

## Role Shift, Indexicals and Beyond – New evidence from German Sign Language

Annika Hübl  
University of Göttingen

### 1 Introduction<sup>1</sup>

Human languages provide their speakers and signers with a variety of means to report the utterances and thoughts of somebody else (including their own utterances and thoughts). Role shift (RS) is a common strategy to cover this linguistic function in sign languages.<sup>2</sup> In this paper, I will focus on instances of RS as reported discourse, more precisely, I will analyze the interpretation of local and temporal indexicals in the scope of RS.

Herrmann & Steinbach (2012: 213) list the following linguistic markers indicating RS:<sup>3</sup>

1. Eye gaze change towards the locus of the addressee of the reported utterance.
2. Change of head position towards the locus of the addressee of the reported utterance.
3. Body lean including a sideward movement of the upper part of the body towards the locus of the reported signer and a midsagittal body shift towards the locus of the addressee of the reported utterance.
4. Facial expressions associated with the reported signer.

Hence, all the named indicators are so-called non-manual markers that are articulated simultaneously to the manual signs. The RS non-manuals accompany the whole reported utterance and may also have scope over the introducing *verbum dicendi*.

Imagine an original utterance event with Lena telling Anna that she will help her the next day. The example in (1) from German Sign Language (DGS) illustrates how this utterance could be reported making use of RS:

- (1) PAST LENA IX<sub>3a</sub> ANNA IX<sub>3b</sub> TELL<sub>3a</sub> : TOMORROW<sub>1</sub> HELP<sub>2</sub>  
'Lena told Anna: I will help you tomorrow.'

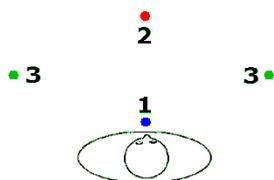
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<sup>2</sup> For a comprehensive overview including the discussion whether RS should be integrated into the larger phenomenon of constructed action see Lillo-Martin (2012).

<sup>3</sup> Concerning the RS markers involving an adjustment with the addressee and/or signer of the reported utterance, Herrmann & Steinbach (2012:217) claim that RS can be marked more or less overtly and state that there is a dependency between these markers: In their data, they find a change in eye gaze (EG) in 86% of the cases, a change in head position (HP) in 77% of the cases, and a body lean (BL) in 48%, whereby eye gaze depends on head position, and head position on body lean. The hierarchy EG > HP > BL is highly expected, given that a body lean without a change in head position and a change in head position without an eye gaze change require more articulatory effort. Furthermore, they explain their findings in terms of salience, articulation costs and contextual restrictions.

Note that signs are always glossed with small caps in my examples, horizontal lines over the glosses indicate the scope of non-manual features, '<...>' stands for the use of RS non-manuals (instead of other non-manual markings like for example 'headshake'). To understand the indices used in (1), one has to understand how sign languages make us of the signing space in order to establish discourse referents and agreement.



**Figure 1:** Loci in signing space.

Pronouns correspond to certain loci in the signing space (cf. Fig. 1) and are introduced by a pointing sign INDEX (IX). Simplifying, one can associate a pointing to the signer's chest (i.e. IX<sub>1</sub>) with a first person pronoun whereas a pointing to the present addressee (i.e. IX<sub>2</sub>) can be interpreted as a second person pronoun. In addition, the INDEX-sign can establish abstract referents that are not present in the current utterance situation, normally on the right (i.e. IX<sub>3a</sub>) or on the left (i.e. IX<sub>3b</sub>) side of the signing space (comparable to third person pronouns), as it is the case in (1). Moreover, many sign languages have a certain type of verb class, so-called *agreement verbs*, which mark agreement with one or two of their arguments (see Mathur & Rathmann 2012 for an overview). The arguments are pronominally linked to loci in signing space and agreement verbs show a path movement (and/or change in orientation) from the subject to the (indirect) object of the clause. In (1), this movement is indicated on the verb HELP by use of the subscripts 1 and 2. During RS, however, *I* is no more 'I' (see Herrmann & Steinbach 2007) in the sense that it refers to the speaker/signer of the actual utterance but has to refer to the speaker/signer of an reported utterance—the same applies in principle to second and third person indexicals.

Regarding notational conventions, note the indices at the beginning and at the end of the horizontal line standing for the scope of the non-manual RS markers. The index at the beginning of this line (i.e. 3a) indicates the signer of the reported utterance, the index at the end (i.e. 3b) indicates its addressee. Hence, the indices represent the key features of the above-named RS properties leading to an adoption of the role and perspective of the quoted signer. That is, the non-manuals trigger a context shift in the sense that we interpret the utterance in question being signed in a context *c* different from the current context *C*; namely as Lena being the signer ('3a') and Anna being the addressee ('3b') of *c*. Herrmann & Steinbach (2012: 221) therefore analyze RS as a non-manual agreement operator: "[R]ole shift does not agree with syntactic arguments but with higher-level discourse-semantic entities, namely the signer and the addressee of the reported utterance." For reasons of readability and clarity, I will normally refer to the matrix context of utterance by using the capital *C*, and I will use the lowercase *c* to talk about the reported/shifted context.

In the next section, I will present some additional background information concerning the interpretation of indexicals in the scope of RS and based on that, I will specify the actual question of this paper. I will then focus on the work of Quer regarding RS in Catalan Sign Language (LSC) and will discuss his findings and conclusions. Then, I will present newly

elicited RS examples from DGS including the following deictic adverbs: HERE, TODAY, NOW, YESTERDAY and TOMORROW. As the indexicals behave very inhomogenously at first glance, I will sketch an analysis that takes into account (i) if the sign in question is directly affected by the use of the non-manual markers, and (ii) if the phonological properties of the sign allow to establish a connection to the current context of the reporting speech act. Both features are relevant to the question of whether the interpretation of indexicals is constrained by modality-specific restrictions. Finally, I will discuss two approaches to analyze free indirect discourse and sketch how these approaches could be applied to the study of role shift.

## 2 Indexicals in role shift

### 2.1 Background

A particularly interesting question concerning the interpretation of RS is raised when looking at the behavior of different kinds of indexical expressions. In RS, personal indexicals such as  $IX_1$  (index towards the signer) and  $IX_2$  (index towards the addressee) must be interpreted relative to the context of the reported utterance  $c$  (cf. (1)). There are only some constellations preventing the use of RS depending on the role the current signer has taken in the reported utterance. For example, it is not possible to express sentence (2a) (reported in indirect speech) in DGS by making use of RS (examples adapted from Herrmann & Steinbach 2007: 166):

- (2) a. Lena told Anna that she would help me the next day.
- $\overset{3a<}{\text{---}} \overset{>3b}{\text{---}}$
- b. \*PAST LENA  $IX_{3a}$  ANNA  $IX_{3b}$   $3a$ TELL- $3b$  : TOMORROW  $1$ HELP- $3b$   
‘Lena told Anna that she would help me tomorrow.’
- c. Lena told me that she would help me the next day.
- $\overset{3a<}{\text{---}} \overset{>3b}{\text{---}}$
- d. PAST LENA  $IX_{3a}$   $3a$ TELL- $1$  : TOMORROW  $1$ HELP- $2$   
‘Lena told me: I will help you tomorrow.’

The problem is that in (2b), it is not possible for the actual signer of the current context to locate him/herself in the signing space of the reported, thus shifted, context because he/she was not an interlocutor of the reported discourse, the reported utterance only made a statement about him/her. Interestingly, this can be easily done if the “matrix signer” was an interlocutor of the reported speech event as in (2cd) (for an overview to the problem focussing on DGS data, see Herrmann & Steinbach 2007). But note, that in all grammatical cases of RS, personal indexicals have to be interpreted relative to the shifted context.

The type of indexicals I want to focus on in this paper are temporal and local indexicals. Consider example (1) again. There we have the sign TOMORROW in the reported utterance and clearly in the scope of the RS non-manuals. Now imagine that the reported speech event took place on Friday (i.e.  $c$ ) whereas the reporting speech event takes place on Saturday (i.e.  $C$ ). The crucial question is if we infer from (1) that (i) Lena wants to help Anna on Saturday or that (ii) she wants to help her on Sunday. In other words, does the temporal indexical shift or not? At first, one could argue that only (i) should be possible since TOMORROW is accompanied by the RS non-manuals. However, in contrast to the personal indexicals, especially  $IX_1$  and  $IX_2$ , a temporal indexical like TOMORROW which is produced with the extended thumb relative to a metaphorical horizontal timeline (see Fig.

2) is not directly affected by the non-manual markers of RS as will be discussed in more detail in the next section. Thus, one could also argue that it is not necessarily the case that TOMORROW behaves like  $IX_1$  and  $IX_2$ , which point to the signer and addressee respectively.



**Figure 2:** TOMORROW in DGS, taken from Kestner (2009).

A major problem is that only very few studies exist that take into account the behavior of temporal and local indexicals in RS (cf. Lillo-Martin 2012). One exception is the profound work of Quer (2005, 2011) based on data from LSC. His research will be the starting point for my analysis of RS in DGS that will be the subject of section 2.3.

## 2.2 Mixed shifting in LSC

Let us start with two examples in LSC from Quer (2005); notational conventions have been adapted to the conventions used in this paper. Imagine that both examples are uttered by a signer in Barcelona.

- (3) a.  $\overline{\text{IX}_L \text{ MADRID MOMENT JOAN}}_t \text{ } \overline{\text{THINK IX}_1 \text{ STUDY FINISH HERE}}_{3a< \text{ } 3b>$   
 ‘When he was in Madrid, Joan thought he would finish his study in Barcelona.’
- b.  $\overline{\text{IX}_L \text{ MADRID MOMENT JOAN}}_t \text{ } \overline{\text{THINK IX}_1 \text{ STUDIES FINISH HERE MADRID}}_{3a< \text{ } 3b>$   
 ‘When he was in Madrid, Joan thought he would finish his study there in Madrid.’

The difference between (3a) and (3b) is rather subtle at first sight: (3b) contains one additional sign specifying the local adverb *HERE*—but this has a significant influence on the interpretation of the two utterances. Despite the fact that the indexical *HERE* is in the scope of the non-manual RS markers in both examples, only in (3b) both indexicals yield a shifted interpretation where  $IX_1$  refers to Joan, the signer of the reported utterance, and where *HERE* refers to Madrid and thus to the location of the reported utterance. In (3a), we are confronted with a kind of mixed shifting since  $IX_1$  clearly shifts and again refers to Joan whereas *HERE* has to refer to the external context Barcelona. In sum, despite being in the scope of RS, *HERE* cannot shift its interpretation unless it is specified by a lexical sign denoting the location of the reported speech event.

Examples like these are in conflict with Anand & Nevins’ (2004) ‘Shift-together constraint’ which states that indexicals in a shifted context must shift together. But in (3a) we are confronted with a shifted first person indexical and with a non-shifted local indexical. Hence, Quer (2005, 2011) concludes that the crosslinguistic validity of the ‘Shift-together constraint’ has to be relativized with regard to sign languages.

However, the data base concerning the behavior of different kinds of indexicals is rather sparse in sign language linguistics. For ASL, findings of Schlenker (2011) suggest that a mixed shifting of indexicals is not possible in ASL. For DGS, Herrmann & Steinbach (2007) state that there was a strong over-all tendency to interpret temporal and local indexicals in the scope of RS with respect to the reported context *c*.

In order to prove if Quer's claims are LSC-specific—as Schlenker's and Herrmann's & Steinbach's discussions would suggest—or if they can be applied to other sign languages, I elicited and analyzed DGS data that deal exactly with the interpretation of local and temporal indexicals. The relevant data will be discussed in the next section.

### 2.3 Mixed shifting in DGS?

I elicited RS examples containing the following local and temporal indexicals: HERE, TODAY, NOW, YESTERDAY, and TOMORROW. All example sentences had the same structure. The first sentence introduced two discourse referents, A and B, the second sentence was an utterance of A addressing B. This second sentence contained the crucial indexical. To establish a link to Quer's work, I started with a similar example to the LSC example (3a):

(4) [uttered in Göttingen]

3a< \_\_\_\_\_ >3b  
PAST M-A-R-I-E HANNOVER IX<sub>L</sub> SAY : HERE IX<sub>1</sub> LIKE LIVE  
'When Marie was in Hannover she said that she would like to live in Göttingen.'

Actually, the interpretation of the DGS example in (4) exhibits the same pattern as the one discussed by Quer: The 1<sup>st</sup> person pronoun gets shifted and refers to the signer of *c*, Marie, but the deictic adverb HERE has to refer to *C* and thus means Göttingen. Furthermore, again as in LSC, one can force HERE to shift to *c* if one overtly specifies its reference as in example (4'):

(4') [uttered in Göttingen]

3a< \_\_\_\_\_ >3b  
PAST M-A-R-I-E HANNOVER IX<sub>L</sub> SAY : HANNOVER AREA HERE IX<sub>1</sub> LIKE LIVE  
'When Marie was in Hannover she said that she would like to live there in Hannover.'

Interestingly, the same holds for the temporal indexical TODAY in DGS. It does not permit shifted reference (5a) unless it specified with respect to *c* (5b).

(5) [uttered on Thursday]

3a< \_\_\_\_\_ >3b  
a. PAST WEDNESDAY M-A-R-I-E IX<sub>3a</sub> T-I-M IX<sub>3b</sub> BOTH EAT IX<sub>L</sub> 1INFORM<sub>2</sub> : IX<sub>1</sub>  
LIKE TODAY DANCE  
'On Wednesday, Marie and Tim ate together and she said that she would like to go dancing on Thursday.'

- b. PAST WEDNESDAY M-A-R-I-E IX<sub>3a</sub> T-I-M IX<sub>3b</sub> BOTH EAT IX<sub>L</sub> <sup>3a<</sup>INFORM<sub>2</sub> : IX<sub>1</sub>  
<sub>>3b</sub>  
 LIKE TODAY WEDNESDAY DANCE  
 ‘On Wednesday, Marie and Tim ate together and she said that she would like to go dancing on Wednesday.’

In addition, Quer (2011) states that not all temporal and local indexicals in LSC behave like this in the scope of RS. The temporal indexical NOW does not seem to permit shifted reference to *c* for some of his informants, whereas YEAR THIS is ambiguous and seems to be able to refer to either *c* or *C* (see Quer 2011: 293).

These newly elicited data suggest that in DGS, TOMORROW and YESTERDAY are ambiguous between a shifted and a non-shifted interpretation: Both temporal indexicals can refer to either the matrix context *C* or the reported context *c*. Without any further specification, there seems to be no clear preference how to interpret these two deictic adverbs (6a-c).

(6) [uttered on Saturday]

- a. PAST THURSDAY M-A-R-I-E IX<sub>3a</sub> K-I-M IX<sub>3b</sub> MEET IX<sub>3a</sub> TELL : IX<sub>1</sub> LIKE  
<sub>>3b</sub>  
 TOMORROW MOVIES GO  
 ‘On Thursday, Marie and Kim met and she told him that she would like to go to the movies on Friday/on Sunday.’
- b. PAST THURSDAY M-A-R-I-E IX<sub>3a</sub> K-I-M IX<sub>3b</sub> MEET IX<sub>3a</sub> TELL : IX<sub>1</sub> LIKE  
<sub>>3b</sub>  
 TOMORROW FRIDAY MOVIES GO  
 ‘On Thursday, Marie and Kim met and she told him that she would like to go to the movies on Friday.’
- c. PAST THURSDAY M-A-R-I-E IX<sub>3a</sub> K-I-M IX<sub>3b</sub> MEET IX<sub>3a</sub> TELL : IX<sub>1</sub> LIKE  
<sub>>3b</sub>  
 TOMORROW SUNDAY MOVIES GO  
 ‘On Thursday, Marie and Kim met and she told him that she would like to go to the movies on Sunday.’

The fifth indexical I have elicited is the temporal indexical NOW. Remarkably, with this adverb, the potential to shift lies somehow in between HERE/TODAY on the one hand and YESTERDAY/TOMORROW on the other hand. There is a preference to interpret NOW with respect to *C* but this preference is not as strong as for HERE and TODAY. Summarizing, the investigated DGS indexicals show a complex pattern. Opposed to personal indexicals that always have to shift, temporal and local indexicals need not to shift. In addition, they show different preferences for either *C* or *c*. These findings relativize the assumptions of Herrmann & Steinbach (2007) and suggest that further research to improve the empirical basis is necessary. At the same time, they support Quer’s results and conclusions concerning LSC and indicate that sign language indexicals have modality-specific semantic properties that influence their interpretation when used in a reported utterance marked by RS non-manuals.

### 3 The deictic potential of sign language indexicals

In this section, I will sketch an analysis that attributes the presented pattern in DGS to phonological properties of the signs in question. It will turn out that in fact two properties are relevant at this point: the deictic potential of the sign and the potential impact that the RS non-manuals might have on this deictic potential. As we have seen in section 2, personal indexicals generally shift their reference to *c* in the scope of the non-manuals that indicate RS. This is not surprising if we remind ourselves of the articulation and function of these non-manual markers. They reflect iconically the matrix signer's adoption of the role of the reported signer and his/her alignment towards the reported addressee.  $IX_1$  and  $IX_2$  are performed with a movement of the index-finger towards the signer or addressee; hence it directly follows that this type of indexicals has to shift to *c* when being accompanied by the RS markers which are directly related to the loci of the signer and addressee of the reported utterance. In contrast, *HERE* and *TODAY* are not explicitly affected by the non-manuals: They always refer iconically to the locus and (thereby metaphorically) to the time of *C* because of the following two features (see Fig. 3):

- a downward movement
- the index finger pointing towards the current locus of the matrix signer

*TODAY* and *HERE* exhibit these crucial properties that establish the deictic relationship to *C* (cf. Fig. 3).



**Figure 3:** *TODAY* (left picture) and *HERE* (right picture) in DGS, taken from Kestner (2009).

In contrast, *TOMORROW* and *YESTERDAY* show no preference at all because both signs are produced with the extended thumb relative to a metaphorical horizontal time line (see Fig. 4 for *TOMORROW*).



**Figure 4:** *TOMORROW* in DGS, taken from Kestner (2009).

They both lack the two iconic properties listed above. Consequently, a shifted interpretation is not blocked. However, unlike personal indexicals, they do not have to shift either since their articulation is not immediately affected by the non-manuals. Recall that the main function of the RS non-manuals is to establish a kind of agreement between

signer and addressee of the reported utterance. Hence, RS examples containing TOMORROW and YESTERDAY without any further specification are ambiguous (see (6a-c) again). Assuming a scale with HERE/TODAY at the one endpoint and TOMORROW/YESTERDAY at the other one, we have seen that NOW is in between because it shows only a preference for an interpretation relative to C.

If we stick to the reasoning proposed in this section, we can attribute this to the fact that NOW has one of the two properties listed above but lacks the other. On the one hand, NOW is produced with a downward movement to the current locus, on the other hand, it is articulated with the Y-handshape and not with the INDEX-finger (cf. Fig. 5). Thus, it is clear why the tendency to interpret NOW with regard to C is less strong as for HERE/TODAY. The phonological properties of the sign itself prevent a stronger relation to the matrix context.



Figure 5: NOW in DGS, taken from Kestner (2009).

#### 4 Role shift and free indirect discourse

Next to an increase in empirical research on role shift, we also need an enhanced theoretical analysis of this phenomenon. Based on the results of this paper, the next step is to formalize these results to get a better idea of the semantics of sign language indexicals and role shift in general. The overall aim would then be to embed RS into a general (and possibly modality-independent) formal semantic framework. Promising candidates could be the approaches of Eckardt (2011) and Maier (2012). Interestingly, both approaches deal with the phenomenon of free indirect discourse (FID) which is a mode of reported speech typical of fictional narratives with the main function to report what a protagonist is thinking (see Maier 2012: 2).

(7) Ashley was lying in bed freaking out. *Tomorrow was her six year anniversary with Spencer and it had been the best six years of her life.*

(example taken from Maier 2012: 2; italics added)

In contrast to the first sentence, which is to be read as the narrator's description, the sentence in italics is rather told from the perspective of the protagonist, Ashley, and displays her thoughts. The crucial point concerning FID is that it exhibits a very marked combination of grammatical features (see (7)): On the one hand, the use of past tense and 3<sup>rd</sup> person pronouns, that seem to be chosen from the perspective of the narrator; on the other hand, the use of temporal and local indexicals and other speaker-oriented expressions that indicate the perspective of the protagonist.

Of course, apart from the fact that both, RS and FID, are modes of reported speech, the two do not seem to have much in common at first sight (but see Lillo-Martin 2012 for a brief discussion of both). And in fact, there are lots of differences that can be explained by taking into account that they belong to two different language modalities (sign

language versus spoken language) and that RS is an integral component of everyday communication in sign languages whereas FID is generally restricted to a certain text type of written language, namely, as mentioned before, to that of fictional narratives.

However, the formal analysis of the structure and meaning of RS as well as of FID requires to consider the same parameters and to answer similar questions. In the study of FID one has to explain why certain expressions and grammatical features are chosen with respect to the context of the narrator (comparable to C of our RS analysis) and why others are chosen against the background of the context of the protagonist (comparable to c). Hence, RS and FID are both somehow in between direct and indirect discourse and show mixed shifting in a certain way. Despite the obvious differences between RS and FID, it is a promising undertaking to apply similar formal mechanisms in the study of both. Besides, Lillo-Martin (2012: 380) supports this hypothesis and states with respect to Quer's crucial examples (see section 2.2): "Examples like this should be considered further, and possibly fruitfully compared with 'free indirect discourse', or 'mixed quotation', mixing aspects of direct and indirect quotation [...]."

Eckardt (2011) presents an analysis based on work of Schlenker (2004) and Sharvit (2008) that explains FID in terms of context shifting by capturing the interpretation of FID by evaluating it relative to two contexts  $\langle C, c \rangle$ . This basic idea, which seems to hold for FID *and* RS, suggests that—taken carefully modality-specific adjustments for granted—it is possible and plausible to apply Eckardt's analysis of FID to RS.

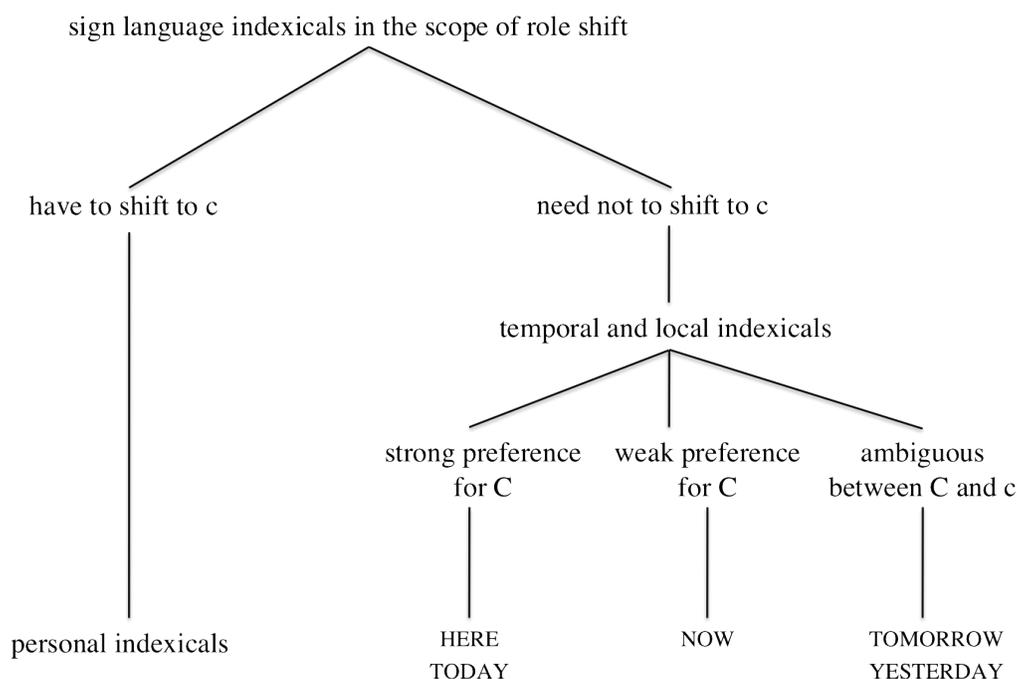
By contrast, Maier (2012) takes FID as instance of mixed quotation and argues that FID "[...] is essentially quotation with systematically punctured 'holes' [...]" (Maier 2012:2) to adjust tense and personal pronouns to the context of the narrator. It has yet to be proven if a mixed quotation analysis along the lines of Maier (2012) would work out well for RS. We have seen in this paper that in sign languages, the interpretation of deictic expressions is more complex than in spoken languages. There does not seem to be a clear-cut distinction between personal indexicals on the one hand and temporal and local indexicals on the other but rather a gradual transition between different kinds of indexicals.

Note finally that many speaker-oriented expressions, e.g. *unfortunately*, *alas* etc. whose potential to be interpreted relative to the shifted context c has been taken into account with regard to FID but not with regard to RS. In sign languages, such speaker-oriented meanings are often conveyed by the use of non-manuals, namely facial expression—recall that facial expressions are a fourth RS marker (section 1). However, so far, it has not been explicitly and systematically investigated in the literature if facial expressions always *shift*, i.e. if they express the reported signer's or the matrix signer's attitude, emotions, etc. Hence, a comprehensive study of the general context-shifting potential of RS needs to integrate this type of expressions into the analysis.

## 5 Summary and outlook

In the introduction of this paper I started with a RS example containing the indexical TOMORROW. I discussed that in general two hypotheses can be derived: First, one may argue that TOMORROW should be interpreted with respect to the reported context c since it is accompanied by the RS non-manuals. Second, one may argue that it should be interpreted relative to the matrix context C since it does not have to be the case necessarily that local and temporal indexicals behave like personal indexicals. Moreover, local and temporal indexicals do not even have to constitute a homogenous group of expressions.

The newly elicited data from DGS (section 2.3) support the second hypothesis and suggest a complex pattern of the interpretation of indexicals in the scope of RS. As opposed to personal indexicals that always have to shift, temporal and local indexicals need not to shift and show different preferences for either C or c. Furthermore, the results support Quer's findings for LSC (section 2.2) and indicate that Anand & Nevins' 'Shift-together constraint' has to be relativized as soon as sign languages are taken into account. One central aim of this paper was to present a plausible semantic explanation for the complex pattern that I found in the elicited data (section 3). It became clear that one first has to separate personal from temporal and local indexicals. Then, one has to explain the semantic differences within this second group (see Fig. 6). To answer the first question, I took into account the nature of the non-manual RS markers, which can be analyzed as a non-manual agreement operator establishing agreement between signer and addressee of the reported utterance (see Herrmann & Steinbach 2012). To answer the second question, I argued that the differences in the deictic potential result from phonological features of the signs themselves.



**Figure 6:** The complex interpretation of DGS indexicals in the scope of RS.

Finally, I outlined how the study of RS could benefit from formal semantic approaches that have been developed for the analysis of free indirect discourse (chap. 4). Although both phenomena are very different modes of reported discourse at first glance, I argued that the same mechanisms can be applied because RS as well as FID can be explained in terms of context shifting (Eckardt 2012) and mixed quotation (Maier 2012).

The results of this paper and of recent research on the interpretation of indexicals in RS suggest that future research should address the 'bigger' question whether there are systematic modality-specific differences in the semantics of indexicals and other context-dependent expressions such as speaker-oriented adverbs in sign and spoken languages.

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