransitive constructions without OBL accompanied by representational gestures (N=4), a qualitative comparison of gestural modes in terms of intransitive constructions with and without OBL would not be reliable, and therefore a statistical test was not carried out. To determine whether or not there is a definite correlation in this regard requires further research.

In addition, transitive and intransitive constructions with/without OBL were examined. We can see from the table that transitive constructions with OBL (TRAN+OBL) were much more likely to be accompanied by Acting gestures as opposed to Tracing gestures (66% vs. 34%), whereas all intransitive constructions with OBL (INTR+OBL) were accompanied by Tracing gestures (100%) and not Acting ones (0%). This difference is statistically significant (p<0.01, \( \chi^2=25.60, df=1, \phi=0.51 \)). Again, due to the small data size of the set of intransitive constructions without OBL accompanied by representational gesture (N=4), gestural modes with respect to transitive and intransitive constructions without OBL are not considered.

The above results indicate that gestural Modes of Representation appear rather sensitive to the type of transitivity, but not to the choice of OBL (namely, events with the explicit versus implicit Figure’s path). This correlation between gestural modes and transitivity versus the path property of motion events challenges Parrill’s (2010) speculation that events with a path tend to activate Observer Viewpoint Gestures (comparable to Tracing gestures in the present study), regardless of transitivity. Parrill proposed that events with a path easily evoke simulation of visual imagery rather than of motor imagery. Surprisingly, the present study suggests that this speculation is not applicable to transitive motion events with a path of the Figure; that is to say, transitive motion events with a Figure’s path might well activate simulation of motor imagery rather than of visual imagery (as shown by the preferred use of Acting gestures versus Tracing gestures). Taking things a step further, this finding suggests that speakers’ mental simulation of motion events may relate to the transitivity of these events, rather than to the path property of the Figure (that is, +/- explicit path) in these events.

Nevertheless, the above results do not mean that a relation between gestural modes and the path property of the Figure in general does not exist. It might be the case that gestural modes may interact with the length of the Figure’s path, such as a longer path of the Figure versus a shorter one, as in they moved the sofa out of the room (from inside the room) vs. he moved his sofa two centimeters to the left.

6.6 Gestures and the causative-inchoative alternation with and without the Agent’s path
Like Section 6.5, the current section considers gestures occurring with a subset of the causative-inchoative alternation: transitive and intransitive motion constructions (including transitive and intransitive uses of move, drop, and roll in the corpus). It specifically examines gestures accompanying transitive motion constructions with/without the Agent’s path, such as he moved his toupee up and he rolled down the window (transitive motion constructions usually without displacement of the Agent) vs. he moved the sofa out of the room and they rolled a trophy in (transitive motion constructions usually involving displacement of the Agent), and gestures occurring with intransitive motion constructions, such as the painting moved from the bed room to the garage. The aim of this section is to examine whether gesture is correlated with the path property of the Agent in these motion events, regardless of transitivity, and if so, how. If not, the question is how gestures relate to this property of events and transitivity respectively.

6.6.1 Gestural rate
Table 6.6 displays the number and proportions of representational gestures occurring with transitive motion constructions with/without the Agent’s path and intransitive motion constructions.

Table 6.6 Frequencies of representational gestures occurring with the causative-inchoative alternation with and without the Agent’s path

<table>
<thead>
<tr>
<th></th>
<th>With Rep.</th>
<th>Without Rep.</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td><strong>TRAN - Agent’s path</strong></td>
<td>108</td>
<td>55</td>
<td>90</td>
</tr>
<tr>
<td>(e.g., he moved his toupee up)</td>
<td></td>
<td></td>
<td>198</td>
</tr>
<tr>
<td><strong>TRAN + Agent’s path</strong></td>
<td>24</td>
<td>83</td>
<td>5</td>
</tr>
<tr>
<td>(e.g., he moved the sofa out of the bedroom)</td>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td><strong>INTR (e.g., the ball moved)</strong></td>
<td>27</td>
<td>56</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

First, we can see that many more representational gestures accompanied transitive motion constructions with an Agent’s path than those without an Agent’s path – 83% and 55%, respectively. This difference is statistically significant (p<0.01, $\chi^2=7.15$, df=1, phi=0.18). Second, as shown in the table, more gestures were
produced to accompany transitive motion constructions with the path of the Agent (83%) than intransitive motion constructions (56%). This difference is statistically significant (p<0.05, $\chi^2=4.56$, df=1, phi=0.24). However, there is no noteworthy difference in gestural frequencies regarding transitive motion constructions without the path of the Agent and intransitive motion constructions: 55% vs. 56% (p>0.05, $\chi^2=0.003$, df=1).

These results suggest that the frequency of representational gestures produced relates to the path property of the Agent in events, but not to the type of transitivity. This finding is consistent with the one in the previous section concerning the path of the Figure in relation to the frequency of the accompanying gestures. Considering together, the results indicate that gestures are more likely to occur with events involving a path (of the Figure and the Agent) than those not involving one.

### 6.6.2 Gestural Modes of Representation

Table 6.7 shows gestural Modes of Representation used with respect to transitive motion constructions with/without the path of the Agent and intransitive motion constructions accompanied by these gestures.

<table>
<thead>
<tr>
<th></th>
<th>Acting</th>
<th>Tracing</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td><strong>TRAN - Agent’s path</strong> (e.g., <em>he moved his toupee up</em>)</td>
<td>76</td>
<td>77</td>
<td>23</td>
</tr>
<tr>
<td><strong>TRAN + Agent’s path</strong> (e.g., <em>he moved the sofa out of the bedroom</em>)</td>
<td>13</td>
<td>54</td>
<td>11</td>
</tr>
<tr>
<td><strong>INTR</strong> (e.g., <em>the ball moved</em>)</td>
<td>2</td>
<td>8</td>
<td>22</td>
</tr>
</tbody>
</table>

To begin with, if we look at gestures accompanying transitive motion constructions with and without the path of the Agent, interestingly, we can see that a larger proportion of Tracing gestures were produced to occur with transitive motion constructions with the Agent’s path (45.83%) than with transitive motion constructions without the Agent’s path (23.23%). This difference is statistically
significant \((p<0.05, \chi^2=3.87, df=1, \phi=0.18)\). This result is different from the one in Section 6.5.2 concerning the relation between gestural modes and (transitive or intransitive) motion events with the path of the Figure, in that it indicates that Tracing gestures seem to be related to the property of Agent displacement in transitive motion events. Specifically, as transitive motion constructions involve displacement of the Agent versus not, the production likelihood of Tracing gestures increases. One possible explanation is that when transitive motion events involve displacement of the Agent, the activation likelihood of visual imagery increases. This is roughly consistent with Parrill’s (2010) speculation in the sense that motion properties of events play a role in the simulation of motor or visual imagery activated by events.

It is noteworthy that, unlike either types of transitive motion construction above, a majority of intransitive motion constructions were accompanied by Tracing gestures (92%). Statistical analyses showed that Acting gestures were significantly more likely to accompany transitive motion constructions without the path of the Agent than intransitive motion constructions \((p<0.01, \chi^2=36.1, df=1, \phi=0.54)\); similarly, Acting gestures were significantly more likely to accompany transitive motion constructions with the path of the Agent than intransitive motion constructions \((p<0.01, \chi^2=9.70, df=1, \phi=0.45)\). Put simply, Acting gestures preferably accompanied transitive motion constructions, either with or without the path of the Agent, whereas Tracing gestures preferably accompanied intransitive motion constructions. This result does not support Parrill’s (2010) speculation that gestural representation is highly correlated with events with a path, regardless of transitivity. Instead, it suggests that the gestural representation does relate to the choice of transitivity in encoding motion events in speech, although to some extent it is also associated with the property of Agent displacement in these events.

Nevertheless, it is not argued in this study that a relation between gestural modes and transitivity always exists. It might be the case that this relation is minimized when the action causing the trajectory movement is not specified in speech. For instance, cases like *he rolled the car down the embankment* only specified the motion of the Figure but not the action of the Agent. Transitive constructions like these might be likely to evoke simulation of visual imagery since the action is not specified, and alternatively, a simulation of a path can be easily activated. This speculation can be supported to some degree by the data in the present corpus in the following way. The corpus contains four representational gestures occurring with transitive constructions depicting someone causing the vehicles to roll, all of which were produced via the Tracing mode, depicting cyclic motions of the Figure-Agent. These gestures are similar to those occurring with
intransitive motion constructions, and a correlation between gestural modes and transitivity seems not to exist in these cases. This is, however, not to say that there is no correlation between gestures and the external causation, which is profiled in a transitive construction. There might be other types of correlation in these cases, such as between more fine-grained gestural forms and the type of transitivity, rather than between the Modes of Representation and the type of transitivity. Future studies would be needed to examine whether and how gestures relate to transitivity of motion events of this type.

6.7 A note on transitivity and agentivity of events in relation to gestural Modes of Representation

With regard to the relation found between gesture and the type of transitivity, it is interesting to note that differential use of gestural Modes of Representation with respect to transitive and intransitive constructions is partially due to the fact that intransitive constructions were less likely to involve animate and purposeful agents (i.e. animate entities who perform purposeful actions as external causation), as in *the door opened* because of the wind rather than of because of human beings, whereby it is difficult to imagine people making Acting gestures with them. I will now have a brief glance at whether or not gestural modes still relate to the type of transitivity when the agentivity of events is controlled. To this end, I first identified intransitive clauses with animate and purposeful agents (vs. those with natural force as an external causation, with an unknown external causation, or with a non-purposeful action), such as the example given above in Figure 6.2, and then randomly selected a comparable number of transitive clauses with animate and purposeful agents according to their contexts in discourse, such as the example given above in Figure 6.1 (see Section 6.3). The results are given in Table 6.8.

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41 Note that the results in this section remain rather speculative due to the small sample size of intransitive clauses accompanied by Acting and Tracing gestures shown in Table 6.8.
Table 6.8 Acting and Tracing gestures accompanying transitive and intransitive constructions with animate and purposeful agents

<table>
<thead>
<tr>
<th></th>
<th>Acting</th>
<th></th>
<th>Tracing</th>
<th></th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Transitive with animate and purposeful agents</td>
<td>15</td>
<td>75</td>
<td>5</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Intransitive with animate and purposeful agents</td>
<td>3</td>
<td>43</td>
<td>4</td>
<td>57</td>
<td>7</td>
</tr>
</tbody>
</table>

We see that transitive constructions with animate and purposeful agents were more likely to be accompanied by Acting gestures than by Tracing gestures – 75% vs. 25%, respectively. By contrast, intransitive constructions with animate and purposeful agents were slightly more likely to be accompanied by Tracing gestures than by Acting gestures – 57% vs. 43%, respectively. This result indicates that transitive and intransitive constructions with animate and purposeful agents tend to be accompanied by different gestural modes, although people could make either Acting or Tracing gestures with both constructions. It furthermore suggests that gestural Modes of Representation are indeed sensitive to the type of transitivity in speech, which reinforces the finding in previous sections.

It is worth noting that gestural Modes of Representation are indeed also related to the agentivity of events. When gestures occurring with intransitive constructions with animate and purposeful agents (as shown in the present section) were compared with those with general intransitive constructions (as shown in Section 6.4.2), the following comparison was obtained: 57% with Acting gestures and 43% with Tracing gestures (intransitive constructions with agents), whereas 12% with Acting gestures (10/82) and 88% with Tracing gestures (general intransitive constructions). The result indicates that as intransitive constructions involve an animate and purposeful agent (e.g., the door opened because of human beings), the likelihood of Acting gestures being produced increases significantly. However, a detailed examination of the role of agentivity of events in gestures is beyond the scope of the present study and needs further research.

6.8 Summary and conclusions
This chapter aimed to investigate whether and if so, how gesture correlates with transitivity and/or properties of events, including events with external causation and changes of location in the Figure and the Agent. By examining gestures
accompanying transitive and intransitive constructions referring to similar types of events and a subset of them – motion events involving the explicit or implicit path of the Figure and with or without the path of the Agent – the following results were obtained, which are summarized in Table 6.9. More specifics follow below.

Table 6.9 Relations found between behaviors of gesture and aspects in language (“−” represents that no correlation was found, and “+” represents that a relation was found in this study)

<table>
<thead>
<tr>
<th>Event with external causation (dynamicity; causality)</th>
<th>Frequency of gestures</th>
<th>Gesture MoR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path of Figure (+/-OBL)</td>
<td>+</td>
<td>−</td>
</tr>
<tr>
<td>Path of Agent</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Transitivity</td>
<td>−</td>
<td>+</td>
</tr>
</tbody>
</table>

First, the frequency of representational gestures produced was found to relate to dynamic events in general (namely, caused change of state/location), and to path properties of both the Figure and the Agent in motion events, rather than to the type of transitivity. These results lend support to the idea that the likelihood of gesture production is largely related to the motor-spatial properties of action, together with some other factors (Hostetter & Alibali 2008). In addition, the correlation between the frequency of gestures produced and explicit/implicit encoding of the Figure’s path (that is, including OBL or not including OBL in motion constructions) suggests that the frequency of gestures produced is sensitive to the syntax (that is, OBL) that speakers choose to encode the path of the Figure rather than simply to the path of the Figure in events, given that the causative-inchoative alternation in this study mostly involves a path of the Figure, whether it is explicit or implicit. Nevertheless, this correlation relation echoes the previous finding that gestures frequently occur with prepositional phrases (Hadar & Krauss 1999; Kok 2017a, b; Morrel-Samuels & Krauss 1992).

Second, gestural Modes of representation were found to relate to the path property of the Agent, but not to the path property of the Figure. More specifically, as motion constructions involve displacement of the Agent versus not, the likelihood of Tracing gestures being chosen increases. This may suggest a link between
displacement of the Agent and the likelihood of activating visual imagery, but it is noteworthy that this interaction seems not to apply to the property of Figure path in motion events.

Despite the above correlations obtained between gestures and various properties of events, gestures were still found to be closely linked with the choice of transitivity in encoding these events. Specifically, Acting gestures preferably accompanied transitive constructions, whereas Tracing gestures preferably occurred with intransitive constructions. This is at odds with the view of an exclusive relation existing between gesture and events. Alternatively, it might be the case that transitive and intransitive constructions afford different ways in which speakers conceptualize events (i.e. +/- profile of external causation), which tend to be associated with the representational forms of the accompanying gestures (either Acting or Tracing gestures). To put it another way, the gestures produced appear to relate to speakers’ construal of events (in terms of +/- a profile of an external causation reflected in the choice of transitive and intransitive construction in speech) rather than simply to the properties of events, either external causation in the background knowledge or the path properties of the Agent and the Figure in motion events. Importantly, these findings call for future studies on gestures in relation to events of change of state (such as break events) or change of location (such as motion events) to consider syntactic encodings of these events, that is, their transitivity (besides the use of directional oblique phrases as discussed above). Otherwise, notable differences between transitive events and intransitive events with change-of-state/location might possibly be overlooked. Moreover, more care is needed in drawing conclusions about an exclusive relation between co-speech gestures and stimulus events without consideration of the narrator’s speech (that is, the syntactic encoding of these stimulus events). Given that the gestures that were elicited to examine their relation to the stimulus events unavoidably come along with speech in an experimental design and that the syntactic encoding in speech tends to play a role in gesture, the relation found between gesture and stimulus events in experiments may be a mixture of gesture in relation to the events and the syntactic encoding of these events.

One major conclusion that can be drawn from this chapter is that an exclusive relation either between gestures and events or between gestures and transitivity has not been found. Instead, a complex story between gestures, events, and transitivity is suggested, which thereby provides a more nuanced understanding of gestures in relation to language. The results reinforce and complement the findings in Chapter 5 about the relation between gesture and transitivity.

There are a few possible extensions of the present research that could be
carried out. One would be to examine the causative-inchoative alternation with one and the same type of external causation, such as human beings as external causation. In the present approach, although events in transitive and intransitive constructions involve external causation for changes of state or location, they do not necessarily involve the same type of external causation. If the alternation involves the same external causation, the relation found between gesture and the type of transitivity could provide more insights into the question as to how gestures relate to speakers’ construal of events. For this purpose, an experimental setting is required. For instance, participants can be asked to watch the same events (such as someone opening a door) and then to describe them with either transitive or intransitive constructions, so that different syntactic encodings would refer to events with exactly the same causation. Another option for extension would be to examine a larger variety of verbs licensing the causative-inchoative alternation, going beyond the few used in the present study. In this way, a wider picture about gesture, events, and the type of transitivity can be obtained. In addition, it would be of interest to investigate gesture in relation to another type of causative alternation – the induced action alternation (e.g., *he jumped the horse over the fence* vs. *the horse jumped over the fence*), so that more insight can be gained relating to the general question in this thesis as to whether and how gesture relates to transitivity – a fundamental grammatical category in language.