HOW DO SIGNERS MARK CONDITIONAL SENTENCES IN GERMAN SIGN LANGUAGE?

INSIGHTS FROM A SENTENCE REPRODUCTION TASK FOCUSING ON THE USE OF NON-MANUAL AND MANUAL MARKERS

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Abstract: *This paper presents the results of a Sentence Reproduction Task (SRT) investigating conditional sentences in German Sign Language (DGS). We found that participants mark conditional sentences in DGS by systematically using different non-manual markers on the antecedent and the consequent. In addition, these non-manual markers were frequently used in combination with one or two manual signs. However, the manual markers were omitted in the test sentences, i.e., the input stimuli the participants were asked to reproduce. The results of our experimental study are, on the one hand, consistent with descriptions of manual and non-manual strategies used to mark conditional sentences in different unrelated sign languages. On the other hand, our findings provide new insights on the multi-layered marking of conditional sentences in DGS.*

Keywords: *conditional sentences, German Sign Language, Sentence Reproduction Task, non-manual and manual markers*

1. INTRODUCTION

Descriptions of conditional sentences in different sign languages have revealed two interesting characteristics: a fixed syntactic order with the 'antecedent' always preceding the 'consequent' and a variety of manual (produced with the hands and arms) and non-manual (produced with the upper part of the body, the head and the face) markers.[1] On the one hand, the use of these markers is optional to a certain degree, and on the other hand, they are typically used in combination to express the conditional relationship between the main clause ('consequent') and the embedded clause ('antecedent'). With respect to German Sign Language (Deutsche Gebärdensprache, DGS), Paulus (2021) provided the first broad description of conditional sentences based on elicited data. The present study contributes new interesting insights based on the first experimental study investigating grammatical markers of conditional sentences in DGS using a controlled Sentence Reproduction

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[1] For American Sign Language (ASL), see Baker and Padden (1978), Liddell (1986), Reilly, McIntire, and Bellugi (1990), Wilbur (1994), and Fischer and Lillo-Martin (1990); for Austrian Sign Language (ÖGS), Lackner (2017); for Brazilian Sign Language (Libras), Paulus (2021); for British Sign Language (BSL), Sutton-Spence and Woll (1999), Waters and Sutton-Spence (2005), and Monaghan (2009); for Israeli

Sign Language (ISL), Dachkovsky (2008), Dachkovsky and Sandler (2009), and Dachkovsky, Healy and Sandler (2013), for Sign Language of the Netherlands (NGT), Smith (2004) and Klomp (2019).

Task (SRT). The focus of this paper is to provide a thorough description of the distribution of different manual and non-manual markers produced by participants in diverse match and mismatch conditions. In this study, we investigated factual (standard) conditional sentences (for counterfactuals and non-predictive/peripheral (pragmatic) conditional sentences, see Haegeman, 1984, Dancygier, 1998, Quer et al., 2017).

This paper is organised as follows: In Section 2, we briefly introduce the main characteristics of conditional sentences in sign languages. Section 3 focuses on the methodology used in the study and the data elicitation process. In Section 4, we present the results of the SRT with examples and illustrations, as well as discuss the grammatical properties of all manual and non-manual markers in DGS conditional sentences that were used by the study participants. In Section 5, we discuss the main results of our study and some open issues that should be addressed in future research.

2. CONDITIONAL SENTENCES IN SIGN LANGUAGES

In sign languages, simple conditional sentences corresponding to English examples such as 'If it rains, then I will go by car' can be expressed using different grammatical manual and/or non-manual markers. These markers can be used on their own or in different (simultaneous and sequential) combinations. Descriptions of conditional sentences in different sign languages have revealed that similar strategies are used across different unrelated sign languages (Quer et al., 2017: 462-470). This holds true especially with respect to the syntactic order of the antecedent and consequent, as well as specific non-manual markers that seem to be frequently used to mark conditional sentences. In the sign languages described so far, the antecedent clause typically precedes the consequent. In addition, raised eyebrows and head nods are two prominent non-manual markers of conditional sentences in many unrelated sign languages.

The following example from the NGT corpus, described in Klomp (2019), illustrates a typical pattern documented in most of the sign languages

where the structure of conditional sentences has been described. In example (1), the antecedent "SUPPOSE1 CHILD UNDERSTAND" precedes the consequent "PALM-UP OTHER-WAY". In addition, the antecedent is accompanied by a brow raise (br) spreading over the whole clause and a head nod (hn) at the end of the antecedent.[2]

		hn	
		br	
(1)	SUPPOSE1 CHILD UNDERSTAND	PALM-UP OTHER-WAY

'If the child understands it, it can go the other way.'
[Corpus NGT: C0058, signer 5, 01:08.760]
(NGT)

In addition to non-manual markers, sign languages can draw on various manual markers that can be used to mark the antecedent and/or the consequent. In the NGT example (1), the clause-initial position of the antecedent is occupied by the manual conditional marker "SUPPOSE1". Variation is mainly observed in the field of manual markers. Many sign languages have different manual markers at their disposal. For example, Klomp (2019) identified seven different manual markers for the antecedent and three manual markers for the consequent in the NGT corpus data. These manual markers typically occupy the initial position of the antecedent and consequent. In addition, the markers of the antecedent are used more frequently than the markers of the consequent.

Conditional sentences in DGS typically seem to follow the general pattern illustrated in the NGT example (1) (see Happ and Vorköper, 2006, Papaspyrou, von Mayenn, Matthaei and Herrmann, 2008, Dachkovsky, Hosemann, Herrmann, Stein-

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[2] Notational conventions: Signs are glossed in caps. Subscripts represent areas in the signing space that are used as referential loci linked to discourse referents (e.g., IX$_1$ in example (2) below). Numbers after a sign are used to represent different versions of a manual conditional marker (e.g., SUPPOSE1 or IF1). Two signs connected with # indicate the formation of a compound. Finally, lines above the glosses indicate the scope of non-manual markers, and the respective non-manual marker is indicated at the end of the line. The abbreviations of non-manual markers are clarified in the explanations of the examples, as well as in Table 3. Note that examples cited in this paper are slightly adapted to our notational conventions.

bach and Sandler, 2015, Herrmann and Steinbach, 2013). The following brief overview of conditional sentences in DGS is based on the thorough comparative description of conditional sentences in DGS and Libras in Paulus (2021). The elicited data reported in Paulus (2021) show that conditional sentences also follow the basic clause order of the antecedent preceding the consequent. In addition, both parts of the conditional sentences can be marked non-manually. While the antecedent is usually accompanied by raised eyebrows (br) and a head nod (hn), the consequent is typically marked by a sentence-initial blink (b) and a head tilt (ht). This pattern is illustrated in the following example (2) from Paulus (2021: 201), which also includes a backward body lean (bl) on the consequent.[3]

		b		bl-backward
		br, hn		ht, hn
(2)	IF1 IX$_3$ THIRD#TIME MOUSE		IX$_1$ DAMN LOSE (g:p-down)	

'If I get three mouse cards, then I will have bad luck and miss my chance.'

(DGS)

In the data discussed in Paulus (2021), 79% of all antecedents (N = 146) were accompanied by a brow raise and 88% by a head movement. The non-manual markers on the consequent occurred in similar frequencies: 95% of all consequent clauses were marked by a head movement and 66% by a blink in the clause-initial position. The blink between the antecedent and the consequent can be analysed as a prosodic marker of a clause boundary: it is a more generic prosodic marker that is not specific to conditional sentences (Wilbur, 1994, Herrmann, 2010, Sandler, 2012). Another non-manual strategy that was frequently observed in the data is a change of eye gaze: the participants changed eye gaze between the antecedent and the consequent in 35% of all examples. During the antecedent, gaze was not directed to the addressee. However, the signer looked at the addressee while signing the consequent. In many sign languages, a similar change in eye gaze is used to mark 'attitude role shift': while signing the reported (embedded) clause, gaze is not directed to the addressee (Steinbach 2021).

Similar to blinks, change of eye gaze seems to be a generic non-manual marker used to mark different kinds of embedding. The frequent use of this strategy in conditional sentences might, however, be a consequence of the elicitation strategy used in Paulus (2021), which was based on a card game called the Cheese Race Game. In this specific situation, signers tend to direct the gaze to the card (which determines the antecedent of the conditional sentence, i.e., the condition the addressee has to accomplish) while signing the antecedent.

With respect to manual markers, Paulus (2021) found four manual makers for the antecedent (IF1 (48% of all antecedents), IF2 (11%), IMAGINE (2%), and FOR-EXAMPLE (2%)), as well as two manual markers for the consequent (MEAN (23% of all consequents) and THEN (7%)).[4] The manual markers usually occupy the clause-initial position. The distribution shows that while for antecedents, IF1 is the most frequent marker, MEAN is the most frequent marker for the consequent.

In summary, DGS, like many other sign languages, exhibits various manual and non-manual strategies to express conditional sentences, including sequential and simultaneous realisations of manual and non-manual markers. In many cases, conditional sentences are marked with more than one marker, and the antecedent usually precedes the consequent. Both the antecedent and the consequent are accompanied by specific non-manual markers. Manual markers typically occur in the sentence-initial position of the antecedent. The most prominent manual maker in DGS seems to be the sign IF1, other manual markers are documented as less frequent.

The brow raise on the antecedent, which is one of the most prominent non-manual markers in conditional sentences across sign languages, provides prosodic evidence for the functional relationship between topics, interrogatives, and conditionals:

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3 The gloss 'g:p-down' stands for the gesture 'palm-down'.

4 Paulus (2021) found a third marker which she glosses as WÄR ('WOULD-BE'). Since this marker was documented only in one example and its syntactic status is unclear, we did not consider it in the following discussion. WÄR was observed to occur between the antecedent and the consequent, and it can most likely be analyzed as a modal expression marking the subjunctive mood in the antecedent.

this has been documented for spoken languages as well (Ebert, Endriss and Hinterwimmer, 2008, König, 2012, Onea and Steinbach, 2012, Leuschner and Van den Nest, 2015). In sign languages, the non-manual marker brow raise is a grammaticalized non-manual gesture, which is typically used to mark topics, polar interrogatives, and the antecedent of a conditional sentence (Janzen, 1999, Pfau and Steinbach, 2006, Pfau and Steinbach, 2011, Cecchetto, 2012, Herrmann and Pendzich, 2014).

3. EMPIRICAL STUDY

3.1 Research questions

The main research goal of the present study was to examine the spectrum and the distribution of manual and non-manual conditional markers in DGS. We focused on four research questions:

(i)   Is a specific combination of different non-manual markers on the antecedent and consequent sufficient to mark a sequence of two clauses as a conditional sentence in DGS?

(ii) Which non-manual markers do DGS signers use in their reproductions that contribute to a conditional interpretation of test sentences?

(iii) What are the manual markers in DGS used to mark the antecedent and/or consequent of a conditional sentence?

(iv) Do signers of DGS maintain the linear order of the antecedent preceding the consequent?

3.2 Methodology

In order to gain deeper insights into the strategies of conditional sentence marking in DGS, we implemented a Sentence Reproduction Task (SRT). This method is often used to assess language abilities in relation to spoken and sign languages. A specific example of this method is the repetition task performed by Riedl, Wiese, Dellwo and Witting (2014), which focused on word stress in spoken German pseudowords.[5]

The use of SRTs for the empirical analysis of complex sentence structures in DGS is a novel methodological approach. The design presented in our paper has subsequently been used in Proske (2021), where the author used a slightly adapted version of our SRT in order to examine basic word order in DGS (for a summary of Proske's findings, see Steinbach, 2022). The application of SRTs for the purpose of the elicitation of conditional sentences has five methodological advantages: SRTs allow for (i) a controlled production of test sentences in different contexts, (ii) the reproduction of the same data set by several individual participants, and (iii) the elicitation of unconscious grammatical knowledge (cf. Munnich, Flynn and Martohadjono, 1994). In addition, SRTs (iv) prevent participants from using other strategies to express a conditional relationship, thereby avoiding the use of conditional sentences (cf. Schimke, 2011), as well as (v) reduce the influence of another modality (e.g., written language).

To ensure controlled data elicitation in the SRT, we created a computer program using the programming language *BlitzBasic*. All data were collected in the SignLab at the University of Göttingen or at participant's homes in Berlin. Each participant was asked to sit at a table with a laptop in front of him/her and was recorded using two camcorders, one focusing on the entire whole body and another on the signer's face. The procedure was structured as follows: 1) instructional video, 2) practice items, 3) experiment block, and 4) concluding video. Each stimulus consisted of a conversation between two signers (signer A and signer B).[6] Each conversation comprised of the following:

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[5] For further information on SRTs in spoken languages, see, for example, Munnich, Flynn and Martohadjono (1994) or Schimke (2011), and for studies on measures of bilingual language dominance, see, for example, Andreou, Torregrossa and Bongartz (2021). For information on SRTs in sign languages, see Mayberry, Fischer and Hartfield (1983), Hauser, Paludneviciene, Supalla and Bavelier (2008), Supalla, Hauser, and Bavelier (2014), and Corina et al. (2020) for ASL, Cormier, Adam, Rowley, Woll and Atkinson (2012) and Marshall et al. (2015) for BSL, Kubus and Rathmann (2012) for DGS, Rinaldi, Caselli, Lucioli, Lamano and Volterra (2018) for Italian Sign Language (LIS), Bogliotti, Aksen and Isel (2020) for French Sign Language (LSF), and Schönström and Hauser (2021) for Swedish Sign Language (STS).

[6] We used and adapted stimulus videos from an unpublished questionnaire rating study on conditional sentences in DGS and ISL based on data collected from deaf participants (see

(i)   a short report (context) signed by signer A
(ii) a follow-up question signed by signer B
(iii) the answer (test sentence) signed by signer A

The participants were asked to memorise the answer (test sentence) provided by signer A (i.e., (iii)) and reproduce this answer after a repetition of the short report (context) and the question (i.e., (i) and (ii)). The stimuli, which are discussed in detail below, were built upon four experimental conditions (see Table 1). The conditional and non-conditional versions of the short reports (contexts) were cross-combined with either conditional or non-conditional answers. The conditional answers were non-manually marked in the form of brow raise, upper lid raise, and head down on the antecedent, as well as head nod on the consequent (see example (3) below). In condition A, a short report with a specific expectation on the conditional continuation was combined with a non-conditional answer (= *mismatch*). Here the participants were expected to add non-manual and/or manual markers typically used in conditional sentences, given that the context triggered a conditional interpretation. Condition B included a short report with the expectation on the conditional continuation combined with a conditional answer (= *match*). In condition B, we expected that the participants' reproduction would include non-manual markers used in the test sentence, as well as additional manual and/or non-manual markers used to mark conditional sentences in DGS. In condition C, a short report with an expectation on a non-conditional continuation was combined with a non-conditional answer. In condition C, we expected that the participants would not add manual or non-manual markers typically used in conditional sentences. Finally, condition D included a short report triggering a non-conditional continuation that was combined with a conditional answer. In condition D, we expected to see the omission of non-manual markers used in

the test sentences. In addition, we expected that the participants would not add any manual conditional markers. Therefore, with respect to the incongruent continuations (i.e., condition A and D), we expected the participants to spontaneously transform these sentences into congruent and well-formed continuations by omitting or adding non-manual and manual markers. Munnich, Flynn and Martohadjono (1994) has reported similar spontaneous transformations of ungrammatical sentences to corresponding grammatical sentences, even among second language (L2) learners. In the present study, we did not use ungrammatical sentences, but we used sentences that were incongruent in relation to the respective contexts.

Condition		Expected reproduction
A	Short report with expectation on **conditional** continuation & **non-conditional** answer → *Mismatch*	Addition of non-manual and/or manual markers
B	Short report with expectation on **conditional** continuation & **conditional** answer → *Match*	Use of similar non-manual markers, as well as addition of manual and/or non-manual markers
C	Short report with expectation on **non-conditional** continuation & **non-conditional** answer → *Match*	No usage of non-manual and manual markers
D	Short report with expectation on **non-conditional** continuation & **conditional** answer → *Mismatch*	Omission of non-manual markers and no usage of manual markers

***Table 1.** Four experimental conditions examined in the SRT and their corresponding expected signed reproduction by deaf participants*

Reports with the expectation of a conditional continuation (i.e., condition A and B) included temporal information referring to a future event and the signer was unsure about whether or not this future event would occur (see Fig. 1). In contrast, reports with the expectation of a non-conditional continuation (i.e., condition C and D) include temporal information referring to the past and an event that had already occurred. Figure 1 provides the English translation of one of the contexts that were expected to trigger a conditional answer. In this condition, signer A describes a future event

Dachkovsky, Hosemann, Herrmann, Steinbach and Sandler 2015). The stimulus videos were recorded in the SignLab at the University of Göttingen. Of the previously available 48 trials, we chose 24 stimuli for our SRT: these stimuli were chosen since they worked well within the framework of a questionnaire rating study and could be distributed over the four conditions illustrated in Table 1.

Signer A (context):
"Next month the rent for my flat will be increased. I don't have a lot of money. I'm considering moving to a small town. The rents are a lot lower there. But it's stupid to commute to work by train every day. Hm, maybe my father will give me his car."
Signer B (question):
"What does this mean?"
Signer A (answer 1 - match):
"(If) I get a new car from him, (then) I will move to a small town." (= conditional)
or
Signer A (answer 2 - mismatch):
"I get a new car from him (and) I move to a small town." (= non-conditional)

Figure 1. *Stimulus example for condition A and B (translated from DGS into English; see also Dachkovsky et al. 2015)*

(i.e., moving to a small town) and he is not sure whether he will be able to accomplish his plans. Both given answers – *match* and *mismatch* – are grammatical sentences in DGS, but only answer 1 is semantically appropriate in the given context.

The participants were provided with each context twice, once with a conditional continuation and once with a non-conditional continuation. Since the test sentences (i.e., the two possible answers of signer A) differed only in the non-manual markers used, both answers were always manually identical and differed only with respect to the non-manual conditional markers. This is illustrated in (3) for the match condition (i.e., the conditional answer). Consequently, both conditions did not include any manual conditional or coordination markers. The conditional continuations included brow raise (br), upper lid raise (ulr), and head down (hd) on the antecedent, eye blink (b) at the clause boundary, and head nod (hn) on the consequent. In contrast, the non-conditional continuations did not include brow raise and upper lid raise. Taken together, both conditions shared two non-manual markers – eye blinks and head movements. We argue that eye blinks are general boundary markers (see Section 4.1.2). Therefore, it comes as no surprise that they were documented in both conditions. As opposed to this, the distribution of head movements, which are also used in both conditions, differed in each of the two conditions. The specific combination of head down (first clause) and head nod (second clause) seems to be a typical marker of conditional sentences. In syntactic coordination (i.e., the non-conditional continuation), we typically found a slight head movement between the two conjuncts.

(3)   Answer: match

$$\begin{array}{c} \underline{\hspace{4cm}\text{br}\ \underline{\text{b}}} \\ \underline{\hspace{4cm}\text{ulr}} \\ \underline{\hspace{4cm}\text{hd}\ \underline{\text{hn}}} \\ \text{IX}_1\ \text{CAR NEW}\ _3\text{GET}_1\ \ \text{IX}_1\ \text{CITY SMALL MOVE} \end{array}$$

'(If) I get a new car from him, (then) I will move to a small town.'

(DGS)

Participants were not provided with the same contexts consecutively. In order to avoid direct adjacency, we manipulated the randomisation in such a way that three or four alternative contexts always occurred between two identical contexts. Furthermore, we manipulated the randomisation to ensure that in half of the stimuli, the context with the expectation of a conditional continuation was presented first followed by the context with the expectation of a non-conditional continuation. In the other half of the stimuli, the contexts with the expectation of a non-conditional continuation was presented first followed by the context with the expectation of a conditional continuation. For balancing linear position effects, we used two lists (randomisation (a) and randomisation (b)), where randomisation (b) represented the reverse order of randomisation (a).

In total, the participants in our SRT were presented with each of the condition (illustrated in Table 1) six times and, were therefore required to sign a total of 24 sentences. The sentences that should be reproduced by the participants had a length of five to nine signs. The task presented to the participants corresponding to each stimulus consisted of the following five parts:

(i)   Follow the conversation: short report by signer A, question by signer B, answer by signer A

(ii)   Memorise the answer given by signer A,

(iii) Two second pause,

(iv)   Follow the first two parts of the conversation again (i.e., short report by signer A and question by signer B),

(v)   Answer the question by reproducing the answer seen before (a white page with a black frame without a video appears on the screen).

In order to maintain the validity of the SRT, it was essential that the participants were unable to keep the form of the sentences in working memory (cf. Schimke, 2011: 652). If a sentence is no longer completely stored in the working memory, it can be assumed that the respective sentence is newly created by means of mechanisms that are involved in normal (uncontrolled) sentence production. "The meaning of linguistic material is remembered much longer than its precise form" (Schimke, 2011: 650). To ensure that the participants remembered the meaning of the sentences for the reproduction rather than the exact morphosyntactic form, we inserted a delay after the stimulus answer: first, the participants saw a white screen with the numbers three, two, one. Next, they watched the conversation between the two signers once again without including the answer of signer A. Using this method, we were able to prevent the participants from merely copying the exact form that they had seen before. The structure of each trial is illustrated in Figure 2. Note finally that the SRT on conditional sentences was part of a larger task with different linguistic topics.[7]

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[7] A second set of stimuli was presented after the main SRT on conditional sentences. This set consisted of grammatical and ungrammatical wh-interrogatives with a non-manual violation, as well as declarative sentences with grammatical classifier construction and declarative sentences with a manual violation of the classifier construction (for wh-interrogatives in sign languages, see Petronio and Lillo-Martin (1997), Happ and Vorköper (2006), Sandler and Lillo-Martin (2006), Cecchetto (2012), and Herrmann and Steinbach (2013); for classifiers in sign languages, see Supalla (1986), Engberg-Pedersen (1993), Glück and Pfau (1998), Benedicto and Brentari (2004), Aronoff, Meir, Padden and Sandler (2003), Sandler and Lillo-Martin (2006), Meir and Sandler (2008), Zwitserlood (2012), and Pfau and Steinbach (2022)).
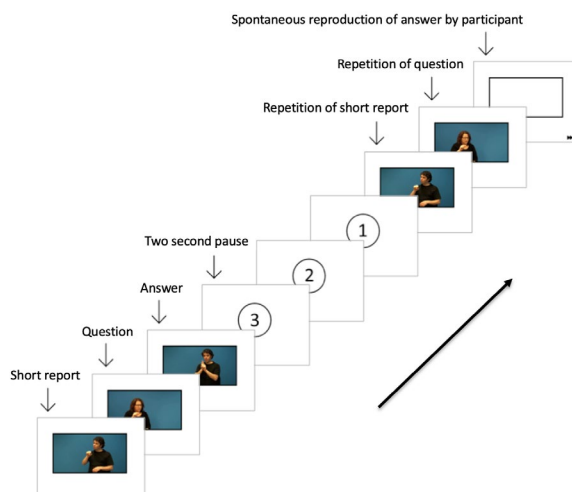

Figure 2. *Structure of trials used in the SRT on conditional sentences*

3.3 Participants

We collected data from 11 signers (five female, six male) between the ages of 27 and 62 years (mean age = 38.3 years). One participant was excluded from the evaluation since it turned out that he is hard of hearing and uses spoken German as his main language of communication in addition to DGS. The final sample consisted of 10 deaf signers who acquired DGS before the age of six and used DGS as their preferred language for daily communication.

3.4 Data analysis

All elicited and recorded sentences were annotated using ELAN (Crasborn and Sloetjes, 2008, Lausberg and Sloeties, 2009). We used gloss annotations and respective tiers for non-manual markers in order to check alignment patterns. The evaluation of non-manual markers was carried out by a certified coder of the Facial Action Coding System (FACS, cf. Ekman et al., 2002). Thus, we indicate the relevant Action Units (AUs) in the following descriptions.

In total, we elicited 237 complete sentences (see Table 2), of which 87 were classified as conditional sentences. This classification was conducted by two deaf native signers of DGS and one fluent hearing signer (all three are authors of this paper). There were some cases of doubt where non-man-

Condition	Reproduced answer
A (conditional context + non-conditional answer)	Conditional: 25 Non-conditional or uncertain: 35
B (conditional context + conditional answer)	Conditional: 38 Non-conditional or uncertain: 22
C (non-conditional context + non-conditional answer)	Conditional: 8 Non-conditional or uncertain: 50 Incomplete sentence: 2
D (non-conditional context + conditional answer)	Conditional: 16 Non-conditional or uncertain: 43 Incomplete sentence: 1
Total	Signed sentences: 237 Conditional: 87 Non-conditional or uncertain: 150

Table 2. Categorisation of the reproduced sentences with respect to the four conditions of the SRT

ual markers were too weak to clearly differentiate between a conditional embedding or a non-conditional coordination (as mentioned in Section 3.2, there is some overlap in the non-manual markers used in both conditions). According to the intuition of the two native signers, without having seen the respective previous context, such sentences could be interpreted as both conditional or non-conditional. Since we applied strict criteria during the classification of the sentences, we decided to exclude such cases of doubt from the evaluation.

One of the key results of the present study was that most of the clearly allocated conditional sentences of the participants were produced in combination with contexts that were supposed to trigger a conditional continuation (conditions A and B). This finding confirms the anticipated contextual effect of the short reports. The non-conditional match condition in C resulted in very few sentences that were analysed as conditional sentences. In condition D, some conditional test sentences were repeated conditionally in the reproductions despite the non-conditional nature of the context.

The fact that signers did not always change the marking for conditional sentences may have two possible explanations: either the sequences were understood as non-conditional coordination that do not require additional markers, or they were understood as unmarked conditionals. The latter would indicate that a sequence of two clauses without non-manual and manual conditional markers could, in specific contexts, still be used to express a con-

ditional relationship between the two clauses. This would mean that a conditional relationship between two clauses can be expressed without a fully spelled-out non-manual conditional marking if the context specifies the conditional meaning clearly. Nevertheless, many signers used non-manual and manual markers, even if they were not present in the input stimuli. Thus, in their reproductions, the signers did not take this construction to be a non-conditional coordination. The fact that many participants added manual and non-manual conditional markers to a non-marked test sentence illustrates that the selected contexts presented in combination with the test sentences clearly triggered conditional readings of critical items. Therefore, the potential optionality of manual and non-manual markers in specific contexts is an important topic for future research.

From a methodological perspective, another important outcome of this study was the successful evaluation of the design of this SRT for the elicitation of complex sentences in a sign language. The SRT and the time lag between the test sentences and reproduced sentences had the anticipated effect since the signers did not merely copy what they had seen. This was especially obvious when signers used dialectal variations of lexical (manual) signs in the reproduced sentences, slightly different sentence structures, as well as manual and non-manual markers that are not present in the stimuli in semantically and pragmatically appropriate ways. Thus, the SRT methodology

worked well for the present study on conditionals and delivered reliable results.

4. RESULTS

In total, we identified a set of 87 conditionals, including 45 solely non-manual marked sentences and 42 sentences that used a combination of non-manual and one or two additional manual signs that contributed to the conditional meaning (see Fig. 3). Interestingly, even though the test sentences we used consisted of stimuli that did not contain any specific manual conditional markers, we observed that a number of manual markers were added by the participants.
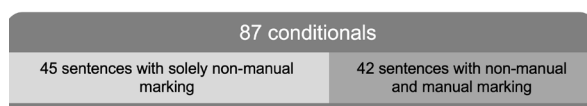
87 conditionals	
45 sentences with solely non-manual marking	42 sentences with non-manual and manual marking

Figure 3. *Distribution of reproduced sentences without (left) and with (right) manual marking in addition to non-manual marking.*

In Section 4.1, we discuss the distribution of non-manual markers in the reproduced conditional sentences. The set of manual conditional markers identified in the elicited data is discussed in Section 4.2. Note that, in this paper, we focus on strategies attested in our data. It is, of course, possible that there are further (dialectal or sociolectal) strategies associated with conditional marking in DGS that were not used by the participants who took part in our study (for sociolectal variation in the expression of conditional sentences in DGS and Libras, see Paulus, 2021; for dialectal variation in DGS, see Macht and Steinbach, 2019).

4.1 Non-manual conditional markers

Table 3 summarises the non-manual markers that we identified in the 87 classified conditional sentences elicited with our SRT. The most frequent non-manual strategy observed in our data was a change in head position between the antecedent and the consequent. In the antecedent, we noted head down (AU 54) in 68 cases and head nod (AU 85) in 29 cases. The consequent was marked by head nod (AU 85) 60 times. In some cases, it was

difficult to distinguish between head down and head nod during the antecedent. Velocity is a useful indicator, but the classification between head down and head nod in sign languages remains fluent. In some cases, head down appeared along with head forward (AU 57), head tilt left (AU 55), or head tilt right (AU 56), and/or body forward (AU 107*[8]) that reinforces the appearance of head down. In the present study, we grouped all these cases and classified them under the non-manual marker head down.

Position	Non-manual	Total
Antecedent		
	head down (hd) AU 54	68
	head nod (hn) AU 85	29
	brow raise (br) AU 1+2	62
	upper lid raise (ulr) AU 5	45
	chin raiser (chr) AU 17	9
Boundary		
	eye blink (b) AU 45	73
Consequent		
	head nod (hn) AU 85	60
	chin raiser (chr) AU 17	21

Table 3: *Non-manual markers used in conditional constructions of the DGS data set*

Another important conditional marker is brow raise (AU 1+2), which was observed 62 times in the antecedent in our data. In addition, wide open eyes were prominent. The upper lid raise (AU 5) occurred 45 times, mainly in combination with brow raise. Furthermore, we observed the use of a mouth gesture in the form of chin raiser (AU 17), which seems to have an affirmative conditional meaning (see Section 4.1.3). This mouth gesture occurred nine times in the antecedent and 21 times in the consequent. Note that, in most cases, the antecedent and the consequent were prosodically separated from each other by an eye blink.

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[8] The AUs for body movements are a supplement to the Facial Action Coding System proposed in Pendzich (2020).

We identified this boundary marker in 73 of the 87 reproduced conditional sentences.

4.1.1 Brow raise, upper lid raise, and head movement

The brow raise (AU 1+2), upper lid raise (AU 5), head down (AU 54), and head nod (AU 85) had different intensities and were distributed differently on the antecedents. Figure 4 shows a typical joint occurrence of brow raise, upper lid raise, and head down.

Figure 4: Representative image depicting a combination of brow raise, upper lid raise, and head down

In the present study, we observed that the head nod (AU 85) on the consequent may occur as a single head nod or as a spreading head nod (i.e., continuous nodding). It was also possible that the head position only changed on the antecedent and returned to neutral on the consequent. In any case, it seems to be a general tendency that signers mark a difference in head (and body) position between the antecedent and the consequent, especially towards the end of the antecedent and at the beginning of the consequent. A rather slow head nod or head down on the antecedent and a faster short head nod at the beginning of the consequent appears as a typical instance of this specific contrastive marker, but the exact arrangement of the change in head (and body) position seems to depend on factors such as context, emphasis, and specific characteristics of the signer.

4.1.2 Eye blink

In most cases, the two parts of the conditional sentences were prosodically separated from each other by an eye blink. In our data, blinks as a prosodic boundary marker were observed 73 times. As discussed in Section 2, the blink between the antecedent (the subordinate clause) and the consequent (the main clause) can be analysed as a general prosodic marker that indicates a clause boundary (cf. Wilbur, 1994, Herrmann, 2010, Sandler, 2012).

4.1.3 Chin raiser

In our data, the chin raiser (AU 17) seems to occur systematically as an accentuation of the conditional meaning, partly in combination with other AUs within the lower face (see Fig. 5). There are many instances where this specific mouth gesture did not have any other lexical or morphological function (see Pendzich (2020) for lexical non-manual markers in DGS). It is interesting to examine the relationship between the chin raiser and the conditional meaning of sentences. We observed nine antecedents and 21 consequents with this chin raiser.[9] The mouth gesture seems to have a pragmatic meaning in the form of an affirmation of the antecedent and/or the consequent.
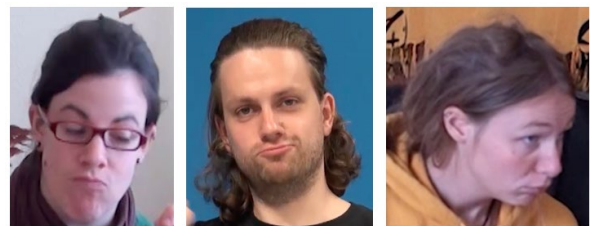
Figure 5. Mouth gesture observed in conditional sentences

Another interesting finding is the combination of chin raiser with head nod or the combination with head nod and the sign THEN1, as illustrated in Figure 6. In this example, the antecedent is marked by brow raise (br), upper lid raise (ulr), head down (hd), and head nod (hn). In contrast, the left boundary of the consequent is marked by a mouth gesture in the form of chin raiser (chr),

---

[9] Note that we only considered the chin raiser in cases where the conditional relationship was classified as strong by a deaf native signer. If we had included all the uncertain cases, the total number would have been significantly higher.

	br
	ulr b
	hd hn hn
	chr

IX₁ CAR NEW ₃GIVE₁ GET THEN1 IX₁ SMALL TOWN MOVE

If I get a new car, then I will move into a small town.

Figure 6. *Example of a conditional sentence accompanied by chin raiser, other non-manual markers, and* THEN1

which is used in combination with head nod and the manual marker THEN1.

As reported in Pendzich (2020), the chin raiser (AU 17) is predominantly associated with the meaning *consent* for deaf signers. In contrast, hearing non-signers predominantly assign contrasting meanings to this mouth gesture such as *contradiction*, *irrelevance*, and *reflection*. This affirmative meaning of chin raiser for deaf signers fits perfectly to the use of chin raiser in conditional sentences.

It would be very interesting to examine the chin raiser further in order to understand whether it occurs more frequently in conditional sentences than in other sentence types, as well as whether this mouth gesture is used more frequently by a particular age group. In addition, it would be interesting to understand to what extent dialectal variations play a role in the distribution of this mouth gesture. One example of a good testing ground for follow-up studies would be the Hamburg DGS corpus (cf. Konrad et al., 2020).

4.2 Manual conditional markers

4.2.1 Manual conditional signs

In the present study, none of the test sentences contained a specific manual conditional marker in the antecedent or in the consequent. Interestingly, we observed that the reproduced sentences contained 53 manual markers. In their reproductions, the participants added 28 markers to the antecedent and 25 to the consequent. In total, we found seven different manual signs marking the conditional relationships in our data (see Table 4). The most frequent signs were IF1 (= 10) and IF2 (= 8) in the antecedent and THEN1 (= 16) in the consequent.

Figure 7. *Conditional signs in the antecedents*

Position	Sign	Total
Antecedent		
	IF1 ('WENN')	10
	IF2 ('WENN')	8
	DEPENDENT ('ABHÄNGIG')	5
	GO-SMOOTHLY('KLAPPT')	5
Consequent		
	THEN1 ('DANN')	16
	THEN2 ('DANN')	7
	THEN3 ('DANN')	2

Table 4. *Manual signs used in conditional constructions of the DGS data set*

Four different signs were used in the antecedents: IF1, IF2, DEPENDENT, and GO-SMOOTHLY (see Fig. 7). The use of IF2 seems to be a more recent phenomenon and this sign seems to be more widely used in the North of Germany. Since these are preliminary observations, they need to be independently verified in follow-up studies. We observed that, unlike IF1, IF2, and DEPENDENT, GO-SMOOTHLY was not used in the clause-initial position, but at the end of the antecedent to emphasise the conditional relationship. In one sentence, GO-SMOOTHLY occurred before the main verb of the antecedent.

We observed three different signs in the consequents: THEN1, THEN2, and THEN3 (see Fig. 8). Based on the previous data, it cannot be decided whether THEN3 is a one-handed variant of THEN2 or an independent sign. Since there are slight differences in the movement, we counted them as two individual signs. THEN2 is signed with a downward and slightly forward movement of the dominant hand against the non-dominant hand. In contrast, THEN3 includes a downward movement of the dominant hand that is articulated in particular with the wrist. We also observed that THEN2 and THEN3 seemed to be used more frequently by elderly signers.

Figure 8: *Conditional signs in the consequents*

In Section 4.1.3, we discussed an example of a conditional sentence, including the sign THEN1. Here we focus on further examples that are marked by other manual markers. In Figure 9, the manual sign IF1 and the non-manual markers brow raise (br), upper lid raise (ulr), and head down (hd) were used on the antecedent, followed by an eye blink (b) at the sentence boundary and head nod (hn) at the beginning of the consequent. The consequent was additionally marked by the sign BE-ABLE at the end of the clause. We noted that, in some sentences, the modal verbs BE-ABLE (= 7) and HAVE-TO (= 1) were added to the consequent. This seems to be a strategy to emphasise the conditional relationship.

```
                                    br
                            _____ ulr b
                          _____ hd   hn
IF1 FATHER CAR 3GIVE1  IX1 CITY MOVE BE-ABLE
```

If father gives me a car, I will be able to move to the city.

***Figure 9.** Representative example of a conditional sentence including the manual signs IF1 and BE-ABLE*

```
_____ br _____ hn
              ____ b                              ____ b
                                     hd _____ hn
DEPENDENT PALM-UP HIMSELF MANY PERSON++ 3INVITE1++ THEN1 TOGETHER RESTAURANT GO
```

If he invites many persons, then they will go into a restaurant together.

***Figure 10.** Representative example of a conditional sentence including the manual signs DEPENDENT and THEN1*

The conditional sentence depicted in Figure 10 shows another interesting manual marker. The signer used the sign DEPENDENT at the beginning of the antecedent and the sign THEN1 at the beginning of the consequent. Furthermore, the antecedent was marked non-manually by brow raise, head down, as well as head nod. The consequent was accompanied by a repeated head nod that was spread over the entire clause. Both parts of the sentence were separated by an eye blink. This participant used the sign DEPENDENT five times in the elicited conditional sentences. Thus, it should be noted that all of the occurrences of this sign in our data were signed by one signer. It looks as if the sign DEPENDENT is a typical conditional marker for sentences in which the signer is not responsible for the decision. In the example illustrated in Figure 10, the signer accentuated that the course of the event was dependent on the decision of another person.

At the end of the antecedent in Figure 11, the signer used the sign GO-SMOOTHLY and started the consequent with the sign THEN1. In addition, the sequence of the two events was emphasised by the sign FIRST at the beginning of the antecedent. The non-manual markers brow raise, upper lid raise, and head down were used on the antecedent, while the consequent began with the head nod.

As mentioned in Section 2, Paulus (2021) listed four manual conditional markers for the antecedent (IF1, IF2, IMAGINE, and FOR-EXAMPLE) and two for the consequent (MEAN and THEN1). The signs IMAGINE, FOR-EXAMPLE, and MEAN were not used in our data. Complementing the findings reported in Paulus (2021), we identified additional signs used in the antecedent (DEPENDENT and GO-SMOOTHLY) and in the consequent (THEN2 and THEN3). These differences clearly show how important the context of production is for the choice of manual signs that contribute to the conditional meaning. Different methodologies reveal different sets of lexical elements and add new data to a broader picture of the realisation patterns for conditional sentences in DGS. Additionally, dialectal and sociolectal aspects may be responsible for the use and distribution of manual markers in DGS in the present study and in Paulus (2021).

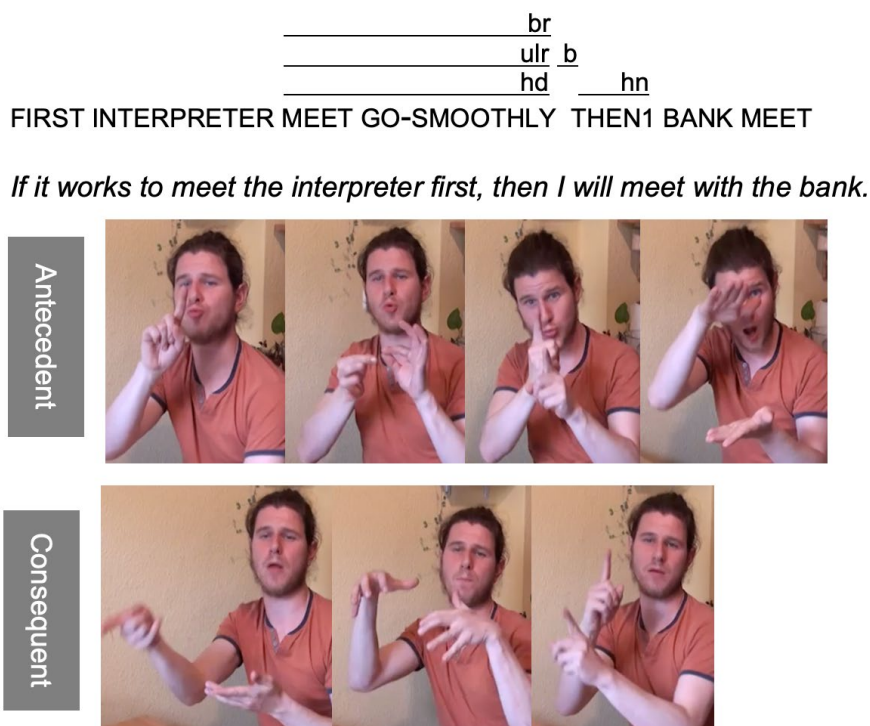Another interesting observation that needs to be investigated further is the function of PALM-UP

```
                                       br
                              ulr  b
                              hd        hn
FIRST INTERPRETER MEET GO-SMOOTHLY  THEN1 BANK MEET
```

If it works to meet the interpreter first, then I will meet with the bank.

Figure 11. *Representative example of a conditional sentence including the manual signs GO-SMOOTHLY and THEN1*

in conditional sentences (see Fig. 12). Within our data set, we identified eight instances in which PALM-UP seems to reinforce the uncertainty of the occurrence of an event (for epistemic uses of PALM-UP in sign languages, see Herrmann, 2013, van Loon, Pfau and Steinbach, 2014 and Cooperrider, Abner and Goldin-Meadow, 2018). PALM-UP occurred at different positions in the conditional sentences: at the beginning of the antecedent, at the boundary between antecedent and consequent, as well as at the end of the consequent (for other functions of PALM-UP in sign languages and the corresponding 'palm-up' gesture in spoken languages, see McNeill, 1992, Müller 2004, van Loon, Pfau and Steinbach, 2014, Cooperrider, Abner and Goldin-Meadow, 2018, and Volk and Herrmann, 2021).

Figure 12. PALM-UP *used in combination with a conditional sentence*

4.2.2 Hand dominance shift

Figure 13 depicts the use of hand dominance shift within the conditional construction in addition to the following non-manual markers in the antecedent: brow raise, upper lid raise, and head down. The antecedent was signed with the right hand and the consequent with the left hand. This strategy has previously been attested in the data collected by Paulus (2021).

The hand dominance shift is used for a systematic division of the signing space: the two interdependent events in the antecedent and in the consequent are signed in two contrasting areas of the signing space. Hand dominance shift emphasises the dependent relationship of both clauses

and connects the condition and the consequence via direct opposition.

```
                          br
                          ulr
                          hd
PARENTS GO-OUT SWEETHEART ₃VISIT₁
```

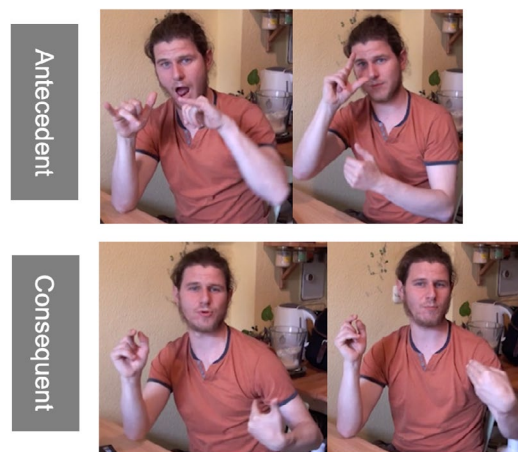*If the parents go out, sweetheart will visit me.*

Figure 13. Representative example of a conditional sentence with hand dominance shift

5. DISCUSSION: CONDITIONAL MARKING IN DGS

One of the main goals of our sentence reproduction study was to examine the spectrum and distribution of non-manual markers used in conditional sentences in DGS (i.e., research questions (i) and (ii) in Section 3.1). We found that the most frequently used non-manual strategy in our data was a change in head position between the antecedent and the consequent. This was mainly expressed through the use of head down (AU 54) and head nod (AU 85) on the antecedent, as well as head nod (AU 85) and/or a return to the neutral position on the consequent. Other important conditional markers are brow raise (AU 1+2) and upper lid raise (AU 5) on the antecedent. Furthermore, we observed the use of a mouth gesture in the form of the chin raiser (AU 17), which was used on the antecedent and/or on the consequent: this mouth gesture seems to have an affirmative conditional meaning. In most cases, the two parts of the conditional sentences were prosodically

separated from each other by an eye blink. Our findings are consistent with the observations made in Paulus (2021). Head movement, brow raise, and eye blink are the most frequent non-manual markers used in conditional sentences in DGS. Furthermore, we identified the systematic use of upper lid raise and the mouth gesture with chin raiser, both of which have not been described for DGS conditional sentences so far. Our findings are also consistent with descriptions of conditional sentences in other sign languages, suggesting that sign languages draw on similar manual and non-manual strategies of conditional marking. However, they exhibit variation especially in the manual elements used to express a conditional relation.

Our second main goal was to examine manual strategies and markers used to express conditionals (i.e., research questions (iii) and (iv) in Section 3.1). First, our results confirm the observation that the antecedent generally precedes the consequent in DGS. Based on our data, in all examples, the antecedent was produced prior to the consequent. Thus, the syntactic rule antecedent > consequent imposes a strict restriction on clause order in conditional sentences. Second, although the test sentences did not contain any specific manual markers, the signers frequently used various manual signs to mark the antecedent and the consequent. In the conditional sentences elicited in our study, the following signs were used to mark the antecedent: IF1, IF2, DEPENDENT, and GO-SMOOTHLY. On the other hand, the consequent was marked with THEN1, THEN2, and THEN3. These manual markers typically appear in the clause-initial position of the antecedent and consequent. The only exception was the marker GO-SMOOTHLY, which is typically used in the final position of the antecedent to emphasise the conditional relation. IF1 and THEN1 were the most frequently used manual markers in our data set. In addition, we identified four signs that have not been described in the context of conditional sentences so far: DEPENDENT, GO-SMOOTHLY, THEN2, and THEN3. Third, we observed that the signers used PALM-UP and modal verbs in conditional sentences. This interesting observation re-

quires further systematic analysis. Finally, another interesting strategy observed in our study was the hand dominance shift with respect to the antecedent and the consequent. Crasborn and Sáfár (2016) illustrated that this general modality-specific strategy can exhibit various functions. In addition, Paulus (2021) mentioned it in association with conditional sentences.

In summary, the results of our study show that in addition to the strict syntactic order of the antecedent preceding the consequent, signers typically use a combination of different manual and non-manual strategies to mark the antecedent and the consequent of a conditional sentence in DGS. Manual markers typically occur in the clause-initial position, while non-manual markers show different spreading behaviours, change at the clause boundary, and are used to mark the boundary between the antecedent and the consequent. An interesting question for future research studies is whether the number and combination of markers are dependent on contextual, individual, dialectal, and/or sociolinguistic factors. Additionally, it might be interesting to identify further strategies not attested in our data that could be used in DGS to mark conditionals.

Figure 14 shows two further manual conditional signs: INDEED and IF3. The sign INDEED is typically used at the beginning of the antecedent in sentences such as "INDEED CAR BROKEN IX$_1$ GO-BY-TRAIN" ('If the car is indeed broken, I will take the train). A typical example with the sign IF3 is the conditional sentence "IF3 CAR ENGINE-FAILURE NEW CAR ORDER" ('If the car has an engine failure, I will order a new car'). Both examples include non-manual conditional markings as well. The sign IF3 seems to be used particularly in the South of Germany, which explains the absence in our elicited SRT data.

INDEED   IF3

Figure 14. Manual conditional signs INDEED *and* IF3

In future studies, it would be particularly interesting to focus on (i) other manual signs that are used to express a conditional relationship, (ii) dialectal variations (in particular other conditional signs used in dialects of DGS that were not investigated in our study), (iii) differences in strategies used by younger and older signers, as well as to further investigate (iv) the occurrence of mouth gestures with chin raiser (AU 17), (v) the meaning of PALM-UP in conditional sentences, and (vi) the relationship between certain markers and the specific contexts they are used in (i.e., the relationship between form and meaning).

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REFERENCES

Andreou, M., Torregrossa, J. & Bongartz, C. (2021). Sentence Repetition Task as a Measure of Language Dominance. In Dionne, D., & Vidal, L.-A. (Eds.), *Proceedings of the 45th annual Boston University Conference on Language Development* (pp. 14-25). Somerville, MA: Cascadilla Press.

Aronoff, M., Meir, I., Padden, C. & Sandler, W. (2003). Classifier Complexes and Morphology in Two Sign Languages. In Emmorey, K. (Ed.), *Perspectives on Classifier Constructions in Sign Languages* (pp. 53-84). Mahwah: Lawrence Erlbaum.

Baker, C. & Padden, C. (1978). Focusing on the Nonmanual Components of American Sign Language. In Siple, P. (Ed.), *Understanding Language through Sign Language Research* (pp. 27-57). New York: Academic Press.

Benedicto, E. & Brentari, D. (2004). Where did all the Arguments Go? Argument Changing Properties of Classifiers in ASL. *Natural Language & Linguistic Theory*, 22, 743-810.

Bogliotti, C., Aksen, H. & Isel, F. (2020). Language Experience in LSF Development: Behavioral Evidence from a Sentence Repetition Task. *PLOS ONE*, 15(11), 2-26.

Cecchetto, C. (2012). Sentence Types. In Pfau, R., Steinbach, M. & Woll, B. (Eds.), *Sign Language. An International Handbook* (pp. 292-315). Berlin: Mouton de Gruyter.

Cooperrider, K., Abner, N. & Goldin-Meadow, S. (2018). The Palm-up Puzzle: Meanings and Origins of a Widespread form in Gesture and Sign. *Frontiers in Communication*, 3, 23, 1-16.

Corina, D.P., Farnady, L., LaMarr, T., Pedersen, S., Lawyer, L., Winsler, K., Hickok, G. & Bellugi, U. (2020). Effects of Age on American Sign Language Sentence Repetition. *Psychology and Aging*, 35(4), 529-535.

Cormier, K., Adam, R., Rowley, K., Woll, B. & Atkinson, J. (2012). The British Sign Language Sentence Reproduction Test: Exploring Age-of-acquisition Effects in British Deaf Adults. Paper presented at the *34th Annual Meeting of the German Linguistic Society*, University of Frankfurt am Main.

Crasborn, O. & Sáfár, A. (2016). An Annotation Scheme to Investigate the Form and Function of Hand Dominance in the Corpus NGT. In Pfau, R., Steinbach, M. & Herrmann, A. (Eds.), *A Matter of Complexity: Subordination in Sign Languages* (pp. 231-251). Berlin: De Gruyter Mouton.

Crasborn, O. & Sloetjes, H. (2008). Enhanced ELAN Functionality for Sign Language Corpora. *6th International Conference on Language Resources and Evaluation (LREC 2008) / 3rd Workshop on the Representation and Processing of Sign Languages: Construction and Exploitation of Sign Language Corpora*, 39-43.

Dachkovsky, S. (2008). Facial Expression as Intonation in Israeli Sign Language: The Case of Neutral and Counterfactual Conditionals. In Quer, J. (Ed.), *Signs of the Time. Selected Papers from TISLR 2004* (pp. 61-82). Hamburg: Signum.

Dachkovsky, S., Healy, C. & Sandler, W. (2013). Visual Intonation in Two Sign Languages. *Phonology*, 30(2), 211-252.

Dachkovsky, S., Hosemann, J., Herrmann, A., Steinbach, M. & Sandler, W. (2015). Perception of Facial Intonation in Two Sign Languages. Paper presented at *IATL 31*, Bar Ilan University.

Dachkovsky, S. & Sandler, W. (2013). Visual Intonation in the Prosody of a Sign Language. *Language and Speech*, 52(2/3), 287-314.

Dancygier, B. (1998). *Conditionals and Prediction: Time, Knowledge, and Causation in Conditional Constructions*. Cambridge: Cambridge University Press.

Ebert, C., Endriss, C. & Hinterwimmer, S. (2008). Topics as Speech Acts: An Analysis of Conditionals. In Abner, N. & Bishop, J. (Eds), *Proceedings of the 27th West Coast Conference on Formal Linguistics (WCCFL 27)* (pp. 132-140). Sommerville, MA: Cascadilla Proceedings Project.

Ekman, P., Friesen, W.V. & Hager, J.C. (2002). *Facial Action Coding System. The Manual*. Salt Lake City UT: Research Nexus Division of Network Information Research Corporation.

Engberg-Pedersen, E. (1993). *Space in Danish Sign Language*. Hamburg: Signum.

Fischer, S. & Lillo-Martin, D. (1990). *Understanding* Conjunctions. *International Journal of Sign Linguistics*, 1, 71-80.

Glück, S. & Pfau, R. (1998). On Classifying Classification as a Class of Inflection in German Sign Language. In Cambier-Langeveld, T. Lipták, A. & Redford, M. (Eds.), *Proceedings of ConSole 6* (pp. 59-74). Leiden: SOLE.

Haegeman, L. (1984). Pragmatic Conditionals in English. *Folia Linguistica*, 18 (3/4), 485-502.

Happ, D. & Vorköper, M.O. (2006). *Deutsche Gebärdensprache. Ein Lehr- und Arbeitsbuch*. Frankfurt am Main: Fachhochschulverlag.

Hauser, P., Paludneviciene, R., Supalla, T. & Bavelier, D. (2006). American Sign Language – Sentence Reproduction Test: Development & Implications. In de Quadros, R.M. (Ed.), *Sign Languages: Spinning and Unraveling the Past, Present and Future* (pp. 155-167). TISLR 9. Petrópolis, RJ: Editora Arara Azul.

Herrmann, A. (2013): *Modal and Focus Particles in Sign Languages: A Cross-linguistic Study*. Boston: Mouton de Gruyter.

Herrmann, A. (2010). The Interaction of Eye Blinks and other Prosodic Cues in German Sign Languages. *Sign Language and Linguistics*, 13(1), 3-39.

Herrmann, A. & Pendzich, N.-K. (2014). Nonmanual Gestures in Sign Languages. In Müller, C., Cienki, A., Fricke, E., Ladewig, S.H., McNeill, D. & Bressem, J. (Eds.), *Body – Language – Communication. A Handbook on Multimodality in Human Interaction* (pp. 2147-2160). Berlin: De Gruyter Mouton.

Herrmann, A. & Steinbach, M. (2013). Satztypen in Gebärdensprache. In Meibauer, J., Steinbach, M. & Altmann, H. (Eds.), *Satztypen des Deutschen* (pp. 786-814). Berlin: De Gruyter.

Janzen, T. (1999). The Grammaticization of Topics in American Sign Language. *Studies in Language*, 23, 271-306.

Klomp, U. (2019). Conditional Clauses in Sign Language of the Netherlands: A Corpus-based Study. *Sign Language Studies*, 19(3), 309-347.

König, E. (2012). Comparative Linguistics and Language Comparison. *Languages in Contrast*, 12, 3-26.

Konrad, R., Hanke, T., Langer, G., Blanck, D., Bleicken, J., Hofmann, I., Jeziorski, O., König, L., König, S., Nishio, R., Regen, A., Salden, U., Wagner, S., Worseck, S., Böse, O., Jahn, E. & Schulder, M. (2020). *MEINE DGS – annotiert. Öffentliches Korpus der Deutschen Gebärdensprache, 3. Release / MY DGS – annotated. Public Corpus of German Sign Language, 3rd release* (Dataset). Universität Hamburg.

Kubus, O. & Rathmann, C. (2012). Degrees of Difficulty in the L2 Acquisition of Morphology in German Sign Language. Paper presented at the *34th Annual Meeting of the German Linguistic Society*, Universität of Frankfurt am Main.

Lackner, A. (2017). *Functions of Head and Body Movements in Austrian Sign Language*. Berlin: Mouton de Gruyter and Ishara Press.

Lausberg, H., & Sloetjes, H. (2009). Coding Gestural Behavior with the NEUROGESELAN system. *Behavior Research Methods*, 41(3), 841-849.

Leuschner, T. & Van den Nest, D. (2015). Asynchronous Grammaticalization: V1-Conditionals in Present-day English and German. *Languages in Contrast*, 15(1), 34-64.

Liddell, S. (1986). Head Thrusts in ASL Conditional Marking. *Sign Language Studies*, 52, 243-262.

Macht, C. & Steinbach, M. (2019). Regionalsprachliche Merkmale in der Deutschen Gebärdensprache. In Herrgen, J. & Schmidt, J.E. (Eds.), *Sprache und Raum. Ein internationales Handbuch der Sprachvariation* (pp. 914-935). Berlin: de Gruyter Mouton.

Marshall, C., Mason, K. Rowley, K., Herman, R. Atkinson, J., Woll, B. & Morgan, G. (2015). Sentence Repetition in Deaf Children with Specific Language Impairment in British Sign Language. *Language Learning Development*, 11(3), 237-251.

Mayberry, R., Fischer, S. & Hatfield, N. (1983). Sentence Repetition in American Sign Language. In Kyle, J., & Woll, B. (Eds.), *Language in Sign: An International Perspective on Sign Language* (pp. 206-215). London: Croom Helm.

McNeill, D. (1992). *Hand and Mind: What Gestures Reveal about Thought*. Chicago: Chicago University Press.

Meir, I. & Sandler, W. (2008). *A Language in Space. The Story of Israeli Sign Language*. New York: Lawrence Erlbaum.

Monaghan, L. (2009). Conditional Constructions in British Sign Language. How are Constructions that are Considered Conditionals in English represented in BSL? (Bachelor's thesis). University of Bristol.

Müller, C. (2004). Forms and Uses of the Palm Up Open Hand: A Case of a Gesture family? In Müller, C. & Posner, R. (Eds.), The Semantics and Pragmatics of Everyday Gestures (pp. 233-256). Berlin: Weidler.

Munnich, E., Flynn, S. & Martohadjono, G. (1994). Grammaticality Judgement Task and Elicited Imitation: Differences and Similarities in Evaluating Linguistic Competence. In Tarone, E.E., Gass, S.M. & Cohen, A.D. (Eds.), *Research Methodology in Second-language Acquisition* (pp. 227-245). Hillsdale, NJ: Erlbaum.

Onea, E. & Steinbach, M. (2012). Where Questions, Conditionals and Topics Converge. In Aloni, M., Roelofsen, F., Weidman Sassoon, G., Schulz, K., Kimmelmann, V. & Westera, M. (Eds.), *Proceedings of the 18th Amsterdam Colloquium* (pp. 20-29). Heidelberg: Springer.

Papaspyrou, C., von Meyenn, A., Matthaei, M. & Herrmann, B. (2008). *Grammatik der Deutschen Gebärdensprache aus der Sicht gehörloser Fachleute*. Hamburg: Signum.

Paulus, L. (2021). Der Konditionalsatz in Deutscher Gebärdensprache (DGS) und Brasilianischer Gebärdensprache (Libras) - Eine empirische soziolinguistische Studie (Doctoral dissertation). University of Göttingen.

Pendzich, N.-K. (2020). *Lexical Nonmanuals in German Sign Language (DGS). Empirical Studies and Theoretical Implications*. Berlin: De Gruyter Mouton and Ishara Press.

Petronio, K. & Lillo-Martin, D. (1997). Wh-movement and the Position of Spec-CP: Evidence from American Sign Language. *Language*, 73, 18-57.

Pfau, R. & Steinbach, M. (2006). *Modality-independent and Modality-specific Aspects of Grammaticalization in Sign Languages*. Potsdam: Universitätsverlag.

Pfau, R. & Steinbach, M. (2011). Grammaticalization in Sign Languages. In Heine, B. & Narrog, H. (Eds.), *Handbook of Grammaticalization* (pp. 681-693). Oxford: Oxford University Press.

Pfau, R. & Steinbach, M. (2022). Morphology in Sign Language: Theoretical Issues and Typological Contrasts. To appear in Ackema, P., Bendjaballah, S., Bonet, E. & Fábregas, A. (Eds.), *The Wiley Blackwell Companion to Morphology*. Hoboken, NJ: Wiley.

Proske, S. (2021). The Impact of Verb Type on Word Order in German Sign Language (Doctoral dissertation). University of Göttingen.

Quer, J., Cecchetto, C., Donati, C., Geraci, C., Kelepir, M., Pfau, M. & Steinbach, M. (2017). *SignGram Blueprint. A Guide to Sign Language Grammar Writing*. Berlin: De Gruyter.

Reilly, J. S., McIntire, M. L., & Bellugi, U. (1990). The Acquisition of Conditionals in American Sign Language: Grammaticized Facial Expressions. *Applied Psycholinguistics*, 11(4), 369-392.

Riedl, L., Wiese, R., Dellwo, V. &. Witting, A. (2014). Die Leistung im Memorieren und Nachsprechen von Pseudowörter: Eine Untersuchung zum Wortakzent im Deutschen. *Linguistische Berichte*, 240, 447-470.

Rinaldi, P., Caselli, M.C., Lucioli, T., Lamano, L. & Volterra, V. (2018). Sign Language Skills Assessed through a Sentence Reproduction Task. *The Journal of Deaf Studies and Deaf Education*, 23(4), 408-421.

Sandler, W. & Lillo-Martin, D. (2006). *Sign Language and Linguistic Universals*. Cambridge: Cambridge University Press.

Sandler, W. (2012). Visual Prosody. In Pfau, R., Steinbach, M. & Woll, B. (Eds.), *Sign Language. An International Handbook* (pp. 55-76). Berlin: Mouton de Gruyter.

Schimke, S. (2011). Variable Verb Placement in Second-language German and French: Evidence from Production and Elicited Imitation of Finite and Nonfinite Negated Sentences. *Applied Psycholinguistics*, 32, 635-685.

Schönström, K. & Hauser, P.C. (2021). The Sentence Repetition Task as a Measure of Sign Language Proficiency. *Applied Psycholinguistics*, 43, 1-19.

Smith, D. (2004). The Layering of Syntactic Non-manual Markers in Sign Language of the Netherlands: Possibilities and Constraints. (Master's thesis). University of Amsterdam.

Steinbach, M. (2021). Role Shift - Theoretical Perspectives. In Quer, J., Pfau, R. & Herrmann, A. (Eds.), *Theoretical and Experimental Sign Language Research* (pp. 351-377). London: Routledge.

Steinbach, M. (2022). Differential Object Marking in Sign Languages? Restrictions on (Object) Agreement in German Sign Language. In Willer-Gold, J. & Nevins, A. (Eds.), *Angles of Object Agreement* (pp. 209-240). Oxford: Oxford University Press.

Supalla, T. (1986). The Classifier System in American Sign Language. In Craig, C. (Ed.), *Noun Classes and Categorization* (pp. 181-214). Amsterdam: John Benjamins.

Supalla, T., Hauser, P.C. & Bavelier, D. (2014). Reproducing American Sign Language Sentences: Cognitive Scaffolding in Working Memory. *Frontiers in Psychology*, 5, 859, 1-16.

Sutton-Spence, R. & Woll, B. (1999). *The Linguistics of British Sign Language: An Introduction*. Cambridge: Cambridge University Press.

van Loon, E., Pfau, R. & Steinbach, M. (2014). The Grammaticalization of Gestures in Sign Languages. In Müller, C., Cienki, A., Fricke, E., Ladewig, S.H., McNeill, D. & Bressem, J. (Eds.), *Body – Language – Communication. A Handbook on Multimodality in Human Interaction* (pp. 2133-2149). Berlin: De Gruyter Mouton.

Volk, E. & Herrmann, A. (2021). Discourse Particles in Sign Languages – Theoretical Perspectives. In: Quer, J., Pfau, R. & Herrmann, A. (Eds.), *The Routledge Handbook of Theoretical and Experimental Sign Language Research* (pp. 480-499). London: Routledge.

Waters, D. & Sutton-Spence, R. (2005). Connectives in British Sign Language. *Deaf Worlds: International Journal of Deaf Studies*, 21(3), 1-29.

Wilbur, R. (1994). Eyeblinks and ASL Phrase Structure. *Sign Language Studies*, 84(1), 221-240.

Zwitserlood, I. (2012). Classifiers. In Pfau, R., Steinbach, M. & Woll, B. (Eds.), *Sign Language. An International Handbook* (pp. 158-186). Berlin: Mouton de Gruyter.